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

REFERENCE DOCUMENT 28 of 36

Reference

This document contains the following:

UWF Replacement Forestry

- **2018 UWF Replacement Forestry EIA Report - Volume C3: EIAR Figure**
- **2018 UWF Replacement Forestry EIA Report - Volume C4: EIAR Appendices (Part 1 of 3)**
    - Appendix 1.1 – Chapter 1 has no appendices
    - Appendix 2.1 – Review of Compliance with Legislation
    - Appendix 2.2 – Environmental Topic Authors Statements of Competency
    - Appendix 2.3 – Scoping of Other Projects or Activities
    - Appendix 2.4 – Completed EIA Report Checklist
    - Appendix 3.1 – Consultation with Statutory Bodies & Other Parties
    - Appendix 4.1 – Chapter 4 has no appendices
    - Appendix 5.1 – Best Practice Measures
    - Appendix 5.2 – Invasive Species Management Plan
    - Appendix 5.3 – Description of Development (UWF Grid Connection)
    - Appendix 5.4 – Description of Development (UWF Related Works)
    - Appendix 5.5 – Compiled Description of Upperchurch Windfarm
    - Appendix 5.6 – Description of UWF Other Activities
    - Appendix 5.7 – A Guide to Risk Assessment in Major Emergency Management Jan 2010
    - Appendix 6.1 – Central Statistics Office Data
    - Appendix 7.1 – Chapter 7 has no appendices

Upperchurch Windfarm
Replacement Forestry
(UWF Replacement Forestry)

UWF Replacement Forestry EIA Report (EIAR)

VOLUME C3: EIAR FIGURES

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Malachy Walsh and Partners
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Engineering
Ireland Ltd.
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May 2018

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ECOPOWER

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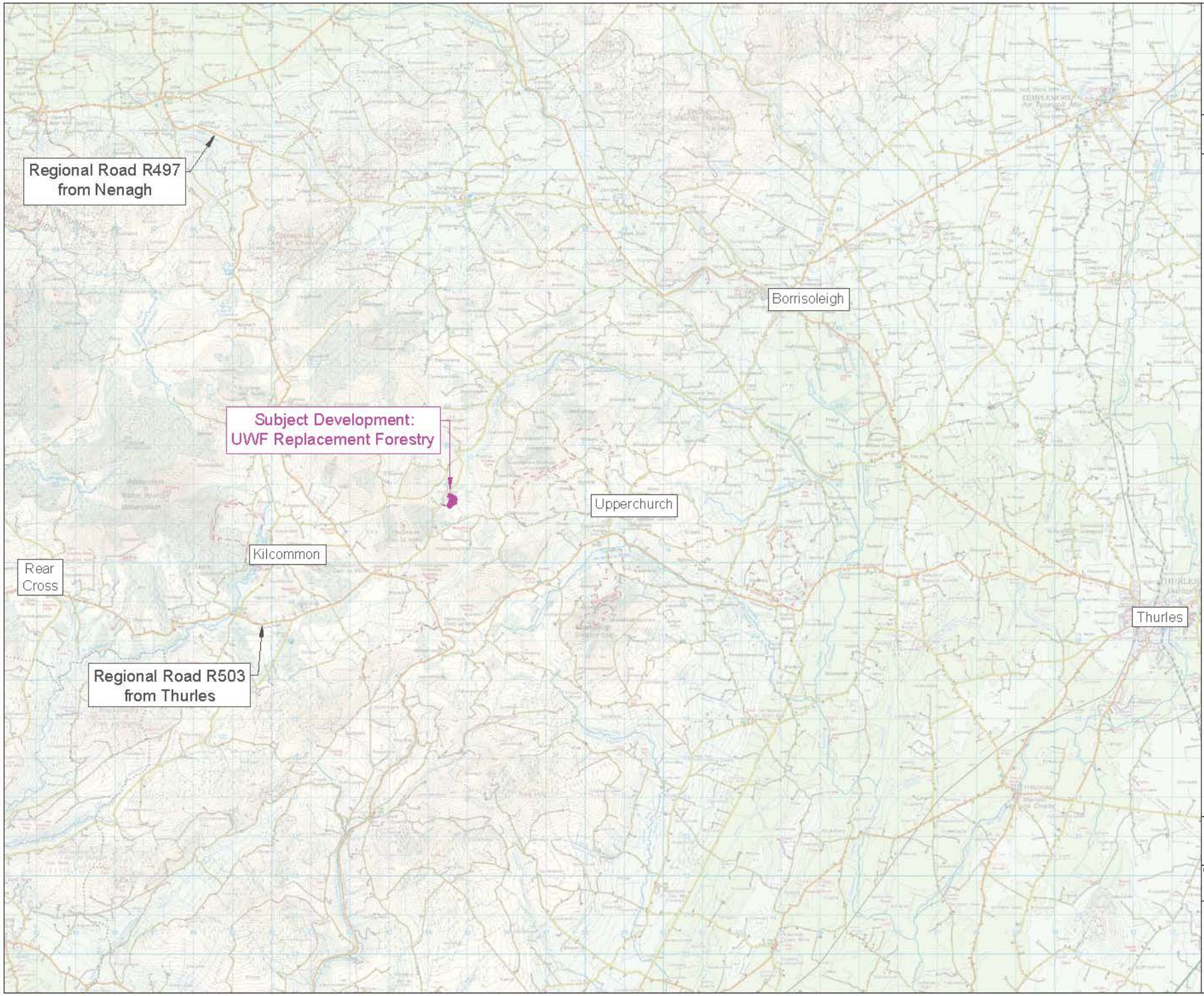

Title:
Figure RF 1.1

Location of the UWF Replacement Forestry on OSI Discovery Mapping (The Subject Development)

Map Number:
1 of 1

Legend:

Subject Development:

UWF Replacement Forestry

N

REFERENCE DOCUMENTS

Project:
UWF Replacement Forestry (RF)

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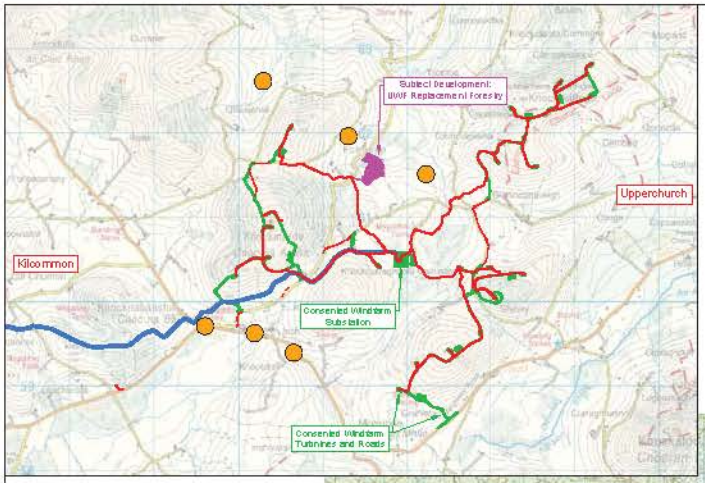

Nenagh
Dolla
Subject Development:
UWF Replacement Forestry
Newport
Upperchurch
Rear
Cross
Thurles
Limerick
Foynes Port
Cappamore
Dundrum
Tipperary Town

Title:
Figure CE 1.1

Location of UWF Replacement Forestry and the Other Elements of the Whole UWF Project on OSI Discovery Mapping

Map Number:
Map 1 of 1

Legend:

Subject Development:

- UWF Replacement Forestry

Other Elements of the Whole UWF Project:

- UWF Grid Connection
- Mountphilips Substation
- UWF Related Works
- Upperchurch Windfarm
- UWF Other Activites

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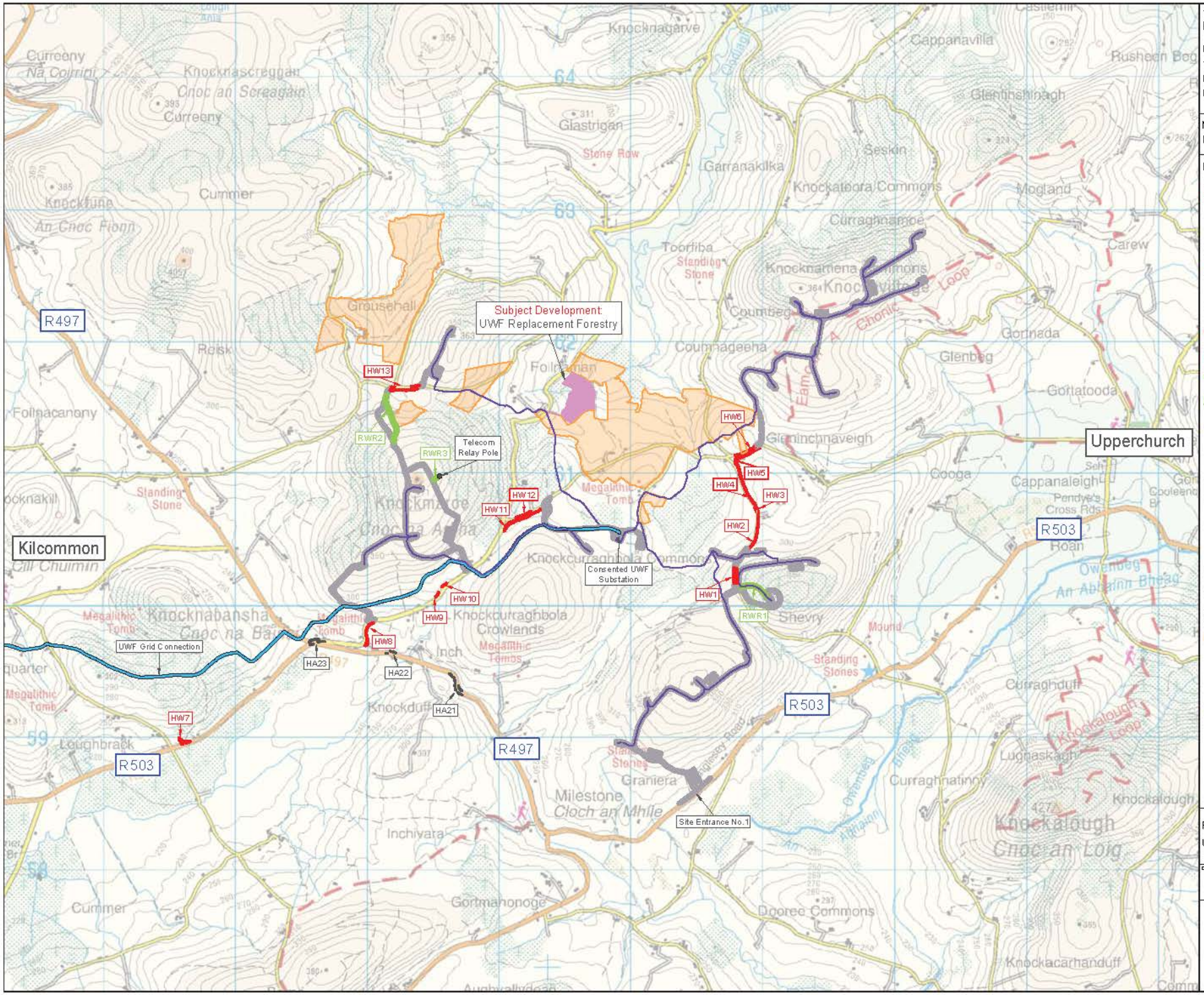

Title:
Figure CE 1.2

UWF Replacement Forestry and the Other Elements of the Whole UWF Project in the vicinity of Upperchurch Windfarm

Map Number:
Map 1 of 1

Legend:

UWF Replacement Forestry:
(Subject Development)
- UWF Replacement Forestry

UWF Grid Connection:
- UWF Grid Connection

UWF Related Works:
- Haul Route Works
- Haul Route Works Numbers (HW1 - HW13)
- Realigned Windfarm Road
- Realigned Windfarm Road Numbers (RWR1 - RWR3)
- Internal Windfarm Cabling
- Telecom Relay Pole

Upperchurch Windfarm:
- Upperchurch Windfarm
  -Consented UWF Turbines
  -Consented UWF Substation
  -Consented UWF Roads

UWF Other Activities:
- Haul Route Activities
- Haul Route Activities Number
- Upperchurch Hen Harrier Scheme

- Regional Road Number

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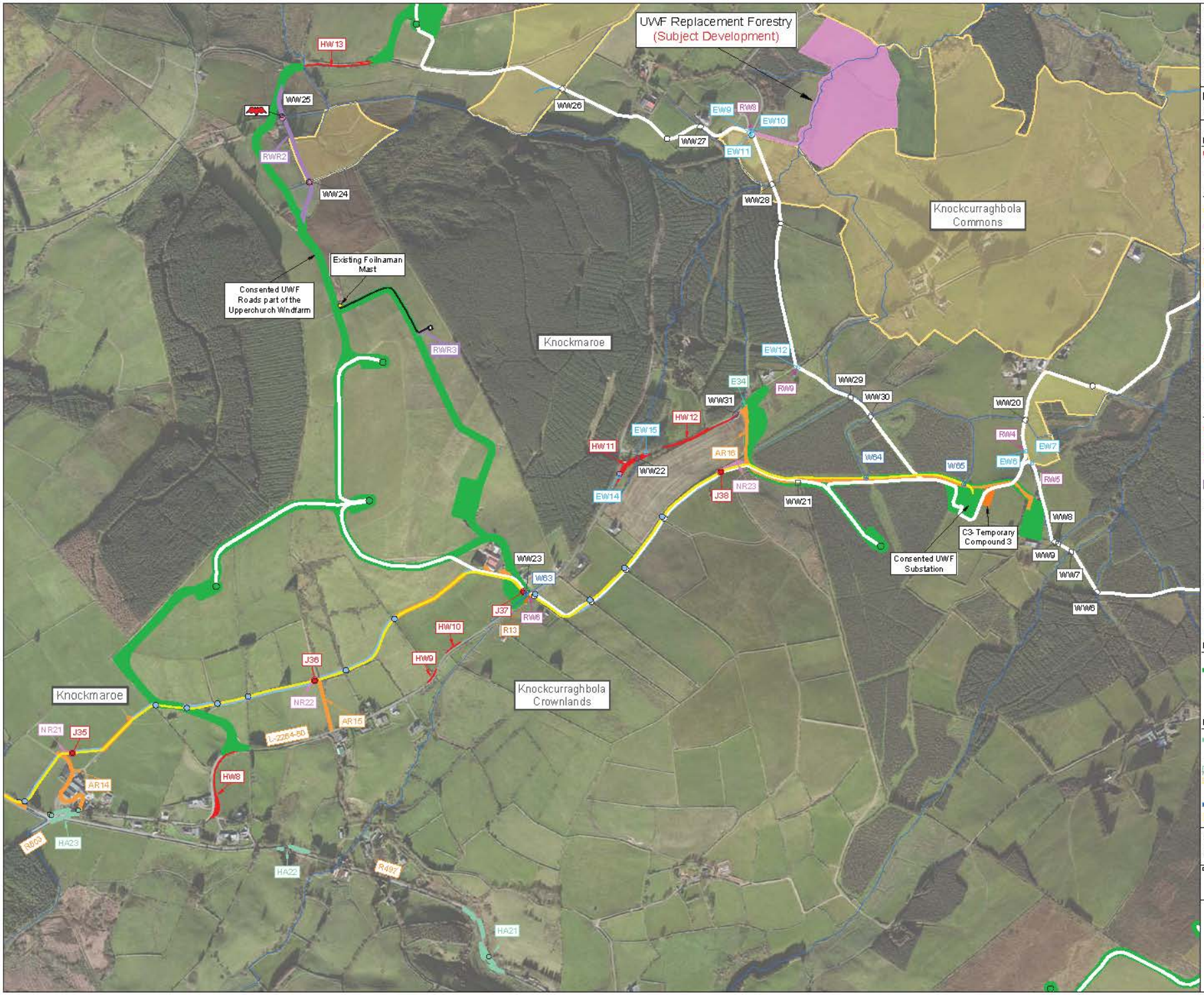

Title:
Figure CE 1.3

UWF Replacement Forestry and the Other Elements of the Whole UWF Project in Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola Crownlands

Map Number:
Map 1 of 1

Legend:

UWF Replacement Forestry:
(Subject Development)
- UWF Replacement Forestry

UWF Grid Connection:
- UWF Grid Connection
- New Permanent Access Roads
- New Permanent Road ID
- Existing Access Roads
- Existing Access Road ID
- Temporary Access Roads
- Temporary hedge/tree removal & pruning
- Joint Bay Locations
- Grid Connection Road Crossings
- Grid Connection Water Crossings
- Grid Connection Site Entrance

UWF Related Works:
- Haul Route Works
- Haul Route Works Numbers (HW8 - HW12)
- Realigned Windfarm Road
- Realigned Windfarm Road Numbers (RWR2 - RWR3)
- Internal Windfarm Cabling
- Telecom Relay Pole
- Temporary hedge/tree removal & pruning
- Permanent hedge/tree removal & pruning
- Related Works Water Crossings
- Bat Crossing Location
- Related Works Road Crossings
- Related Works Site Entrance

Upperchurch Windfarm:
- Upperchurch Windfarm
  -Consented UWF Turbines
  -Consented UWF Substation
  -Consented UWF Roads

UWF Other Activities:
- Haul Route Activity - Vegetation Trimming
- Haul Route Activity - Street Furniture Removal
- Haul Route Activities Number
- Upperchurch Hen Harrier Scheme
- Watercourse
- Regional Road Number

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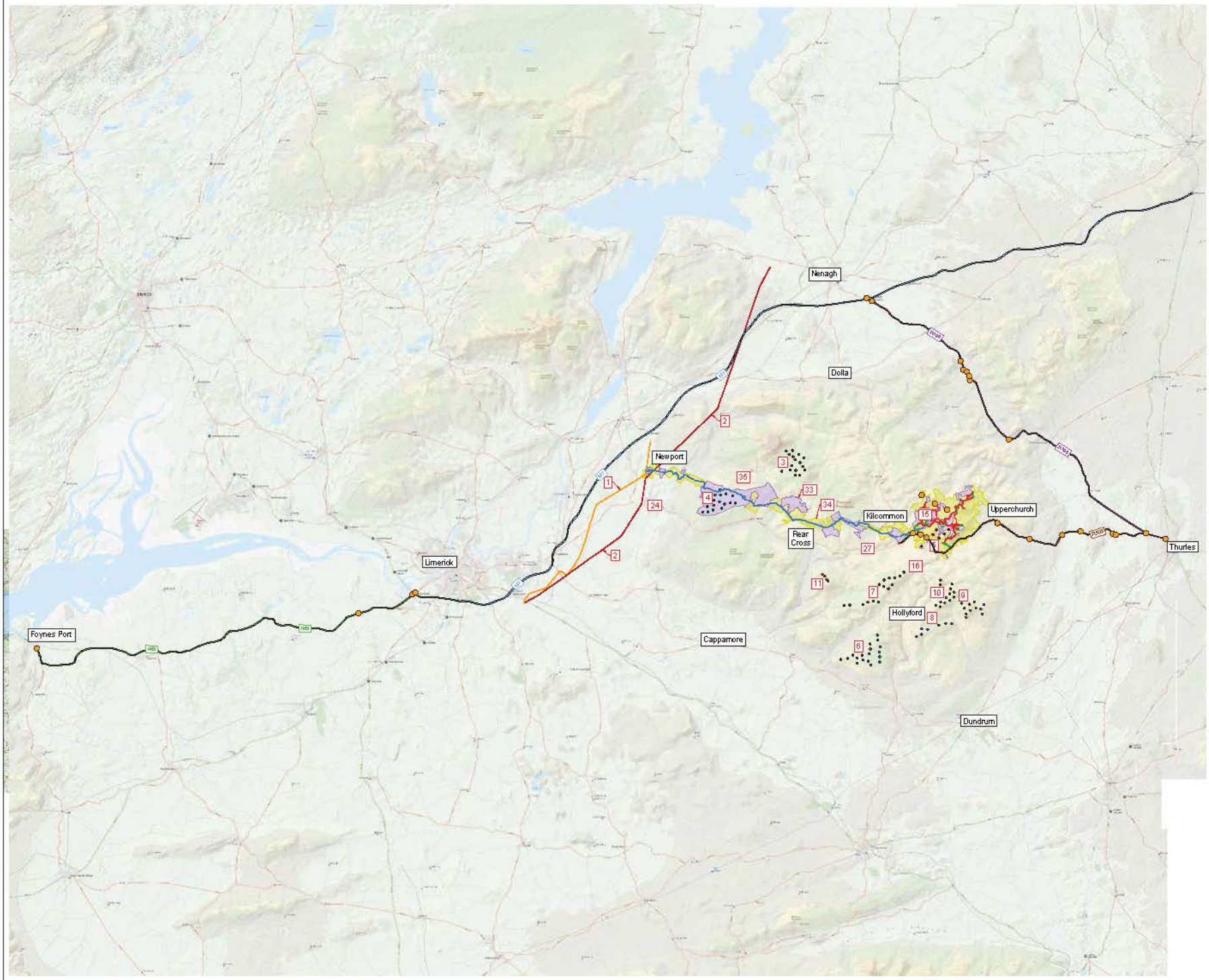

Title:

Figure CE 2.1

Other Projects or Activities Scoped in for Cumulative Evaluation in the Environmental Factor topic chapters

Map Number:
Map 1 of 1

Subject Development:

- UWF Replacement Forestry

Other Elements of the Whole UWF Project:

- UWF Related Works
- Upperchurch Windfarm
- UWF Grid Connection
- Mountphilips Substation
- UWF Other Activites

Other Projects or Activties Scoped in:

1. Killonan to Nenagh 110kV OHL
2. Shannonbridge to Killonan 220kV OHL
3. Bunkimalta Windfarm
4. Castlewaller Windfarm
5. Milestone Windfarm
6. Cappawhite Windfarm
7. Garracummer Windfarm
8. Glencarby Windfarm
9. Glenough Windfarm
10. Hollyford Windfarm
11. Knockastanna Windfarm
15. Foilnaman Mast
16. Cummermore Communications Pole
24. Newport Distributor Road
33. Forestry
34. Agriculture
35. Turf - Cutting

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Figures for Chapter 3: EIA Report Process	Tab 3 (printed version)
No mapping or figures for Chapter 3	

REFERENCE DOCUMENTS

Figures for Chapter 4: EIA Report Process	Tab 4 (printed version)
No mapping or figures for Chapter 4	

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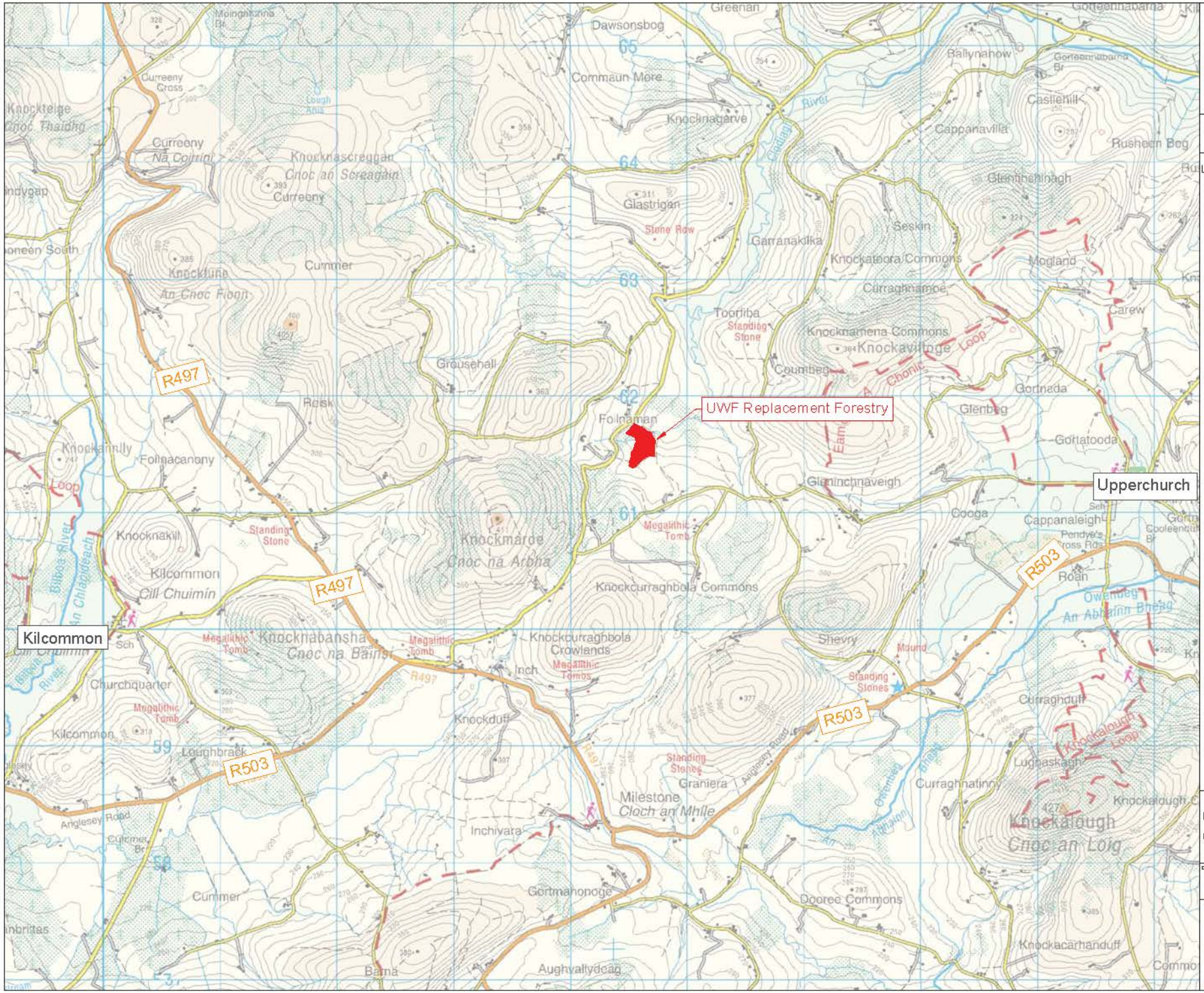
UWF Replacement Forestry
Upperchurch
Kilcommon
R497
R503
Dawsonsbog
Commaun More
Knocknagarve
Glastrigan
Stone Row
Garranakilka
Knockateora Commons
Knockaviltoge
Toorliba
Standing Stone
Grousehall
Foilnaman
Knockmarde
Cnoc na Arbha
Megalithic Tomb
Knockcurraghbola Commons
Knockcurraghbola Crowlands
Knocknabansha
Cnoc na Bainsi
Knockduff
Graniera
Milestone
Cloch an Mhile
Inchivara
Gortmahonoge
Aughvallydeag
Barna
Knockalough
Cnoc an Loig
Knockacarhanduff
Dooree Commons
Curraghnafinoy
Lughaskagh
Curraghduff
Shevry
Standing Stones
Mound
Roan
Cappanaleigh
Cooga
Gortatooda
Glenbeg
Gortnada
Glenninchnaveigh
Knocknamena Commons
Coumbeg
Curraghnamoe
Mogland
Carew
Seskin
Glennihinshagh
Cappanavilla
Castlehill
Rusheen Beg
Ballynahow
Greenan
Knocknascreggan
Cnoc an Screagain
Curreeny
Na Coirrini
Curreeny Cross
Knockline
An Cnoc Fionn
Cummer
Rosk
Foilnacanony
Knocknanilly
Knocknakill
Kilcommon
Cill Chuimin
Churchquarter
Loughbrack
Anglesey Road
Cutcmer Br
Bilbos River
An Chlaidheach
Owenbeg
An Abhainn Bheag
Greenfield
Abhainn
Knockalough Loop
Chorlic
Eam
Loop
Standing Stone
Megalithic Tomb
Megalithic Tomb
Megalithic Tomb
Megalithic Tomb
Standing Stones
Standing Stones
Mound
Sch
Pendye's Cross Rds
Cooleencuil Br
Gortn
Gortnabarna Br
Kn
Kil
Knockkeige
Cnoc Thaidhg
Lough Ana
Moinghionna
Indygap
oneen South
Cummer
Inbritas
Cummer
Br
Anglesey Road



Title:
Figure RF 5.2

Planting Layout on Aerial Photography Mapping

Map Number:
Map 1 of 1

Legend:
- Ride Lines
- Planting Area
- Riparian Zone
- Site Boundary
- Existing Access Road
- Existing Hedgerows
- Watercourse
- Public Road
- EW10 Site Entrance

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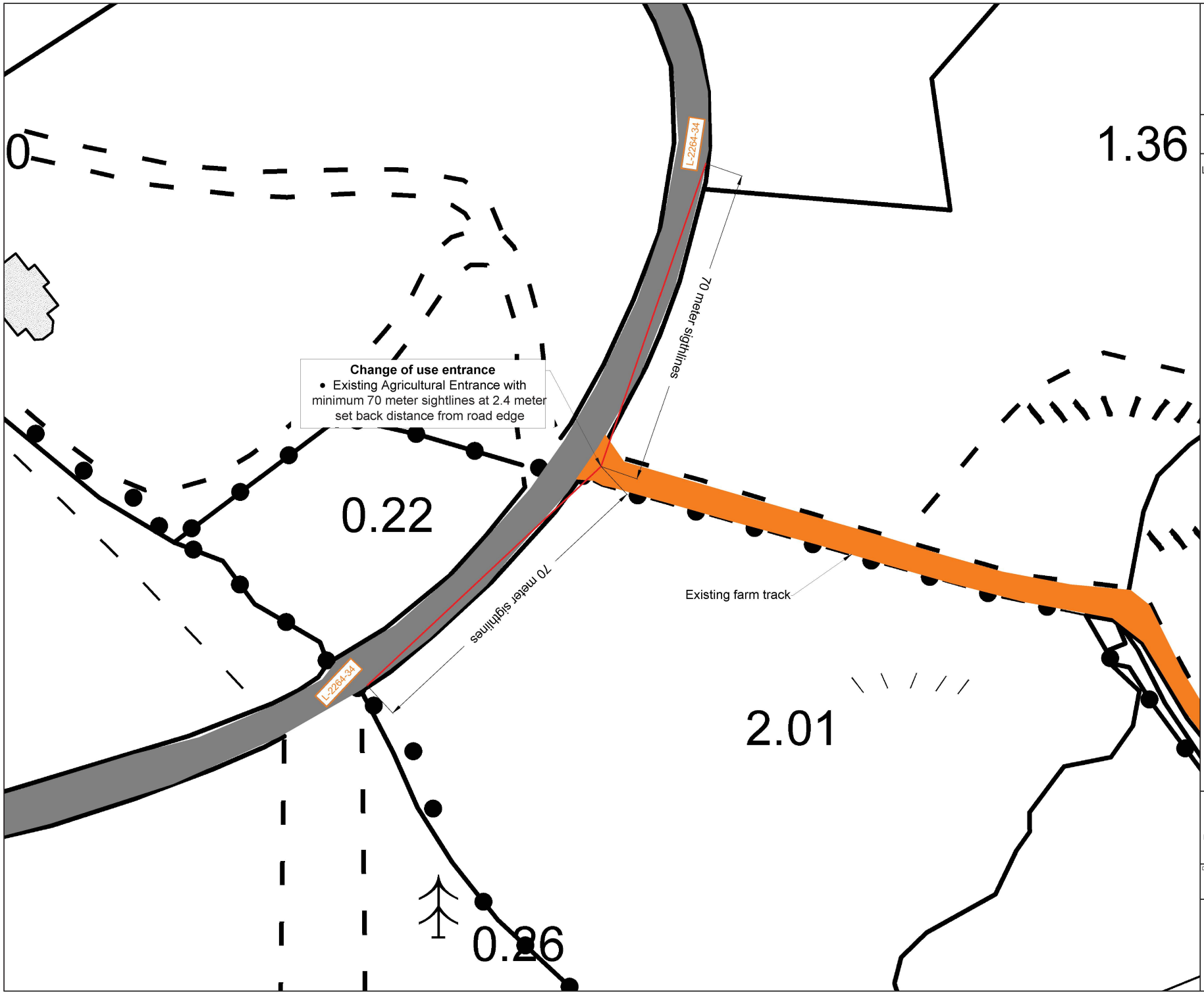

Title:
Figure RF 5.3

Entrance for Replacement Forestry Lands

Map Number:
Map 1 of 1

Legend:

- Public Road
- Existing farm track
- L-2264-34 Public Road Number
- Existing sightlines

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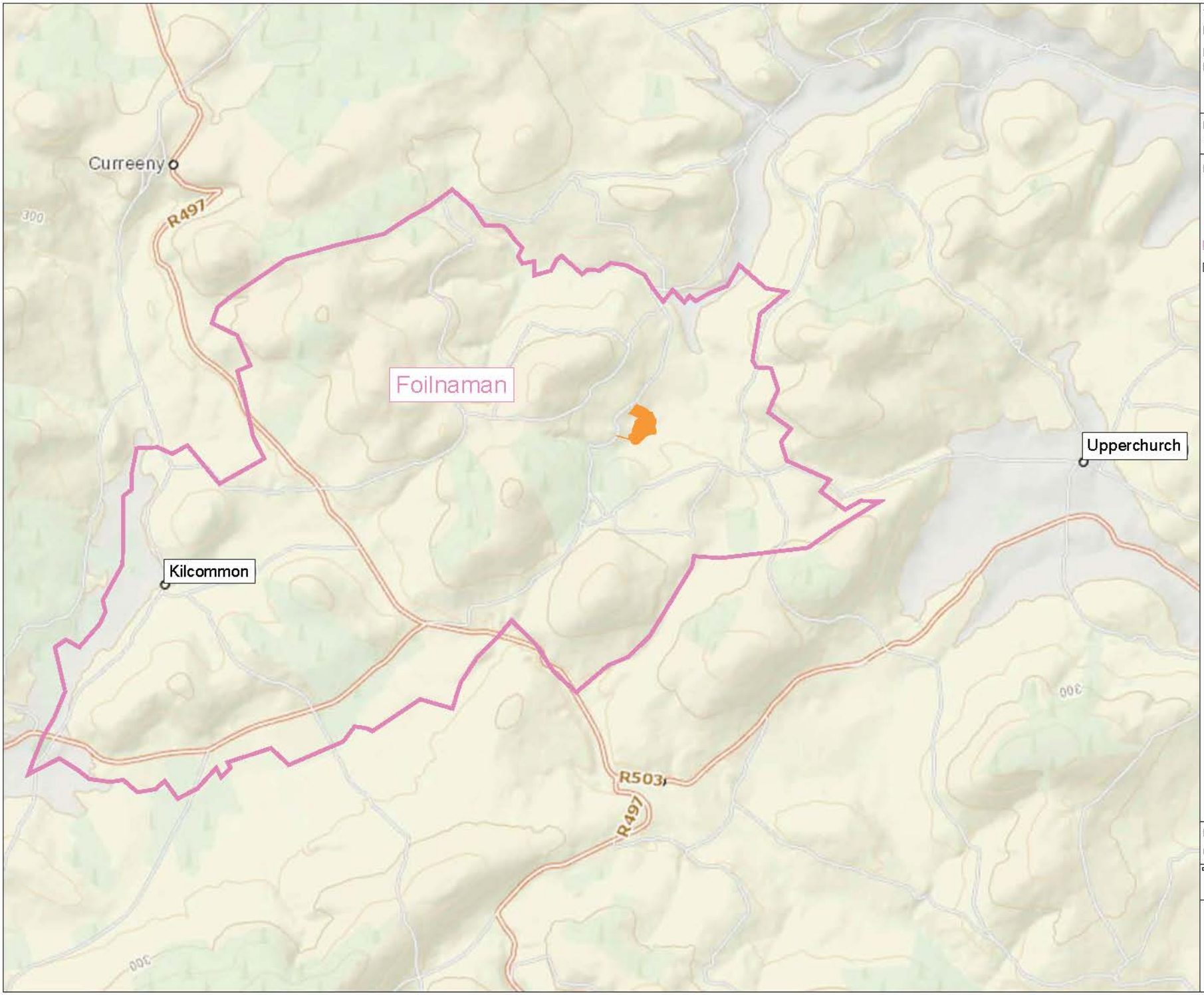

Title:

Figure RF 6.1

Location of the UWF Replacement Forestry

Map Number:
1 of 1

Legend:

- UWF Replacement Forestry Area
- Electoral Division
- Foilnaman Electoral Division Name
- Kilcommon Villages

REFERENCE DOCUMENTS

N

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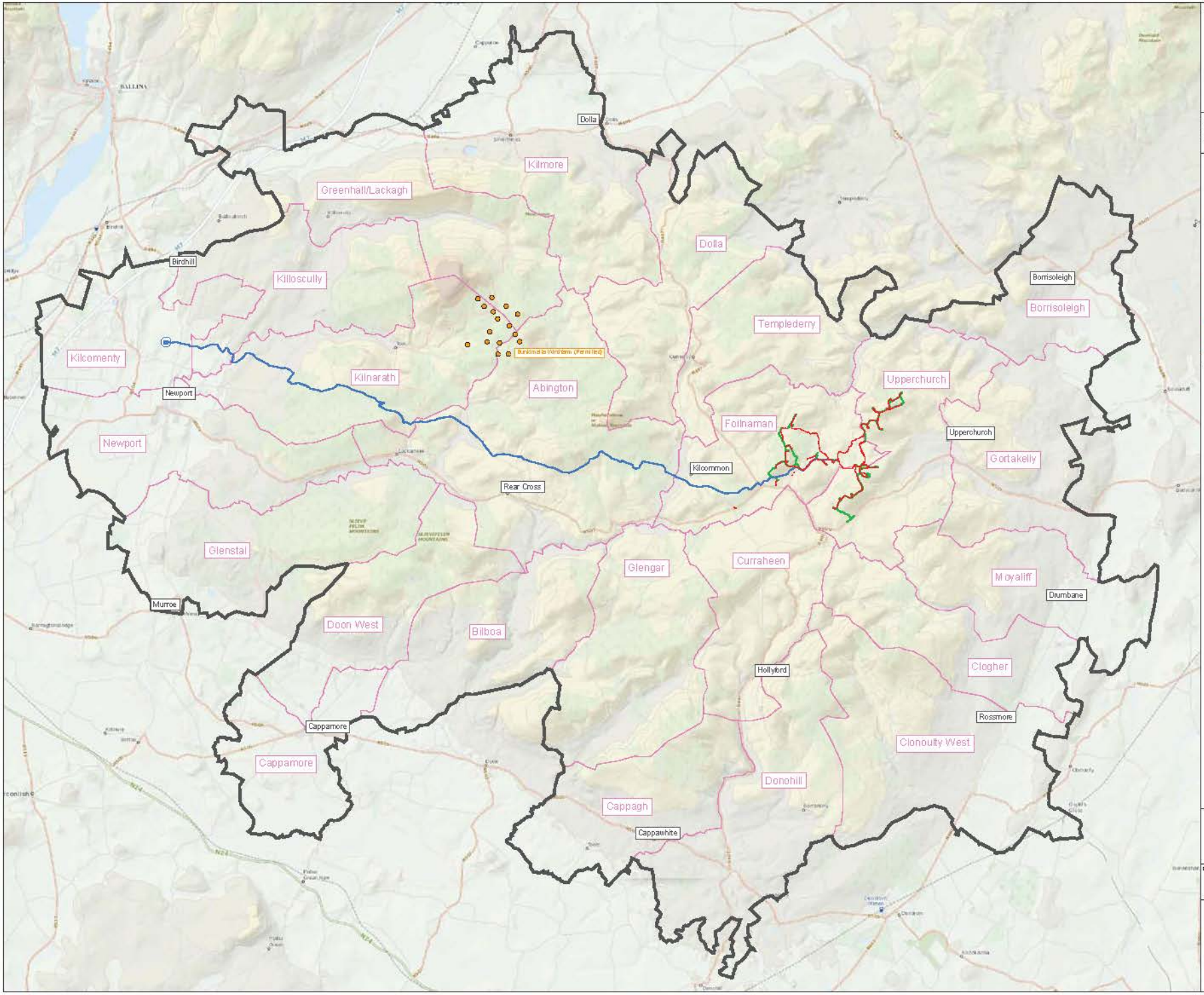

Title:

Figure CE 6.2

Local Economy within the Cumulative Evaluation Study Area

Map Number:
Map 1 of 1

Legend:

Study Area Extents :

- UWF Grid Connection
- Mountphilips Substation
- Study Area for the Local Economy
- Electoral Divisions
- Dolla — Electoral Division Names
- UWF Related Works
- Upperchurch Windfarm
- Newport — Villages

Survey Results :

- Bunkimalta Wind Turbines

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N

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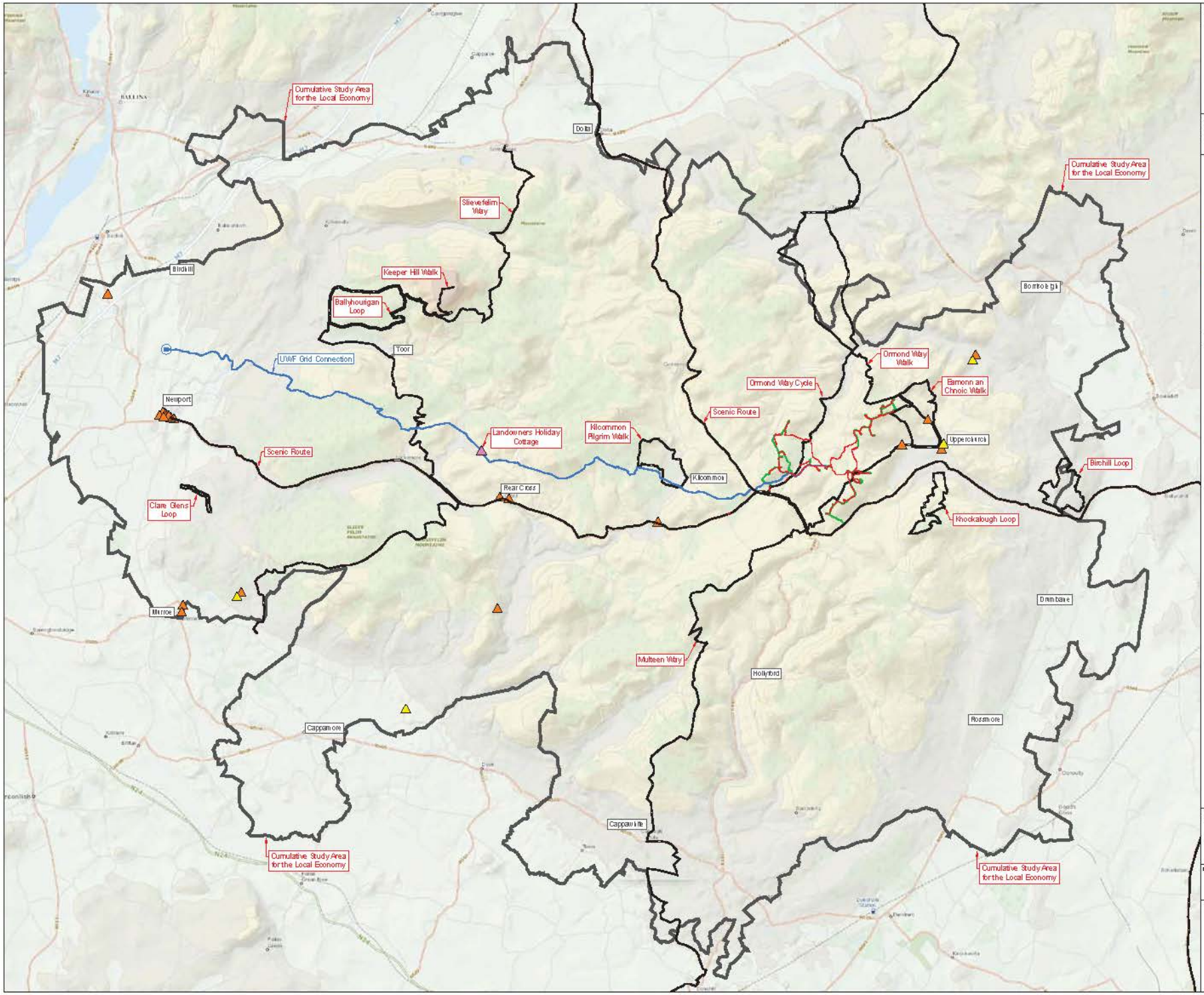

Title:

Figure CE 6.2.1

Tourism Products within the Cumulative Evaluation Study Area

Map Number:
Map 1 of 1

Legend:

Study Area Extents :

- UWF Grid Connection
- Mountphilips Substation
- UWF Related Works
- Upperchurch Windfarm
- Cumulative Study Area for the Local Economy
- Newport — Villages

Survey Results :

- Accomodation or Food Services
- Landowner Holiday Cottage
- Activites
- Walking/Cycling Trails and Driving Route

REFERENCE DOCUMENTS

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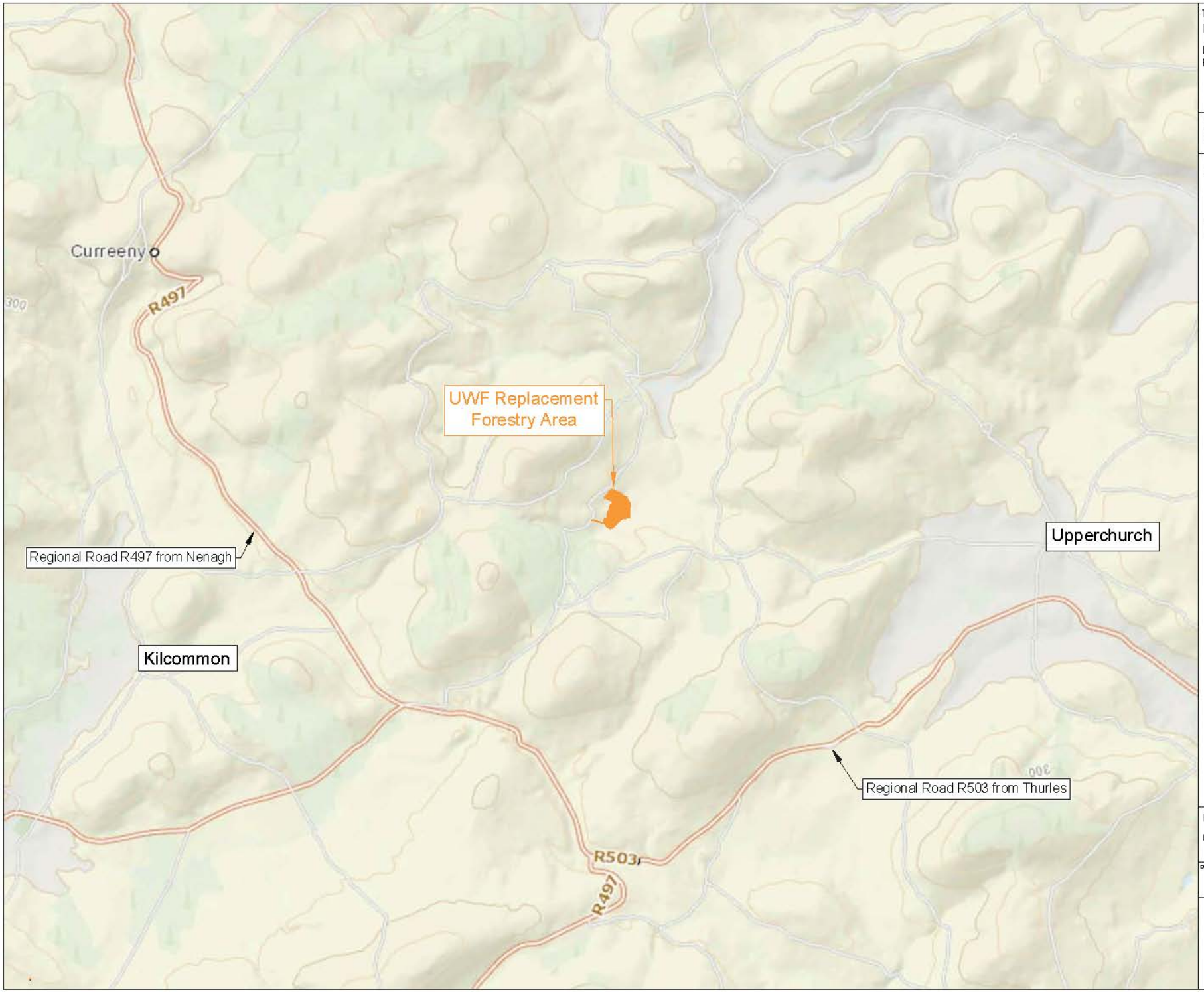

Title:
Figure RF 7.1

Location of the UWF Replacement Forestry Study Area

Map Number:
Map 1 of 1

Legend:

UWF Replacement Forestry

Kilcommon — Villages

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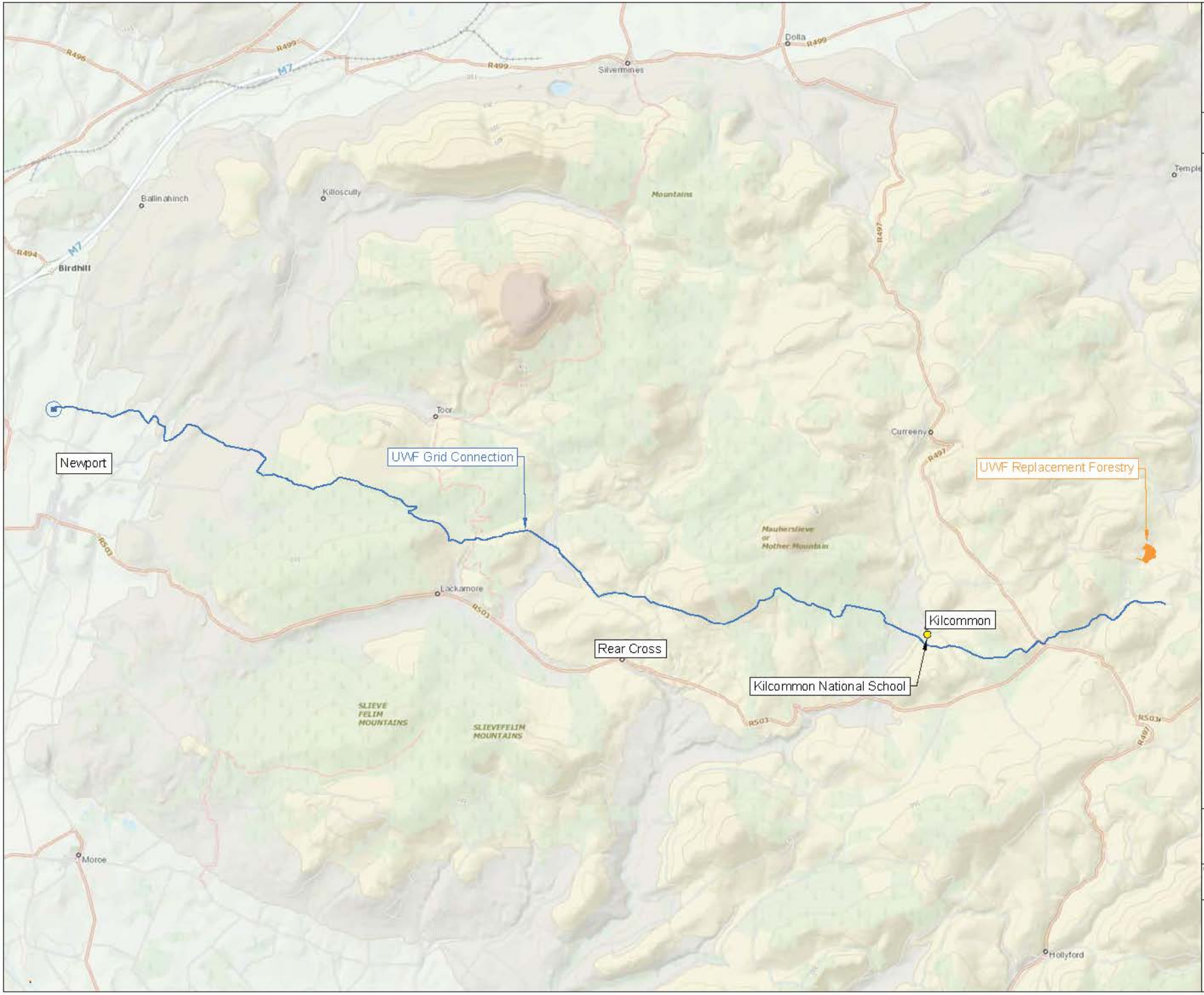

Title:

Figure CE 7.3

Kilcommon National School within the Cumulative Evaluation Study Area

Map Number:
Map 1 of 1

Legend:

- UWF Replacement Forestry
- UWF Grid Connection
- Kilcommon — Villages
- Location of Kilcommon National School

N

REFERENCE DOCUMENTS

Project:
UWF Replacement Forestry (RF)

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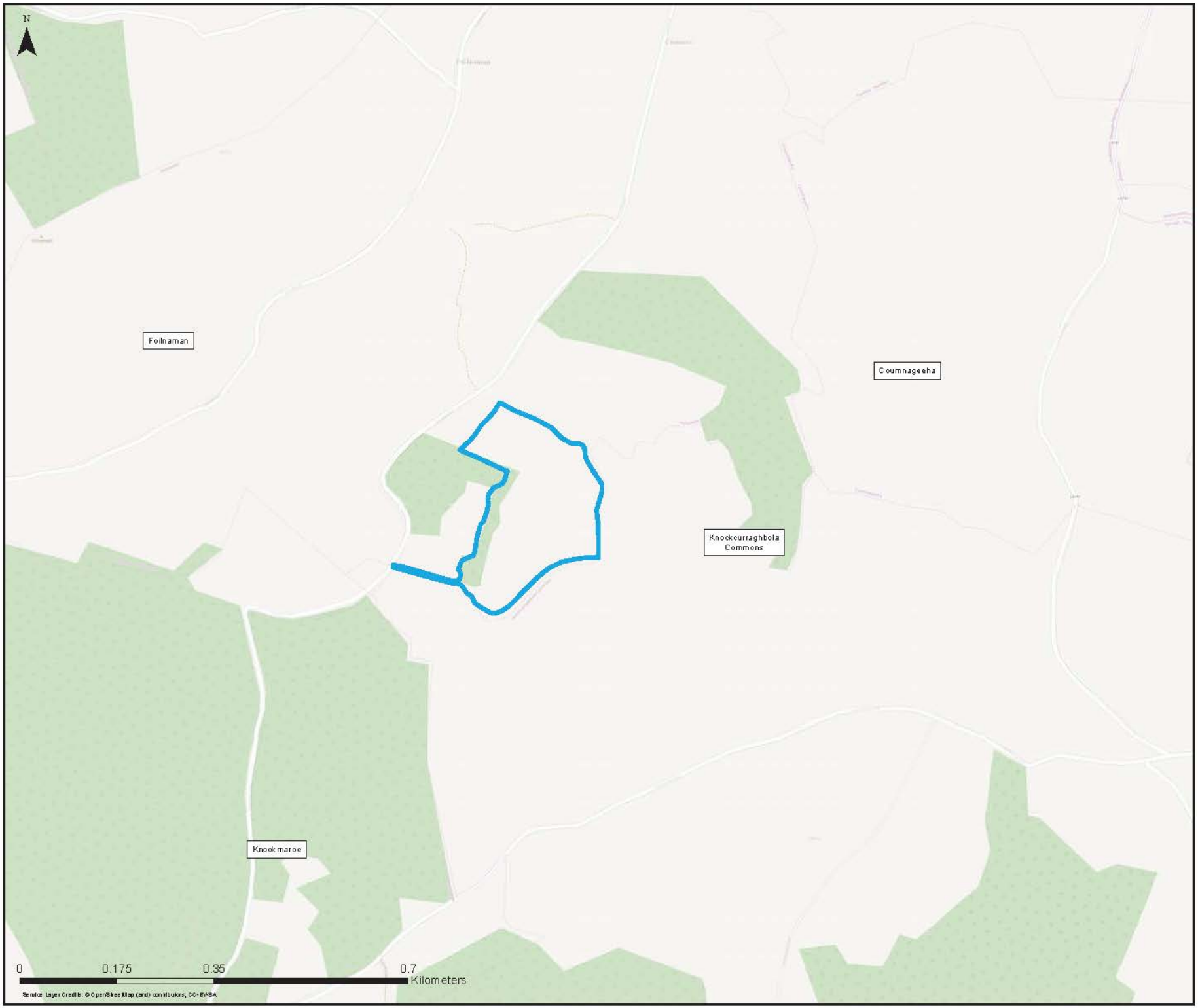

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure RF 8.1:
UWF Replacement Forestry Location Map

Legend:

UWF Replacement Forestry Area

REFERENCE DOCUMENTS

For illustrative purposes only. Map not to scale

Disclaimer: Although presented in mapping, please note that the construction works boundary for the Consented Windfarm is included for illustrative purposes only as it is already subject to planning consent. For study area boundaries please see Figure 8.1, and the accompanying EIAR Biodiversity Chapter/Biodiversity Appendix.

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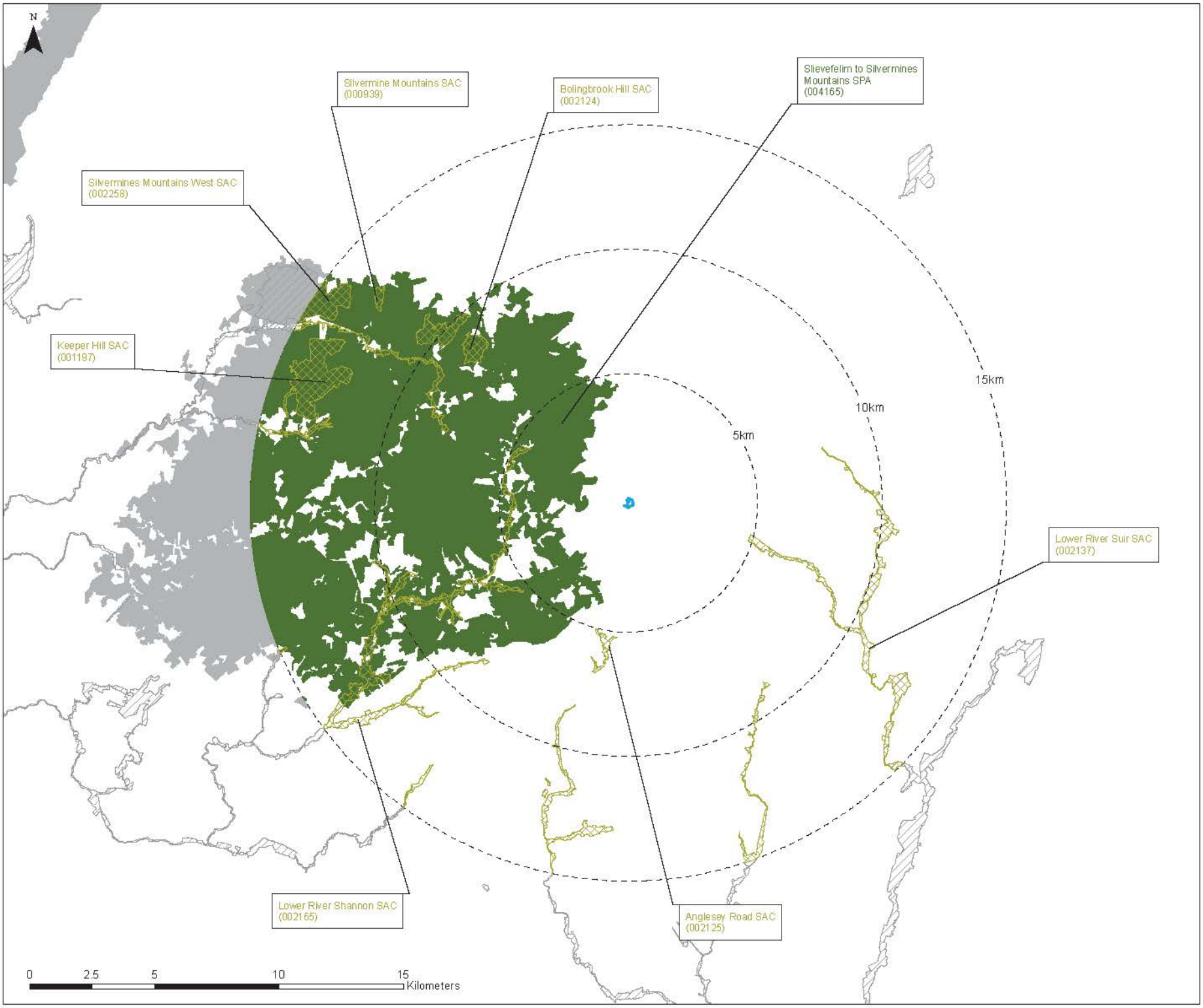

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure RF 8.2:
European Sites within the
UWF Replacement Forestry Study Area

Legend:

- UWF Replacement Forestry Area
- Special Areas of Conservation within 15km
- Special Protection Areas within 15km
- Replacement Forestry 5km, 10km, 15km Buffer

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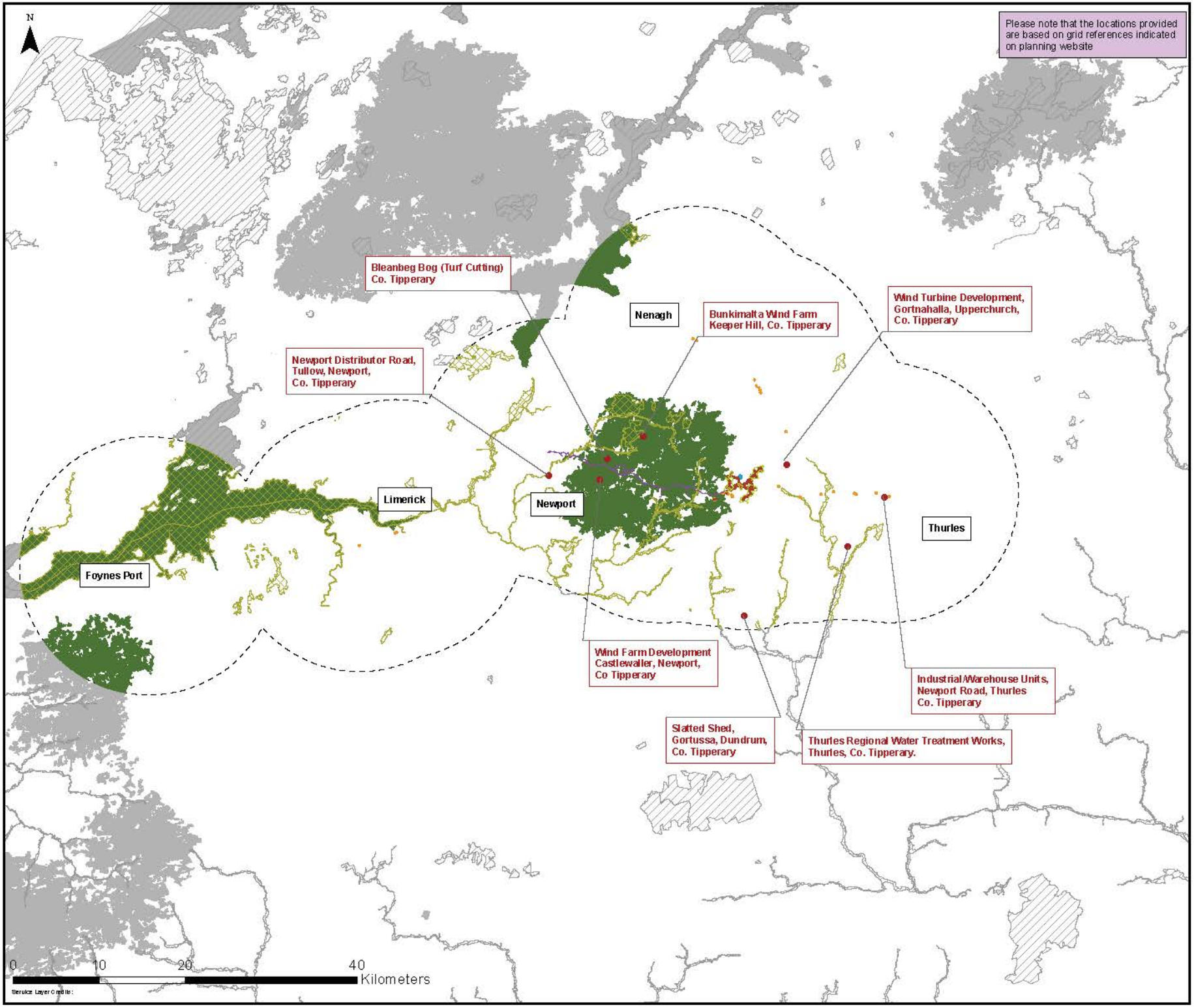

Client: Ecopower Developments Ltd.

Project: Whole Windfarm Project

Title:
Figure CE 8.2: European Sites within the Cumulative Evaluation Study Area

Legend:

- Projects/Activities
- Upperchurch Windfarm 2013 Study Area
- UWF Related Works Construction Works Area
- UWF Grid Connection Construction Works Area
- UWF Replacement Forestry Construction Works Area
- UWF Other Activities Construction Works Boundary
- Special Areas of Conservation within 15km
- Special Protection Areas within
- 15km Buffer (Designated European Sites)

* Forestry & Agriculture: Please see those map book figures which illustrate terrestrial habitats on aerial photography, for reference purposes with respect to the extent of Forestry and Agricultural lands.

** Please Refer to Natura Impact Statement in Volume E

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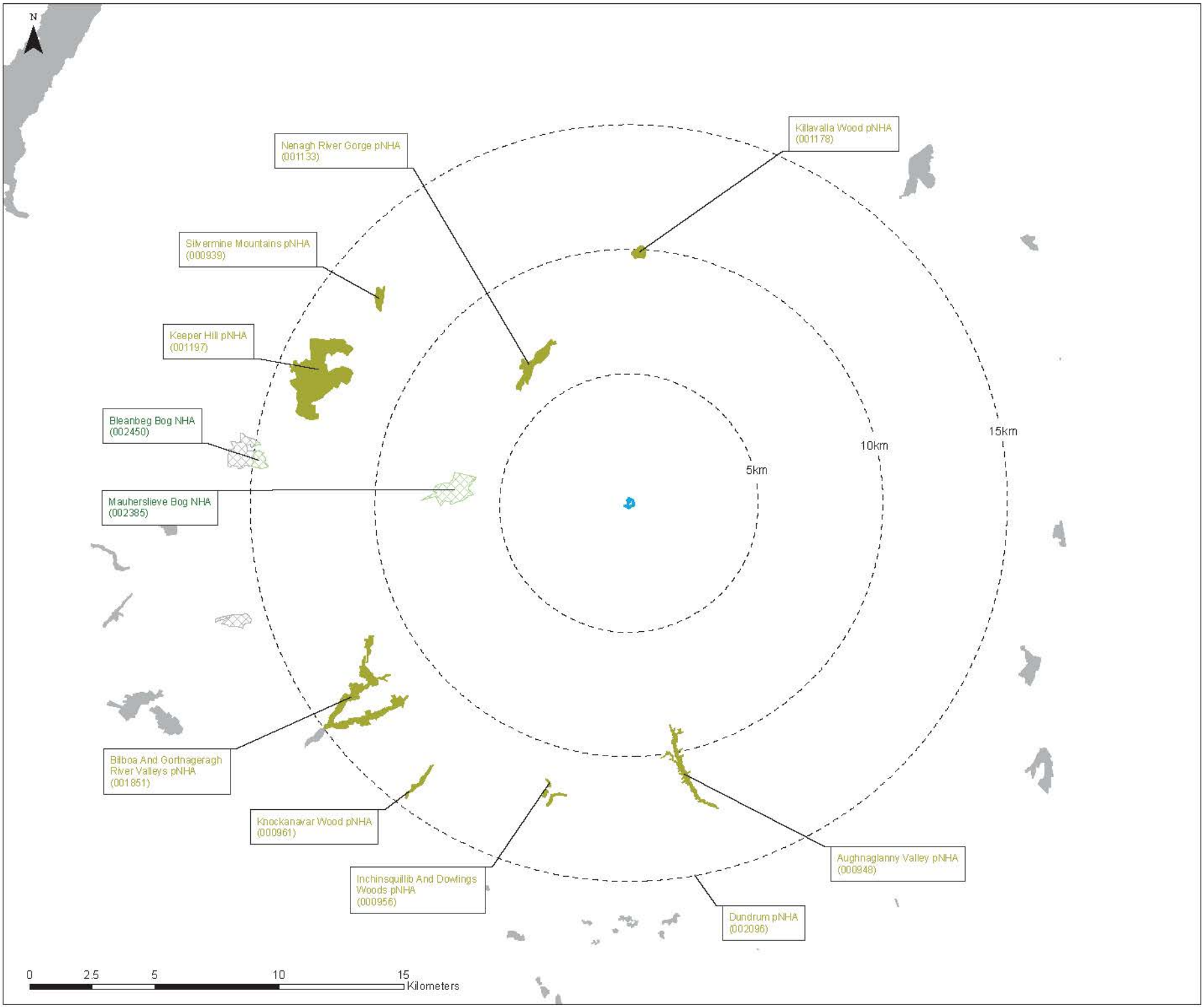

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure RF 8.3:
National Sites within the UWF Replacement Forestry Study Area

Legend:

- UWF Replacement Forestry Area
- National Heritage Areas within 15km
- Proposed Natural Heritage Areas within 15km
- Replacement Forestry 5km, 10km, 15km Buffer

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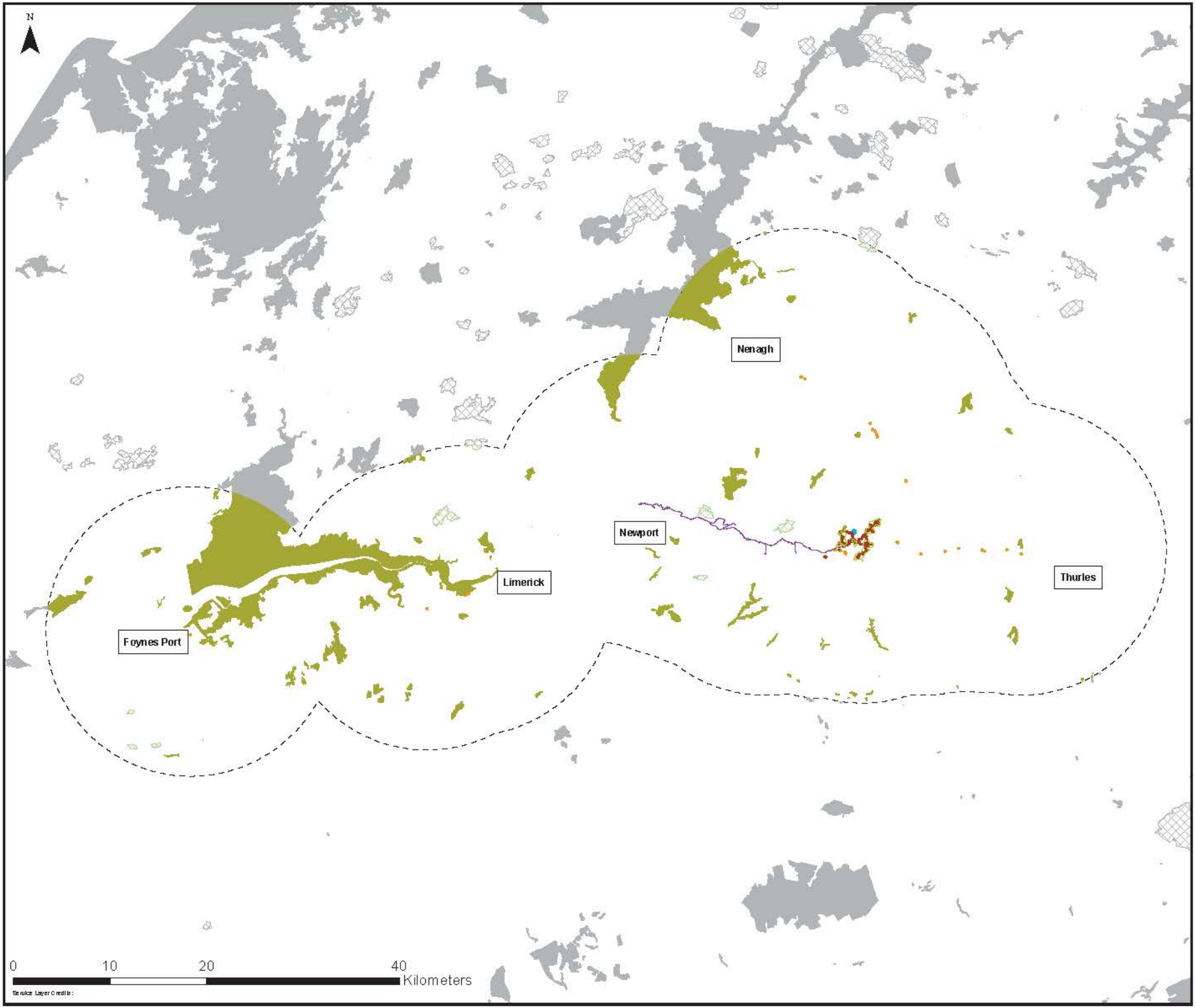

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure CE 8.3: National Sites within the Cumulative Evaluation Study Area

Legend:

- Upperchurch Windfarm 2013 Study Area
- UWF Related Works Construction Works Area
- UWF Grid Connection Construction Works Area
- UWF Replacement Forestry Area
- UWF Other Activities Construction Works Boundary
- Proposed Natural Heritage Areas within 15km
- Natural Heritage Areas within 15km
- 15km Buffer (NHA and pNHA sites)

No Other Projects or Activities scoped in for evaluation

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Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure RF 8.4: Aquatic Habitats & Species within the UWF Replacement Forestry Study Area

Legend:

- UWF Replacement Forestry Area
- Watercourses

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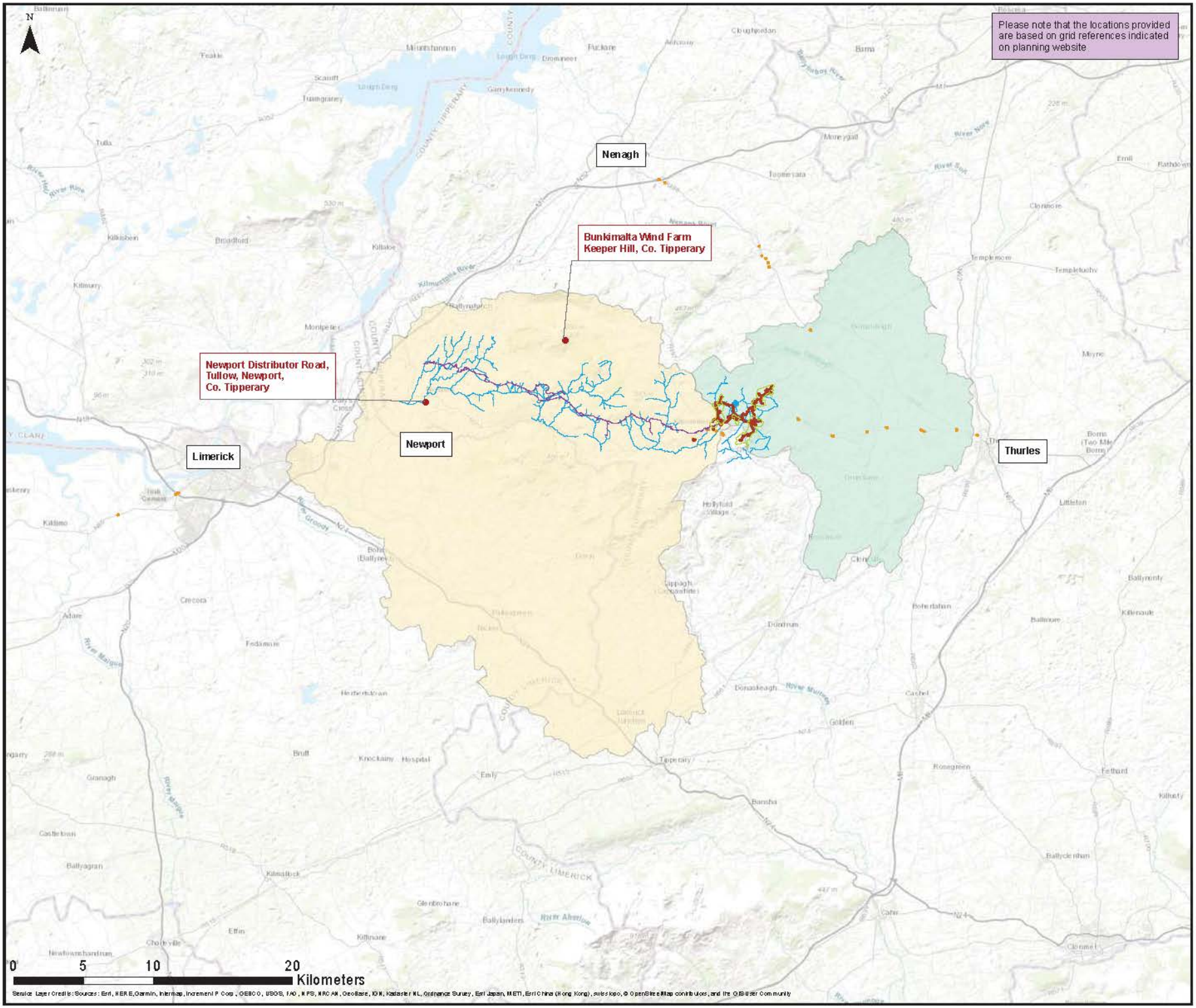

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:

Figure CE 8.4: Aquatic Habitats & Species within the Cumulative Evaluation Study Area

Legend:

- Project/Activities
- Upperchurch Windfarm 2013 Study Area
- UWF Related Works Construction Works Area
- UWF Grid Connection Construction Works Area
- UWF Replacement Forestry Area
- UWF Other Activities Construction Works Boundary
- Watercourses
- Clodiagh River Catchment
- Mulkear River Catchment

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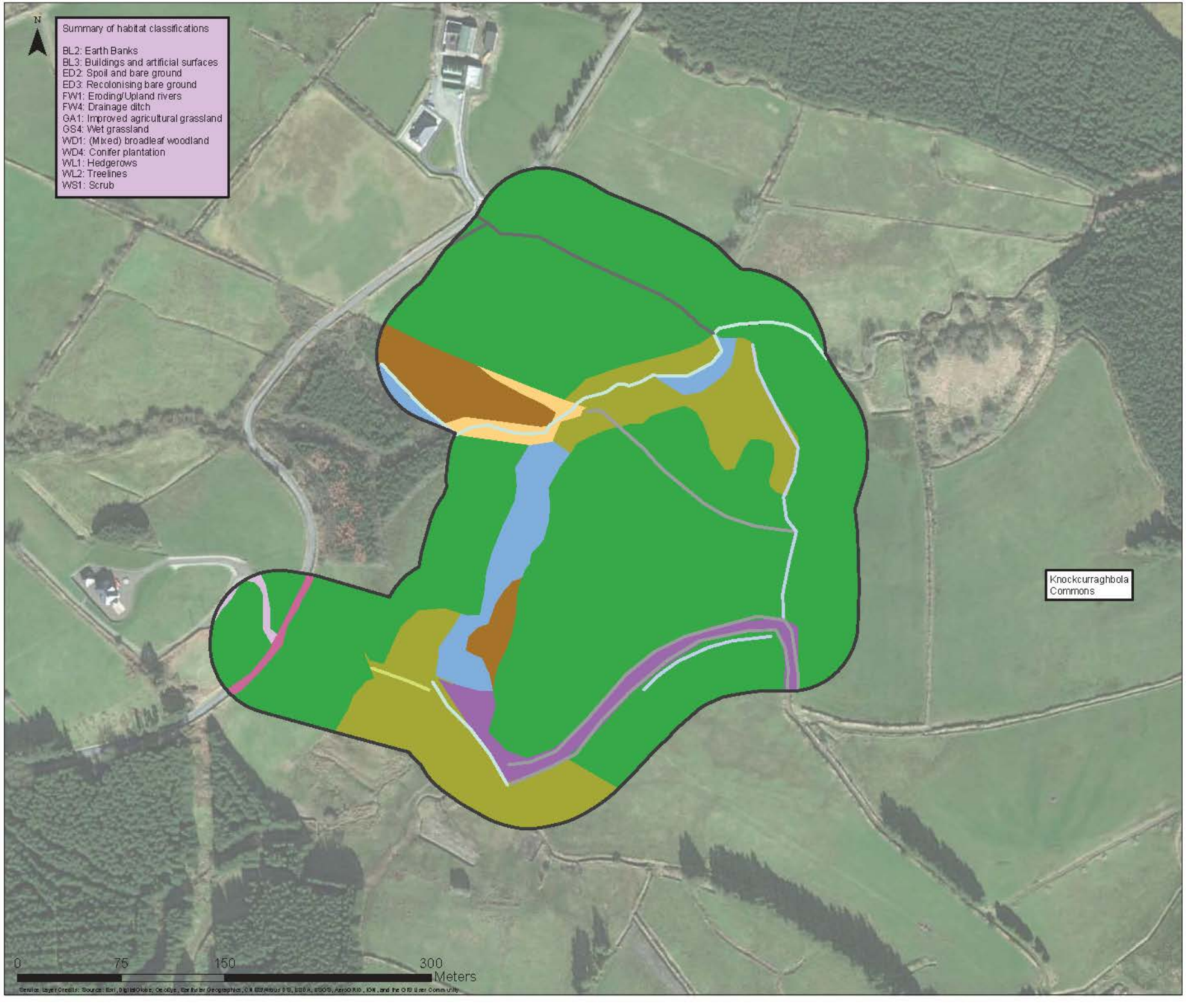

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure RF 8.5: Terrestrial Habitats within the UWF Replacement Forestry Study Area.

Legend:

- BL3
- ED2
- ED3
- GA1
- GS4
- WD1
- WD4
- WS1
- BL2
- BL3
- FW1
- FW4
- WL1
- WL2
- Study Area Boundary (50m)

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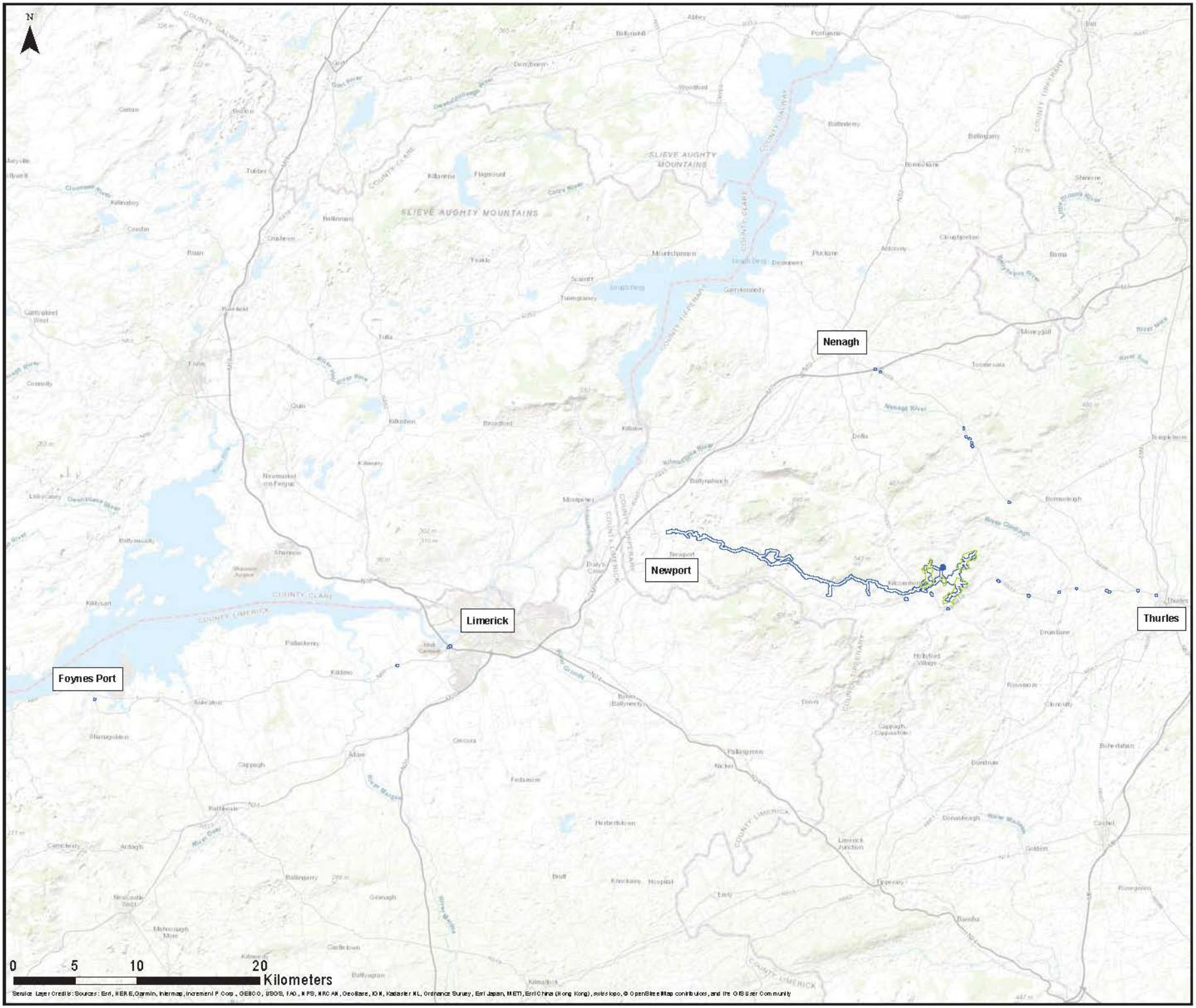

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure CE 8.5: Terrestrial Habitats within the Cumulative Evaluation Study Area

Legend:

- Upperchurch Windfarm 2013 Study Area
- Habitats 100m Buffer

No Other Projects or Activities scoped in for evaluation

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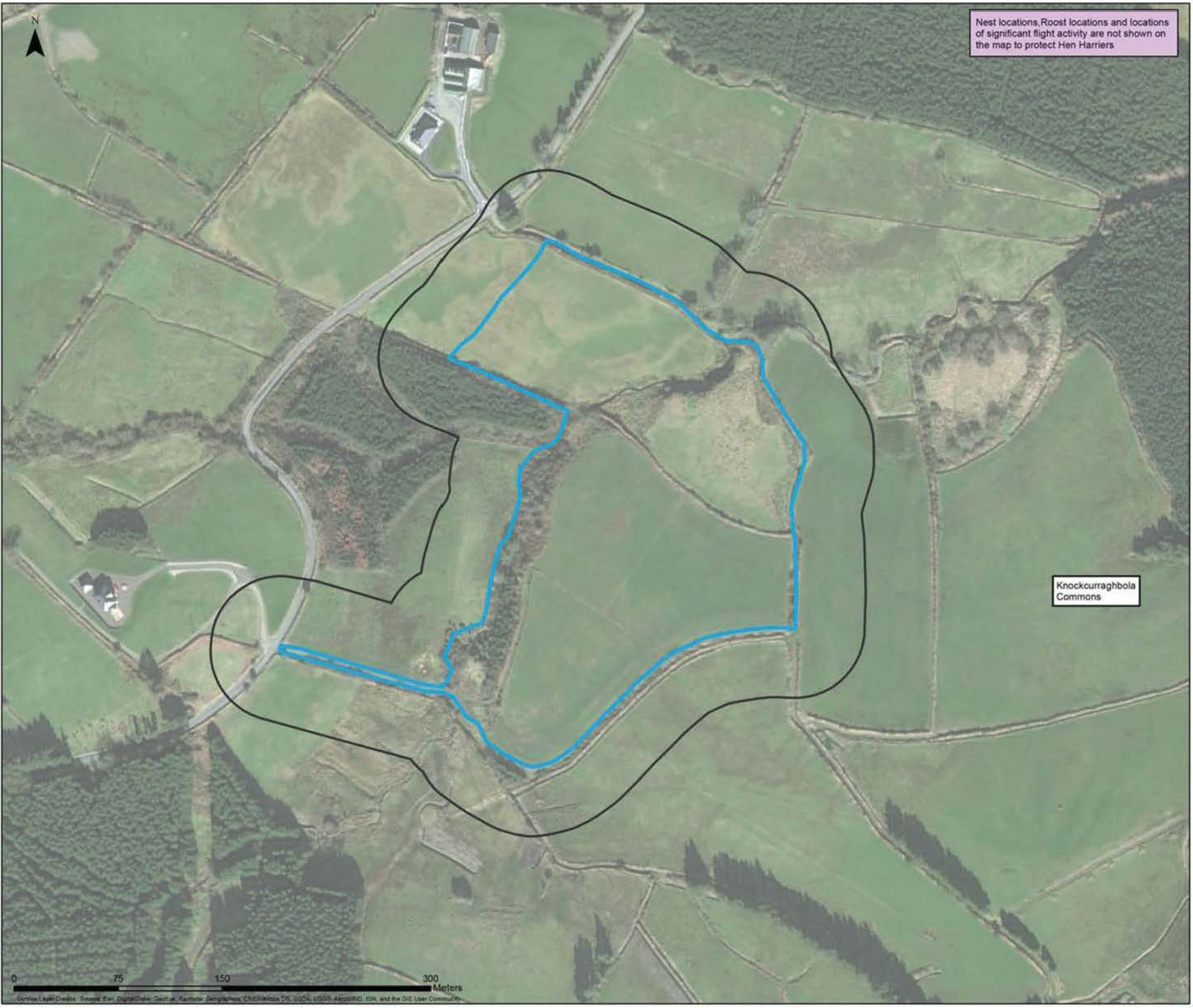

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure RF 8.6: Hen Harrier within the UWF Replacement Forestry Study Area.

Legend:

- UWF Replacement Forestry Area
- Study Area Boundary (50m)

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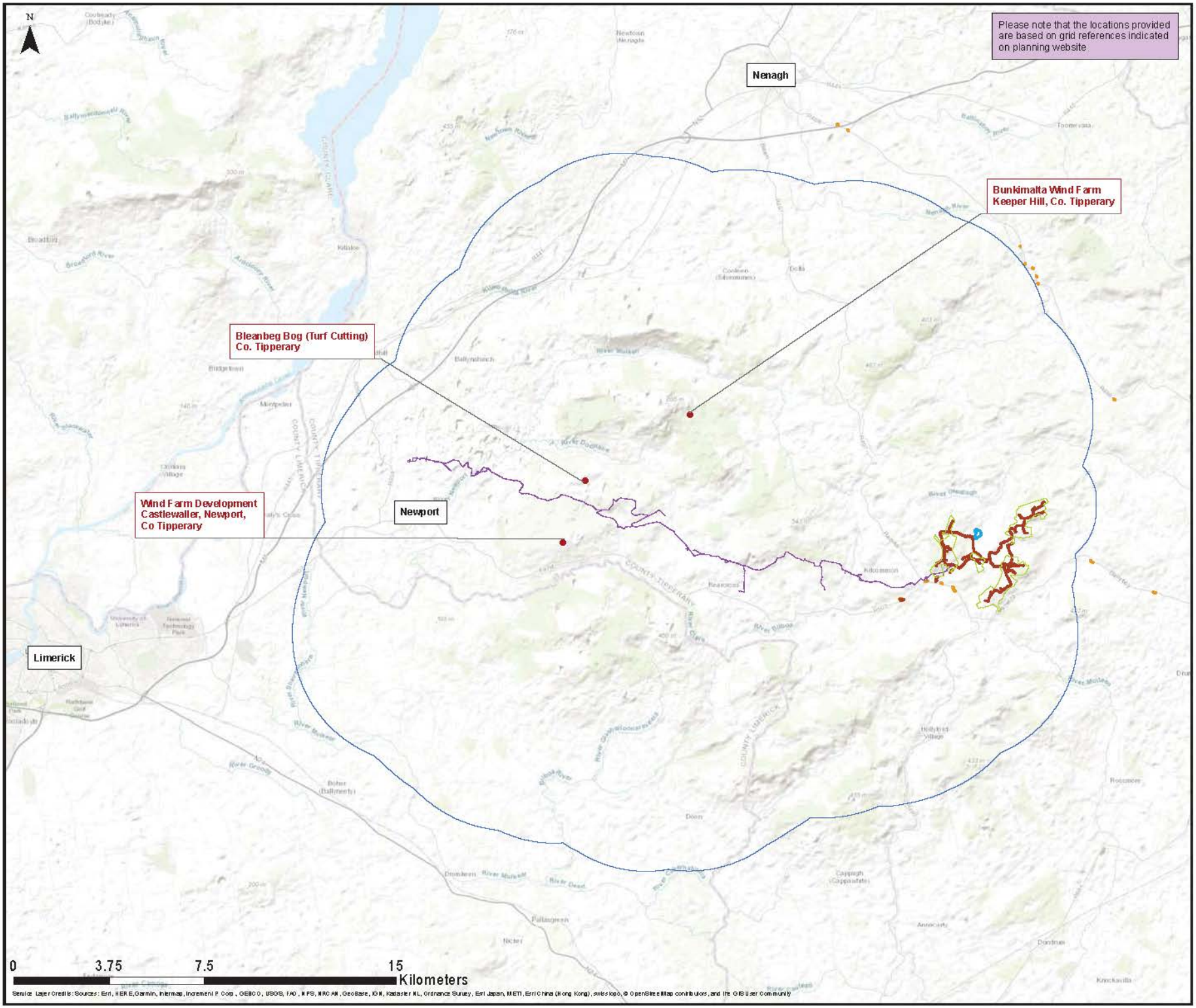

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure CE 8.6: Hen Harrier within the Cumulative Evaluation Study Area

Legend:

- Projects/Activities
- Slievefelim to Silvermines Mountains SPA plus Consented Wind Farm plus 5 km Buffer (Hen Harrier)
- Upperchurch Windfarm 2013 Study Area
- UWF Related Works Construction Works Area
- UWF Grid Connection Construction Works Area
- UWF Replacement Forestry Area
- UWF Other Activities Construction Works Boundary

* Forestry & Agriculture: Please see those map book figures which illustrate terrestrial habitats on aerial photography, for reference purposes with respect to the extent of Forestry and Agricultural lands.

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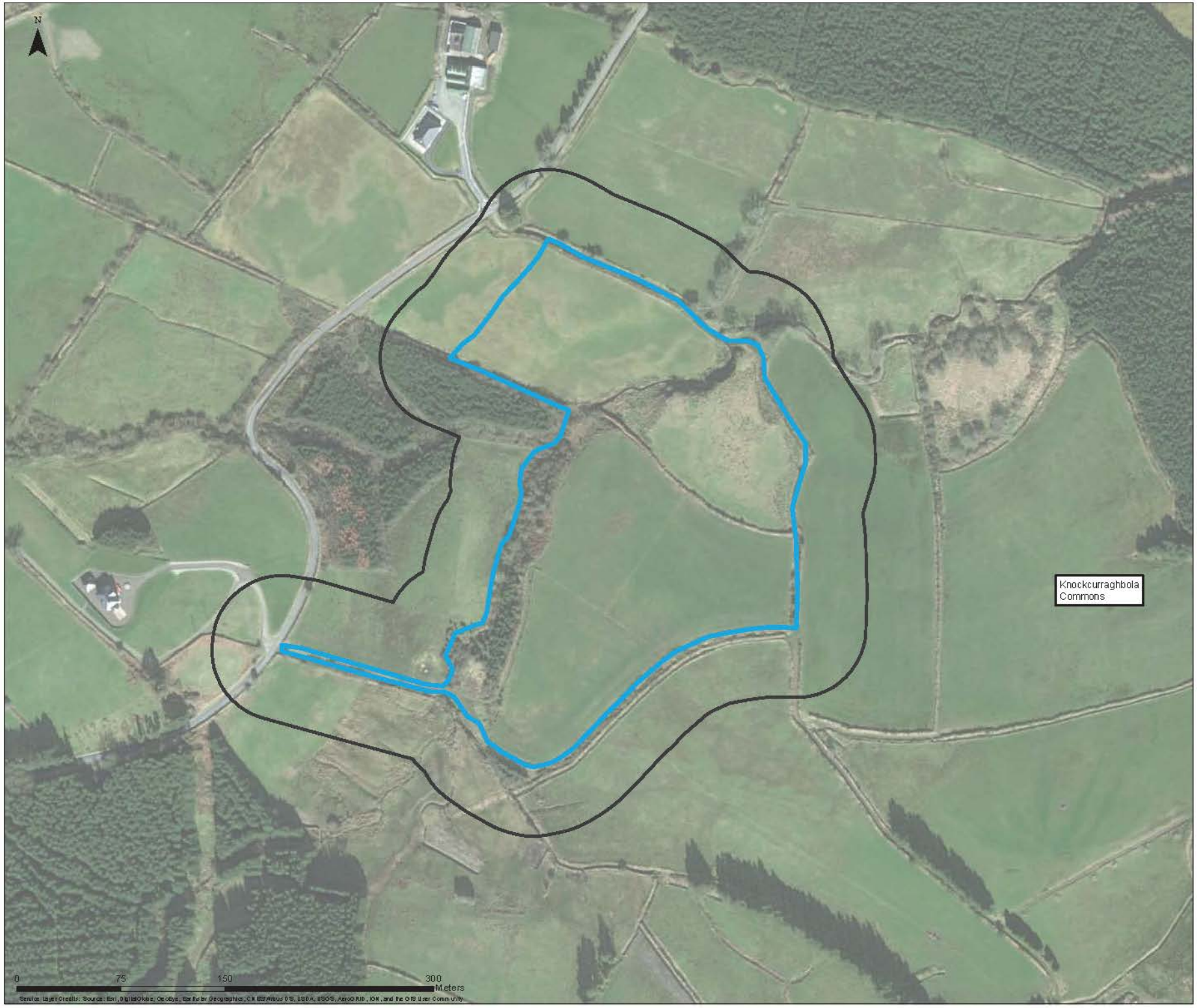

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure RF 8.7: General Bird Species within the UWF Replacement Forestry Study Area.

Legend:

UWF Replacement Forestry Area

Study Area Boundary (50m)

Nil Observations of Note

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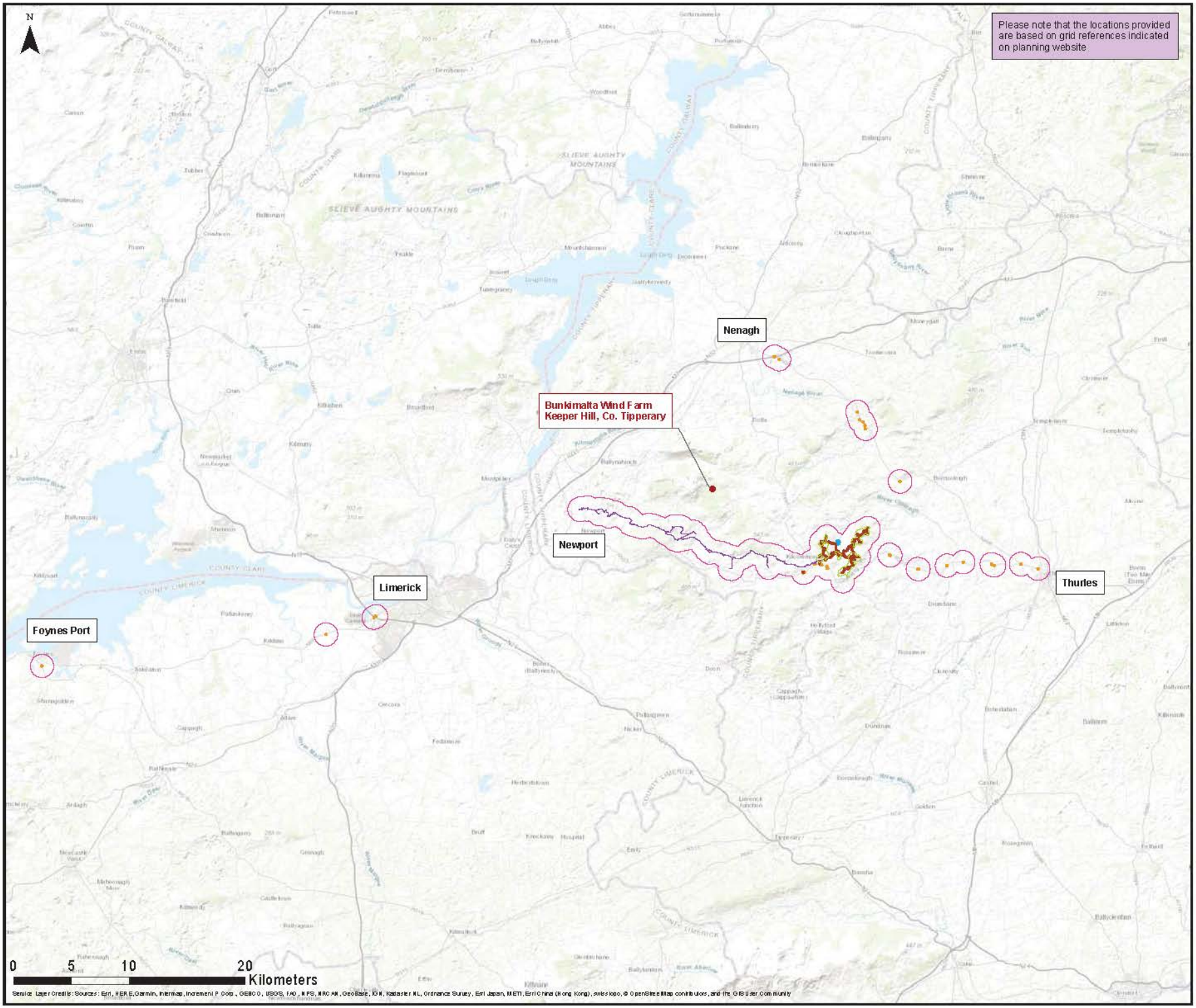

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure CE 8.7: General Bird Species within the Cumulative Evaluation Study Area

Legend:

- Project/Activities
- Upperchurch Windfarm 2013 Study Area
- UWF Related Works Construction Works Area
- UWF Grid Connection Construction Works Area
- UWF Replacement Forestry Area
- UWF Other Activities Construction Works Boundary
- 1km Buffer (General Bird Species)

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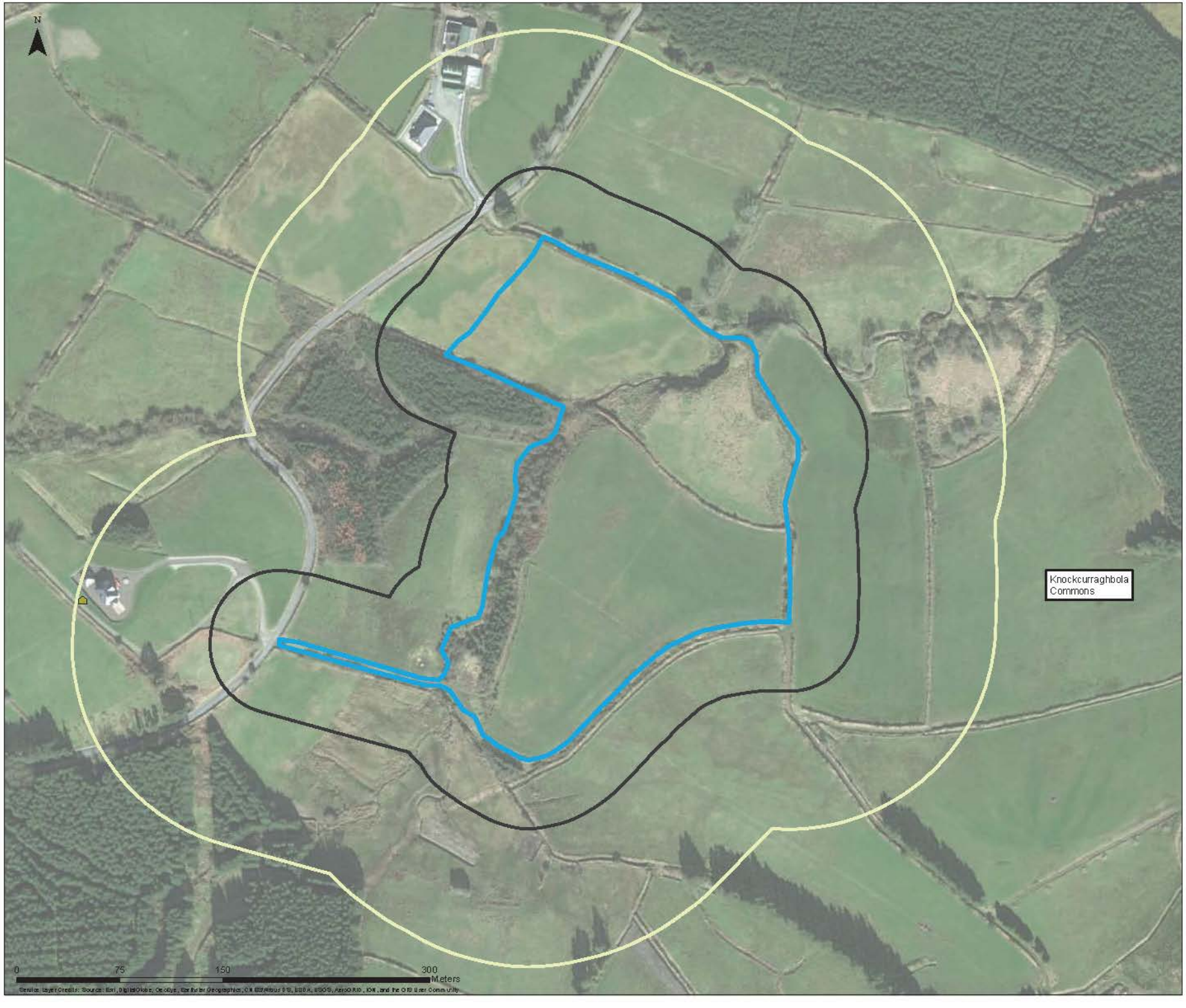

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure RF 8.8: Bats within the UWF Replacement Forestry Study Area.

Legend:

Bat Roost Suitability: *

Buildings
- Low

Study Area Boundary (150m)

UWF Replacement Forestry Area

Study Area Boundary (50m)

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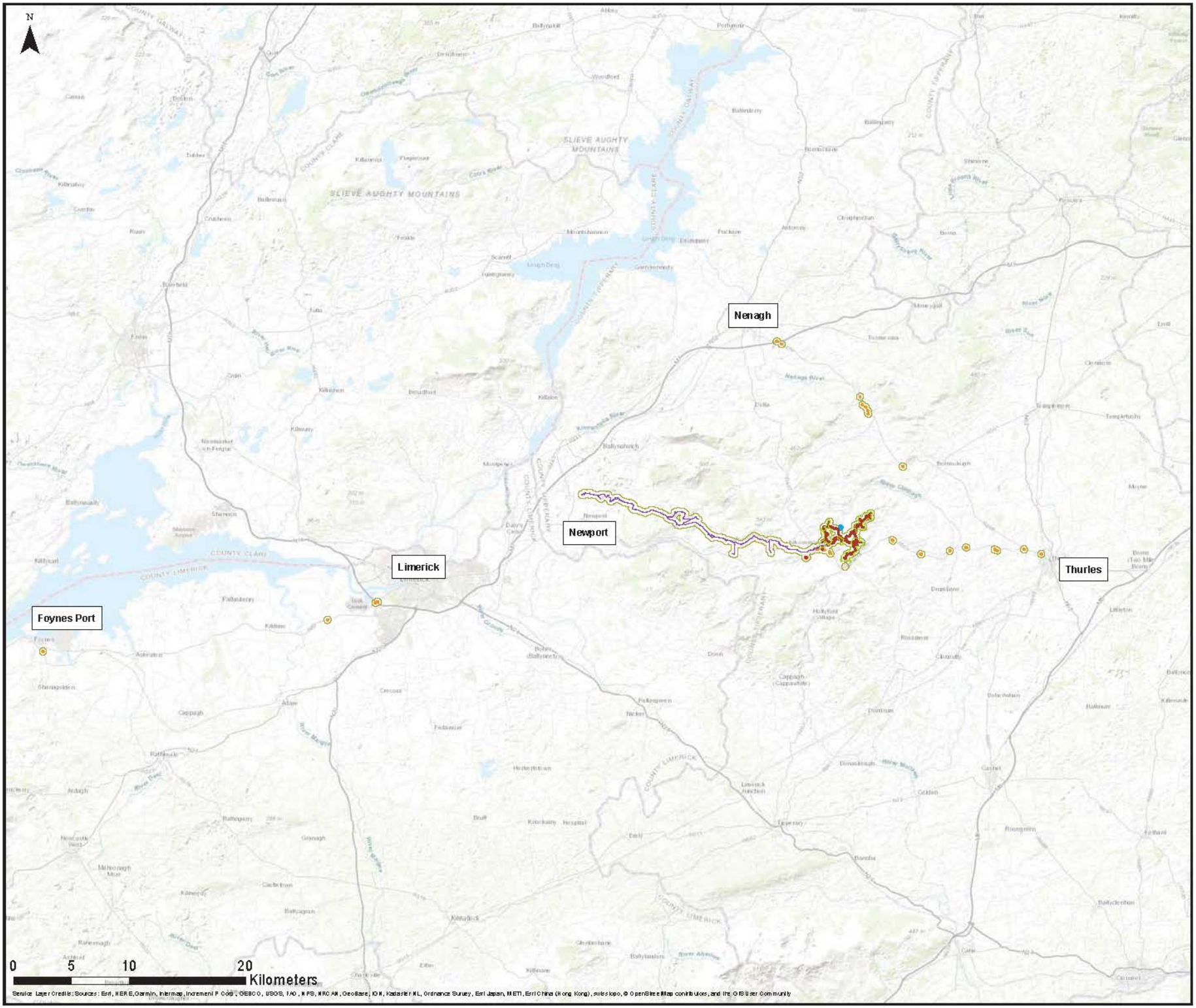

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure CE 8.8: Bats within the Cumulative Evaluation Study Area

Legend:

- Upperchurch Windfarm 2013 Study Area
- UWF Related Works Construction Works Area
- UWF Grid Connection Construction Works Area
- UWF Replacement Forestry Area
- UWF Other Activities Construction Works Boundary
- Bats 300m Buffer

No Other Projects or Activities scoped in to evaluation

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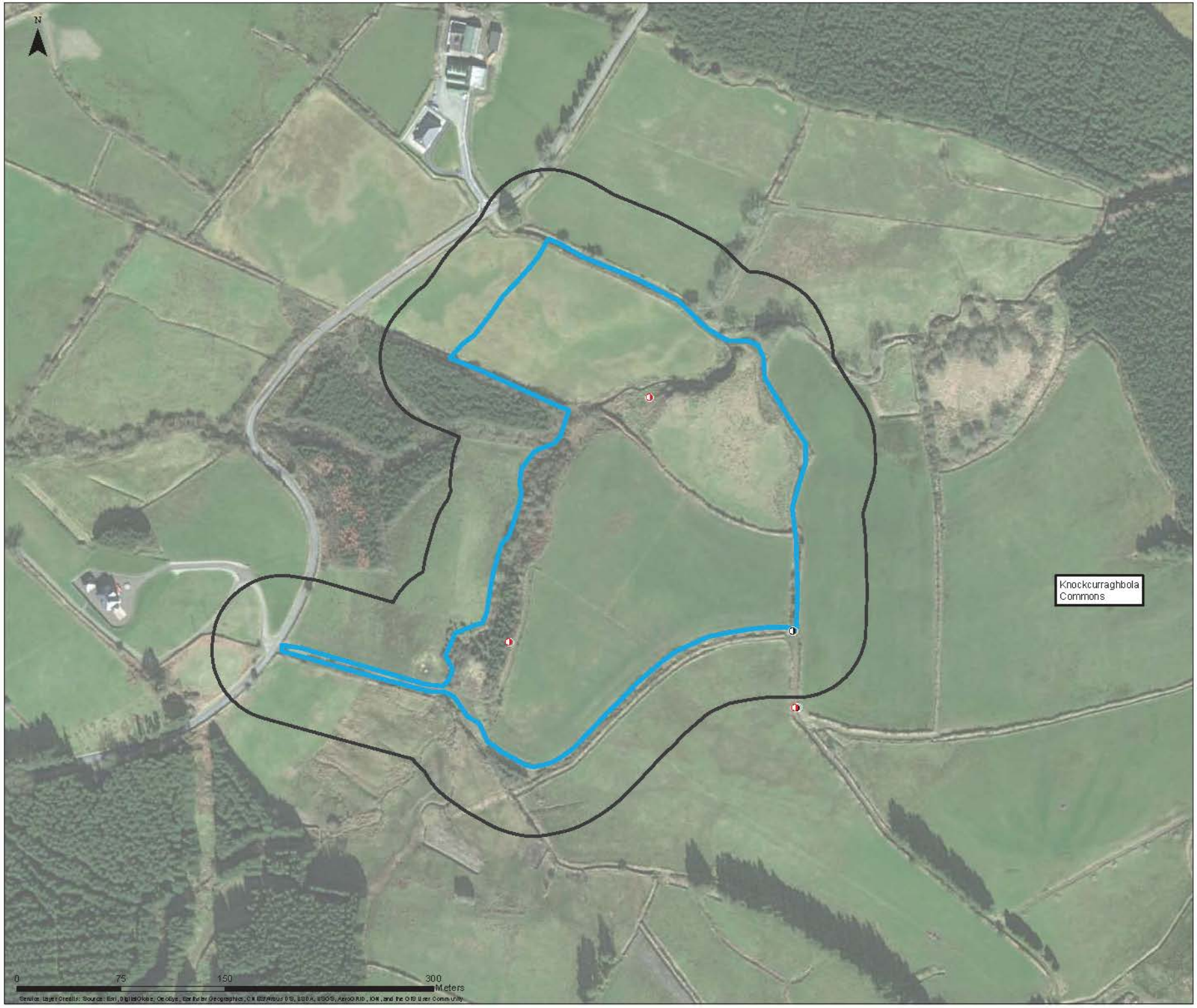

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure RF 8.9: Non-Volant Mammals within the UWF Replacement ForestryStudy Area

Legend:

UWF Replacement Forestry Area

Study Area Boundary (50m)

Survey Results:*

Badger

Fox

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Note: Fallow Deer, Pine Marten, Red Squirrel and Irish Hare and Other Mammals were recorded throughout the study. Please refer to appendix for locations

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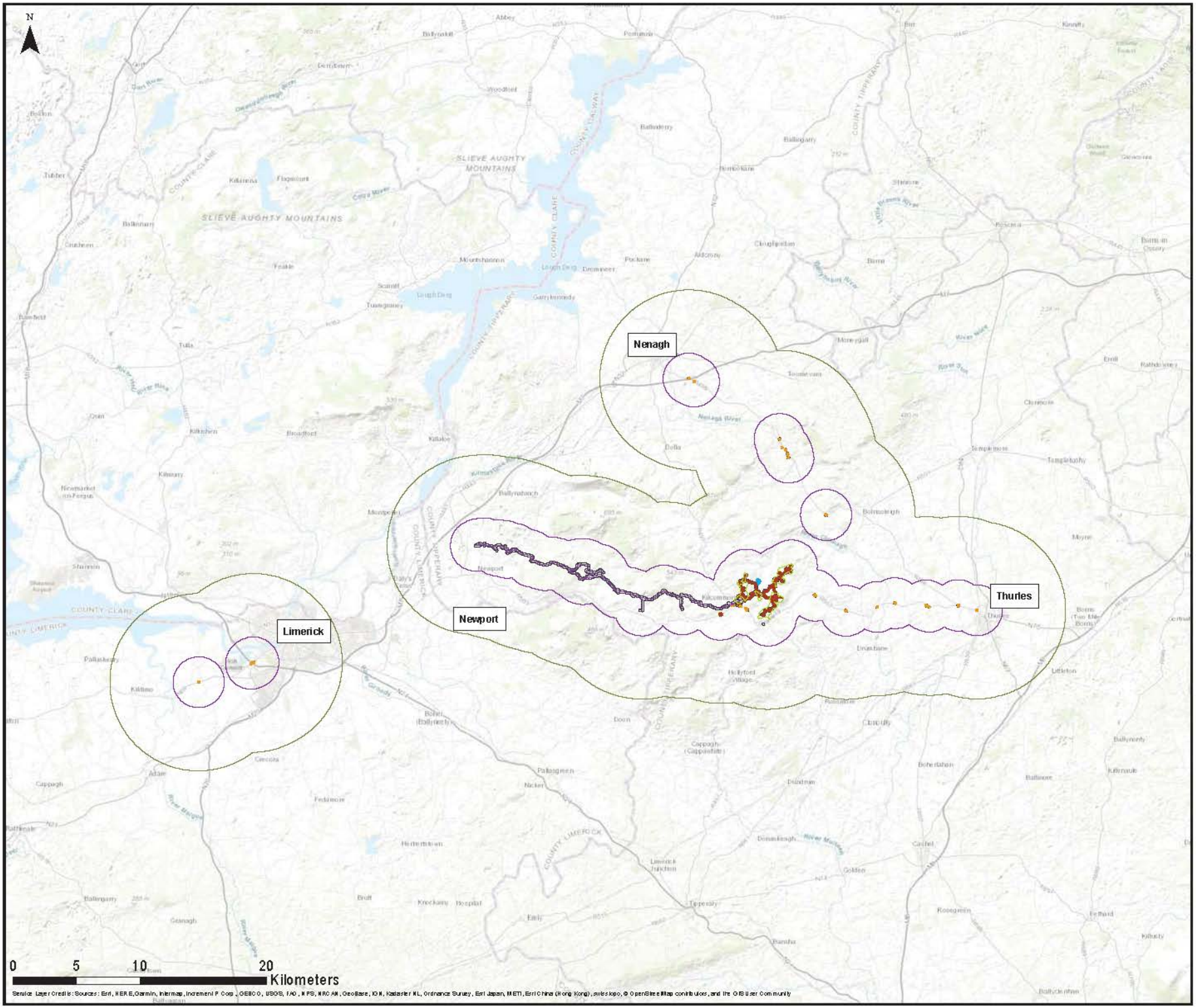

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure CE 8.9: Non-Volant Mammals within the Cumulative Evaluation Study Area

Legend:

- Upperchurch Windfarm 2013 Study Area
- UWF Related Works Construction Works Area
- UWF Grid Connection Construction Works Area
- UWF Replacement Forestry Area
- UWF Other Activities Construction Works Boundary
- General Non-Volant Mammals 100m Buffer
- Badger 2km Buffer
- Otter 7km Buffer

* Forestry: Please see those map book figures which illustrate terrestrial habitats on aerial photography, for reference purposes with respect to the extent of Forestry lands.

REFERENCE DOCUMENTS

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POC	CC	HW

Date:	Map Reference:
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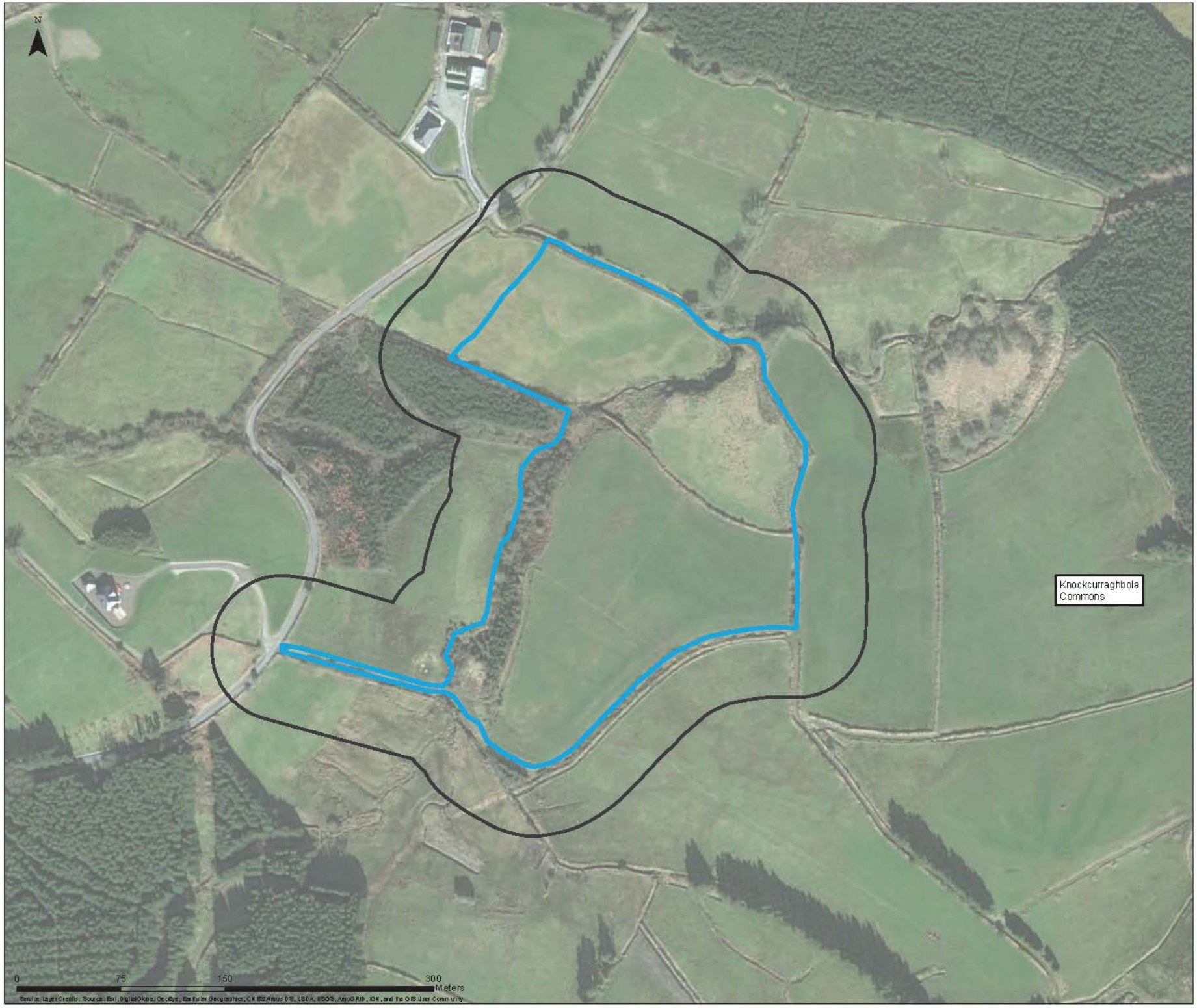

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure RF 8.10: Amphibians & Reptiles within the UWF Replacement Forestry Study Area

Legend:

UWF Replacement Forestry Area

Study Area Boundary (50m)

Nil Observations

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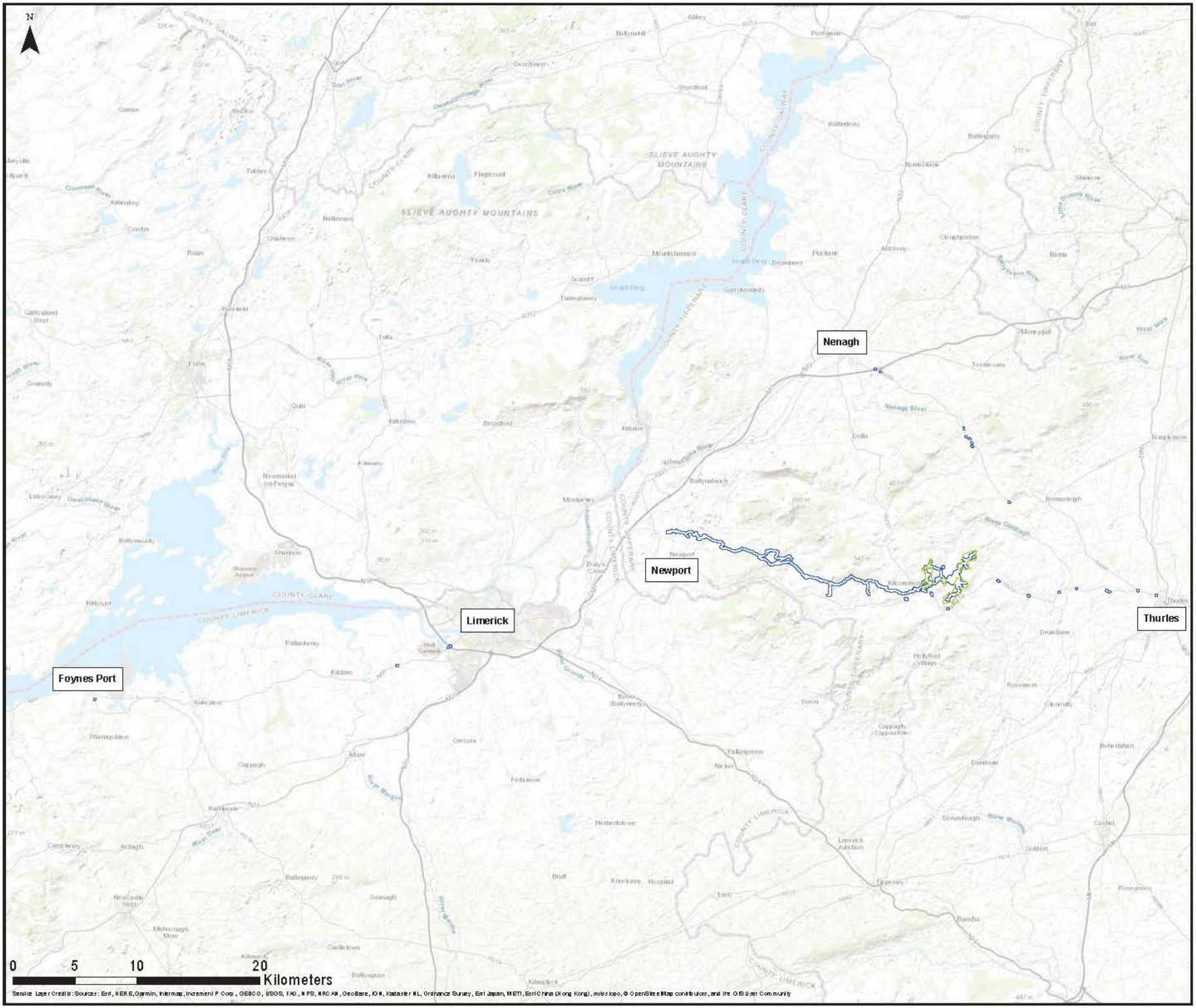

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure CE 8.10: Amphibians & Reptiles within the Cumulative Evaluation Study Area

Legend:

- Upperchurch Windfarm 2013 Study Area
- Amphibians & Reptiles 100m Buffer

No Other Projects or Activities scoped in for evaluation

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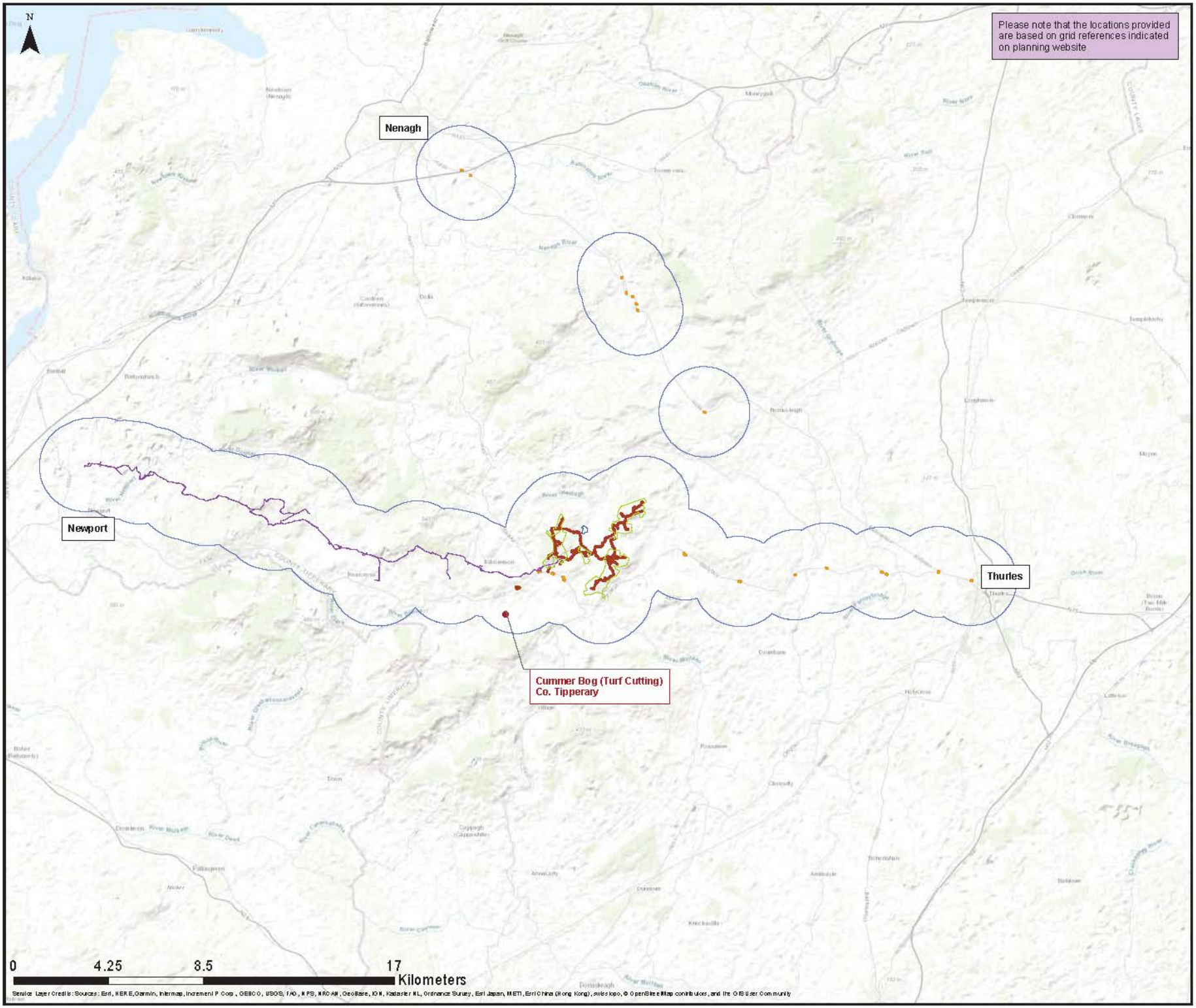

Client: Ecopower Developments Ltd.

Project: Whole UWF Project

Title:
Figure CE 8.11: Marsh Fritillary within the Cumulative Evaluation Study Area

Legend:

- Projects/Activities
- Upperchurch Windfarm 2013 Study Area
- UWF Related Works Construction Works Area
- UWF Grid Connection Construction Works Area
- UWF Replacement Forestry Area
- UWF Other Activities Construction Works Boundary
- 2km Buffer (Badger, Invertebrates - Marsh Fritillary)

* Forestry & Agriculture: Please see those map book figures which illustrate terrestrial habitats on aerial photography, for reference purposes with respect to the extent of Forestry and Agricultural lands.

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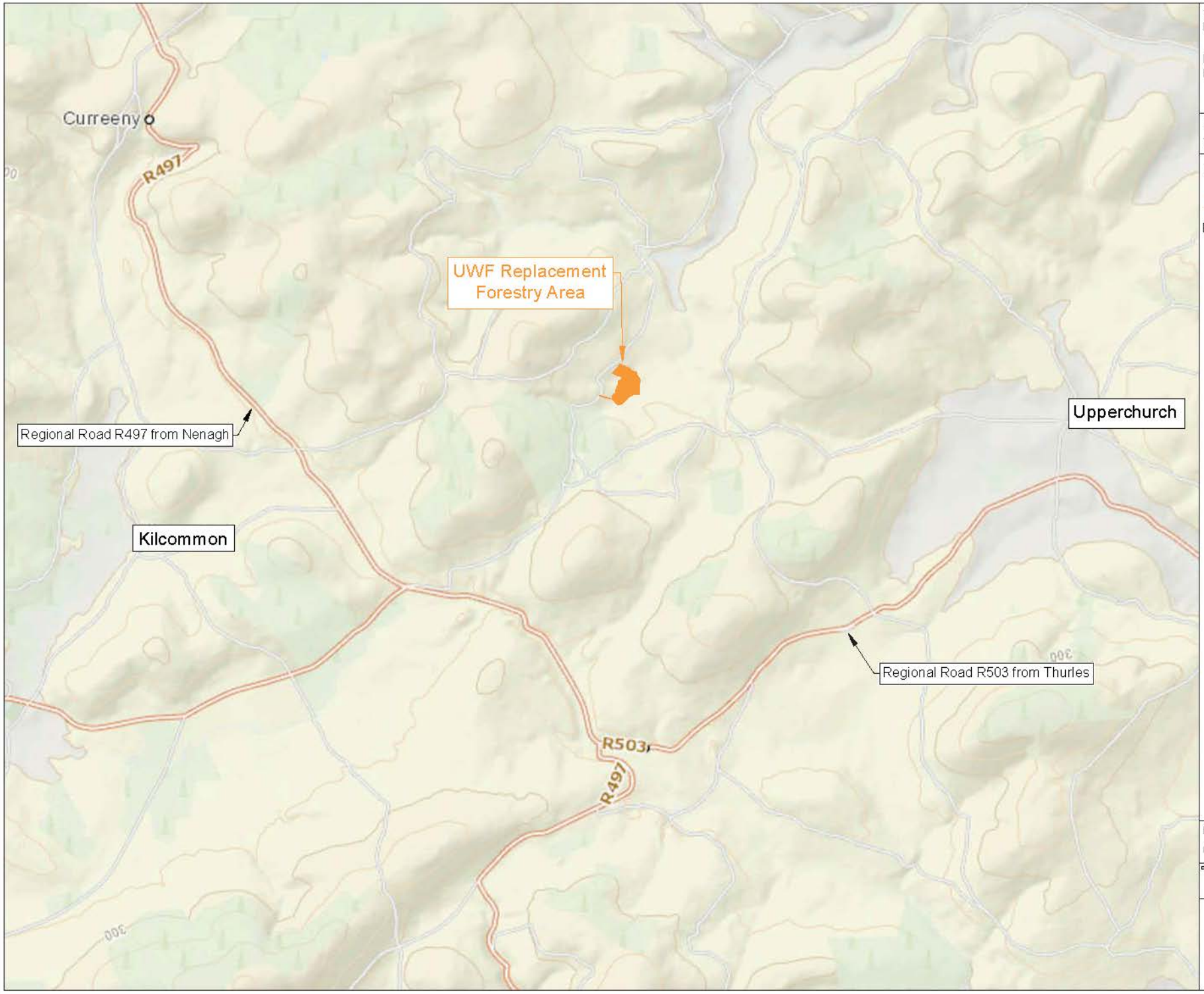

Title:
Figure RF 9.1

Location of the UWF Replacement Forestry Study Area

Map Number:
1 of 1

Legend:

UWF Replacement Forestry Area

Kilcommon Villages

N

REFERENCE DOCUMENTS

Project:
UWF Replacement Forestry (RF)

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AB	JB	5-Apr-18	A4

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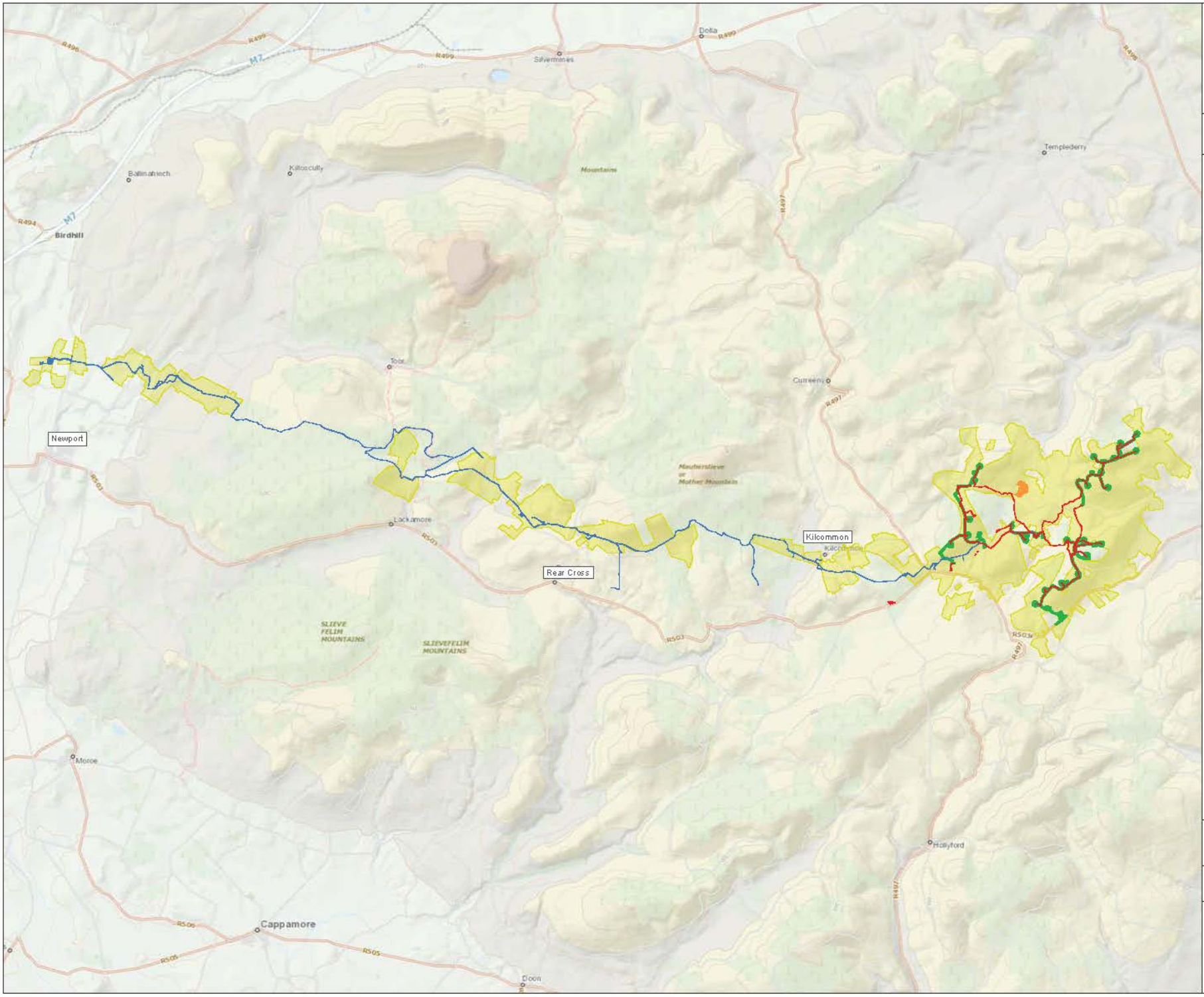

Title:
Figure CE 9.2

Agricultural Land within the Cumulative Evaluation Study Area

Map Number:
1 of 1

Legend:

- UWF Grid Connection Construction Works Area
- UWF Related Works Construction Works Area
- Upperchurch Windfarm Construction Works Area
- UWF Replacement Forestry Area
- Landholding: Agricultural Land

REFERENCE DOCUMENTS

N

Project:
UWF Replacement Forestry (RF)

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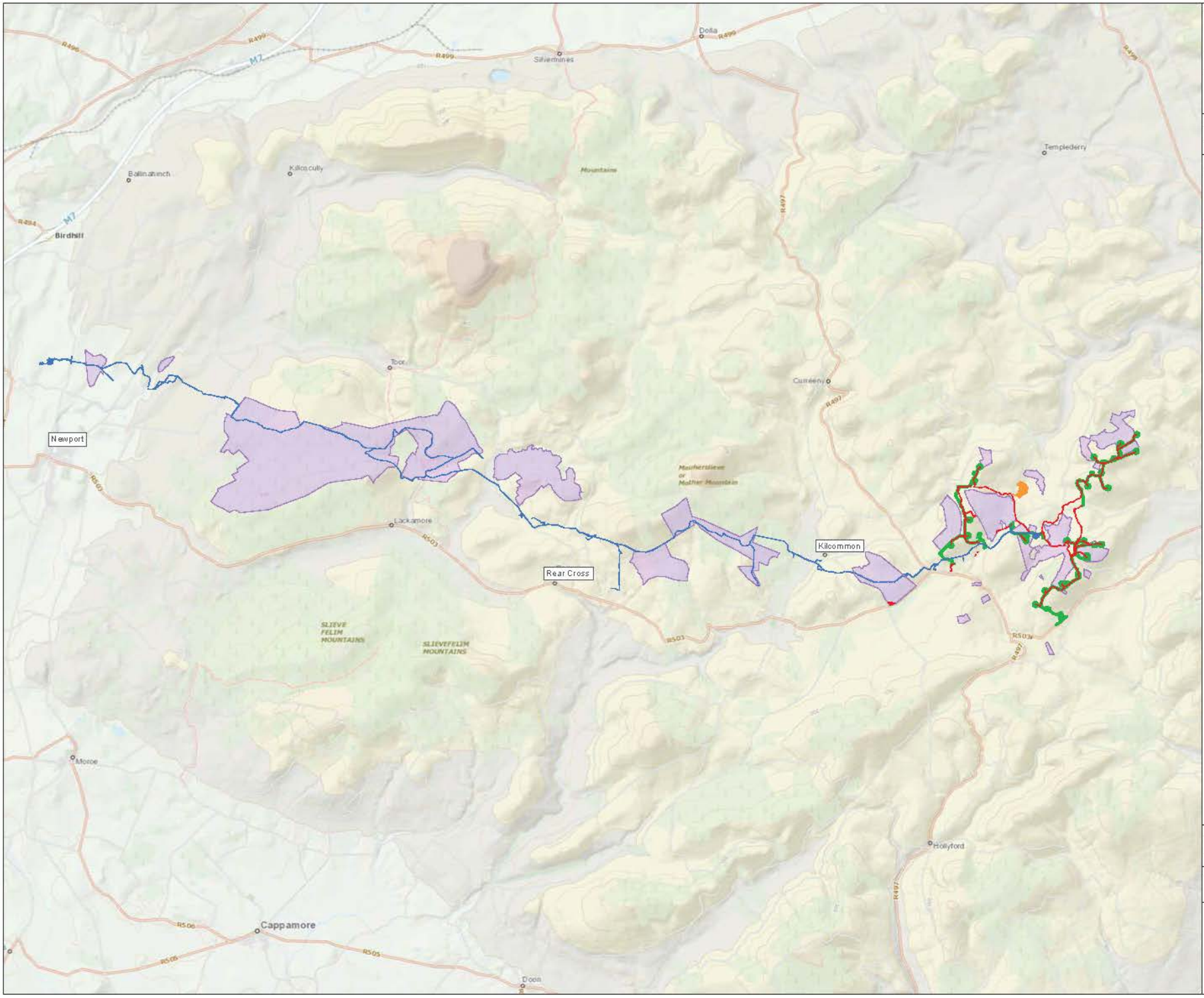

Title:
Figure CE 9.3

Forestry Lands within the Cumulative Evaluation Study Area

Map Number:
1 of 1

Legend:

- UWF Grid Connection Construction Works Area
- UWF Related Works Construction Works Area
- Upperchurch Windfarm Construction Works Area
- UWF Replacement Forestry Area
- Landholding: Forestry

N

REFERENCE DOCUMENTS

Project:
UWF Replacement Forestry (RF)

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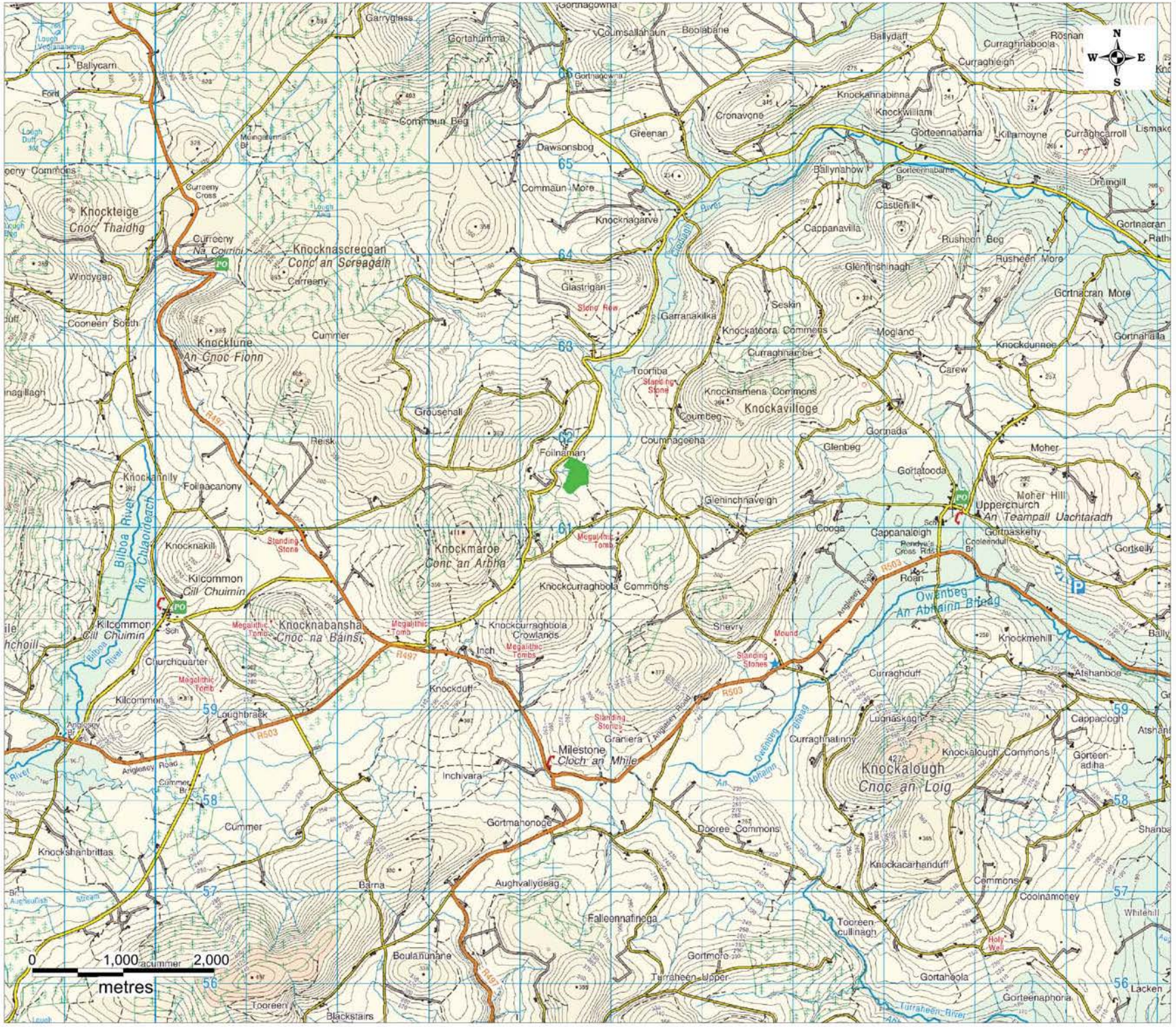

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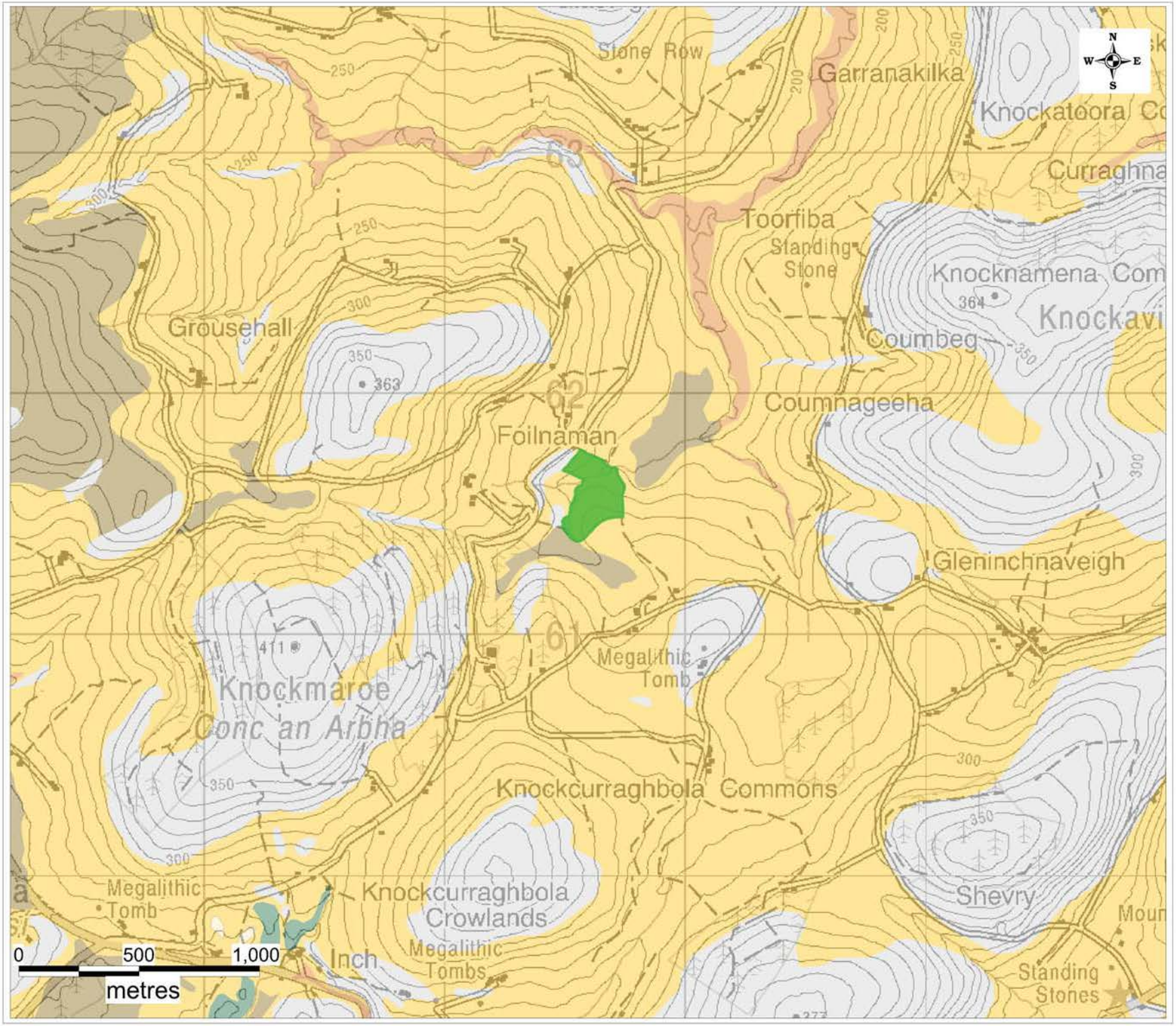
Client: Ecopower Developments Ltd.	
Job: UWF Replacement Forestry	
Title: Location of the UWF Replacement Forestry	
Figure No: Figure RF 10.1	
Drawing No: P1299-2-0318-FRF-10-1-A3-0A	
Sheet Size: A3	Project No: P1299-2
Scale: 1:40,000	Drawn By: GD
Date: 13/03/2018	Checked By: MG



Legend

- UWF Replacement Forestry
- Alluvium
- Blanket Peat
- Cutover Peat
- Sandstone Sands and Gravels
- Made Ground
- Bedrock at Surface
- Sandstone Till Devonian
- Sandstone Till Lower
- Sandstone and Shales Till
- Water

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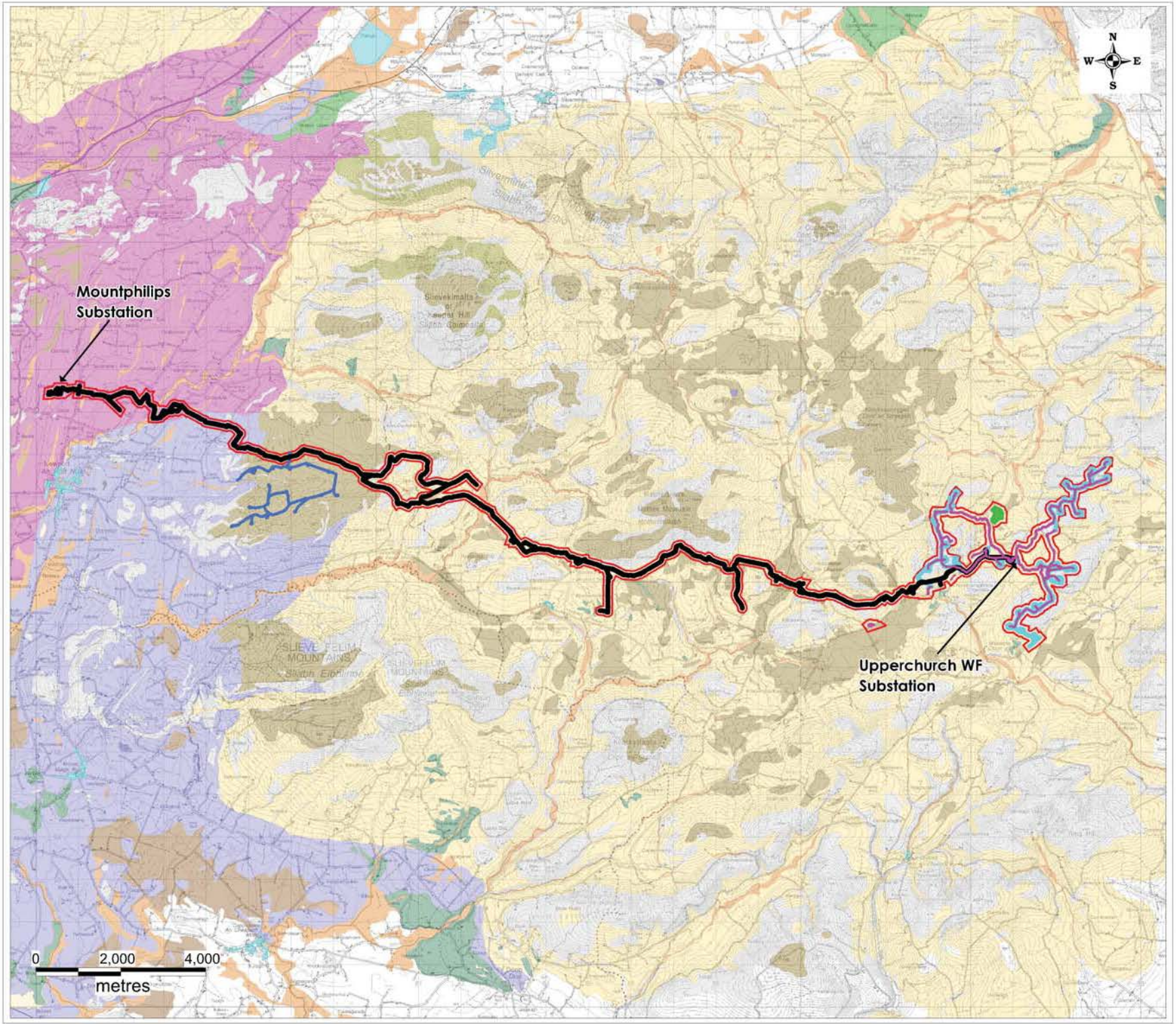
Client: Ecopower Developments Ltd.	
Job: UWF Replacement Forestry	
Title: Local Soils & Subsoils within the UWF Replacement Forestry Study Area	
Figure No: Figure RF 10.2	
Drawing No: P1299-2-0318-FRF-10-2-A3-0A	
Sheet Size: A3	Project No: P1299-2
Scale: 1:15,000	Drawn By: GD
Date: 12/03/2018	Checked By: MG



Legend

- UWF Grid Connection Construction Works Area Boundary
- UWF Related Works Construction Works Boundary
- Upperchurch Windfarm Construction Works Boundary
- Castlewaller Windfarm Construction Footprint
- UWF Replacement Forestry
- 100m Buffer for the Whole UWF Project
- Alluvium
- Blanket Peat
- Cutover Peat
- Sandstone Sands and Gravels
- Made Ground
- Bedrock at Surface
- Sandstone Till Devonian
- Sandstone Till Lower
- Sandstone and Shales Till
- Water

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Client: Ecopower Developments Ltd.

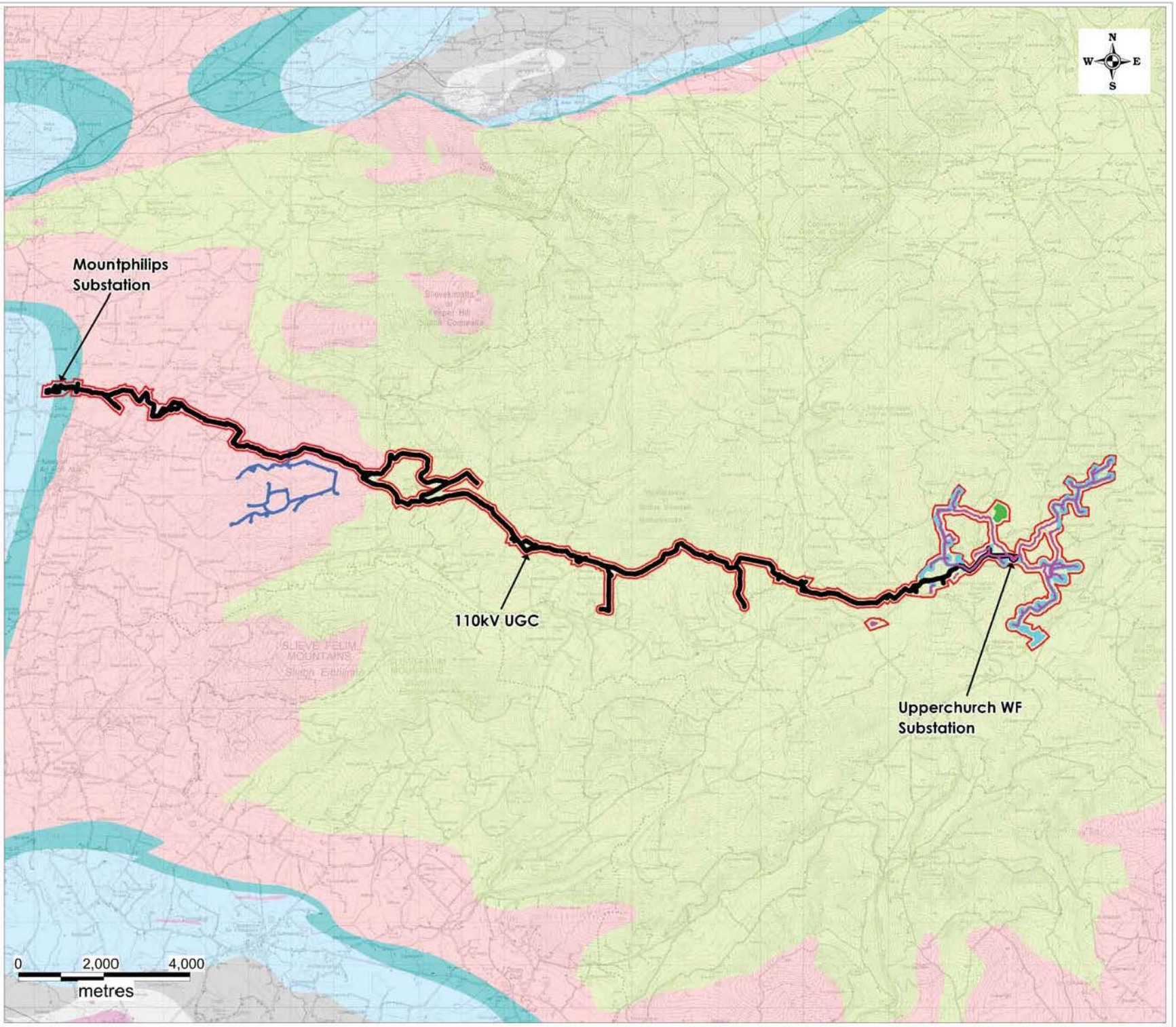
Job: UWF Related Works

Title: Local Soils & Subsoils within the Cumulative Evaluation Study Area

Figure No: Figure CE 10.2

Drawing No: P1299-2-0318-FCE-10-2-A3-0A

Sheet Size: A3	Project No: P1299-2
Scale: 1:85,000	Drawn By: GD
Date: 12/03/2018	Checked By: MG



Legend

- UWF Grid Connection Construction Works Area Boundary
- UWF Related Works Construction Works Boundary
- Upperchurch Windfarm Construction Works Boundary
- Castlewaller Windfarm Construction Footprint
- UWF Replacement Forestry
- 100m Buffer for the Whole UWF Project
- Dinantian (early) Sandstones, Shales and Limestones
- Dinantian Lower Impure Limestones
- Devonian Old Red Sandstones
- Dinantian Pure Unbedded Limestones
- Dinantian Pure Unbedded Limestones
- Silurian Metasediments and Volcanics

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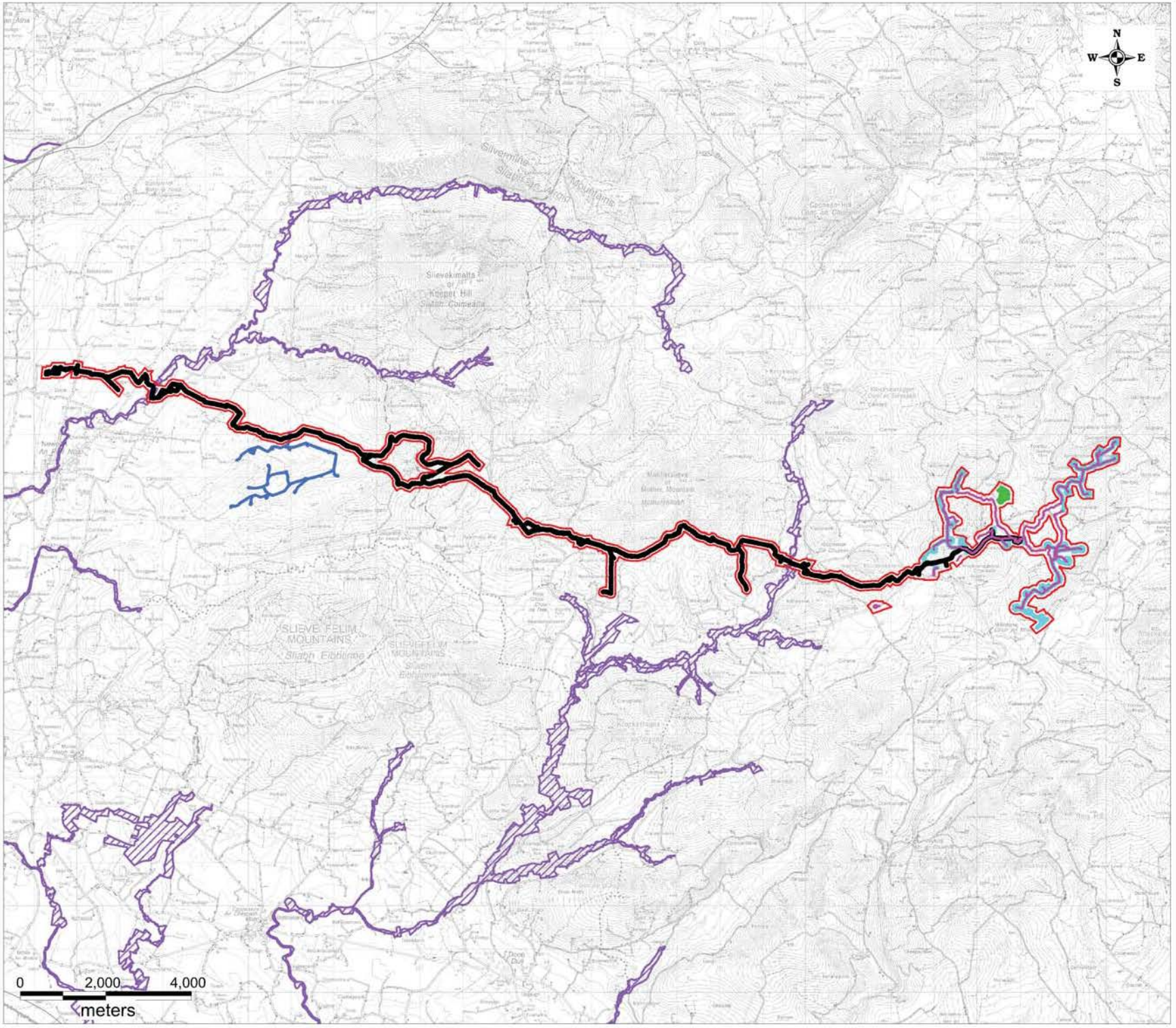
Client: Ecopower Developments Ltd.	
Job: UWF Related Works	
Title: Local Bedrock within the Cumulative Evaluation Study Area	
Figure No: Figure CE 10.3	
Drawing No: P1299-2-0318-FCE-10-3-A3-0A	
Sheet Size: A3	Project No: P1299-2
Scale: 1:85,000	Drawn By: GD
Date: 12/03/2018	Checked By: MG



Legend

- UWF Grid Connection Construction Works Area Boundary
- UWF Related Works Construction Works Boundary
- Upperchurch Windfarm Construction Works Boundary
- Lower River Shannon SAC
- UWF Replacement Forestry
- Castlewaller Windfarm Construction Footprint
- 100m Buffer for the Whole UWF Project

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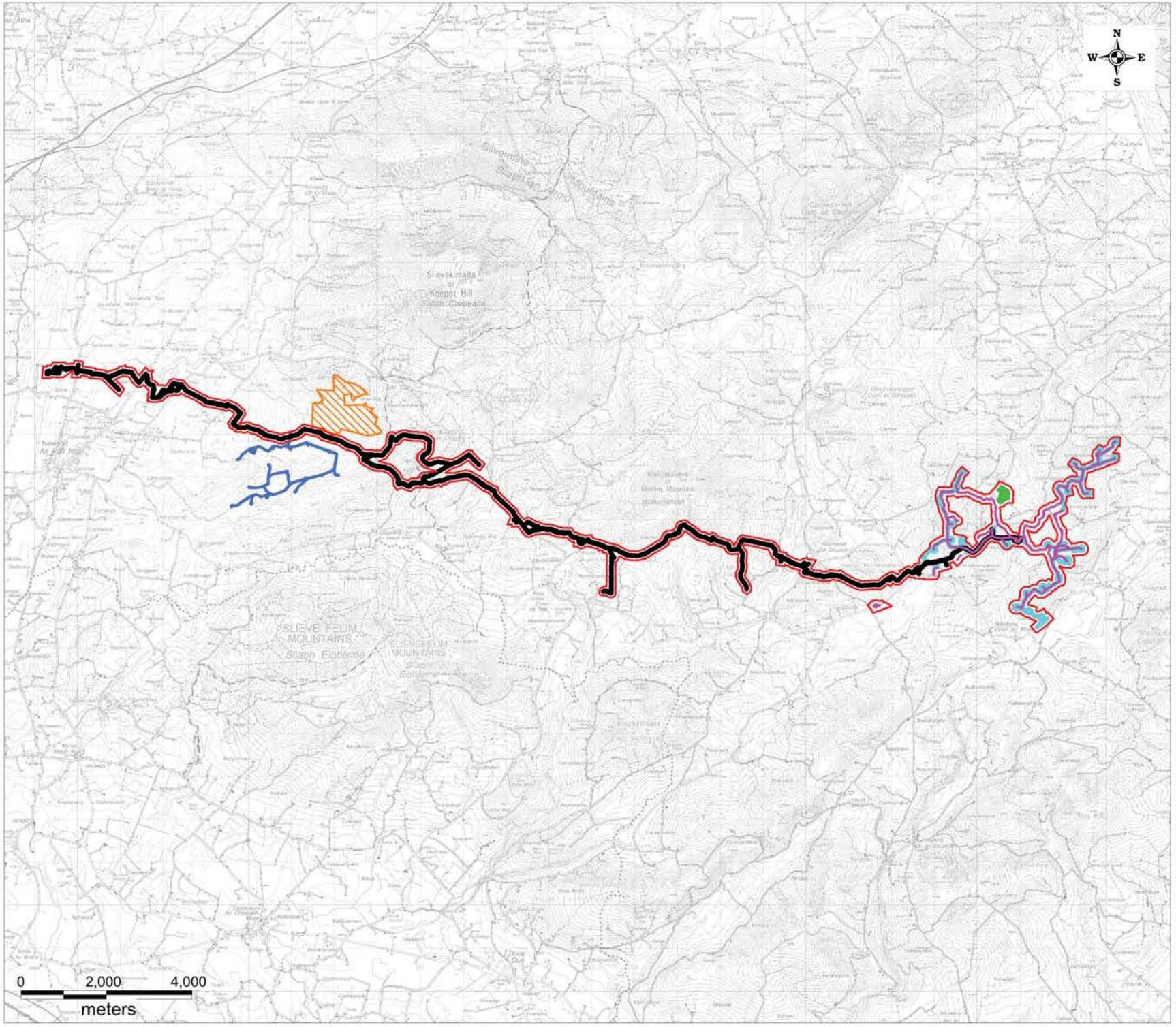
Client: Ecopower Developments Ltd.	
Job: UWF Related Works	
Title: Lower River Shannon SAC within the Cumulative Evaluation Study Area	
Figure No: Figure CE 10.4	
Drawing No: P1299-2-0318-FCE-10-4-A3-0A	
Sheet Size: A3	Project No: P1299-2
Scale: 1:85,000	Drawn By: GD
Date: 12/03/2018	Checked By: MG



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Client: Ecopower Developments Ltd.

Job: UWF Related Works

Title: Bleanbeg Bog NHA within the Cumulative Evaluation Study Area

Figure No: Figure CE 10.5

Drawing No: P1299-2-0318-FCE-10-5-A3-0A

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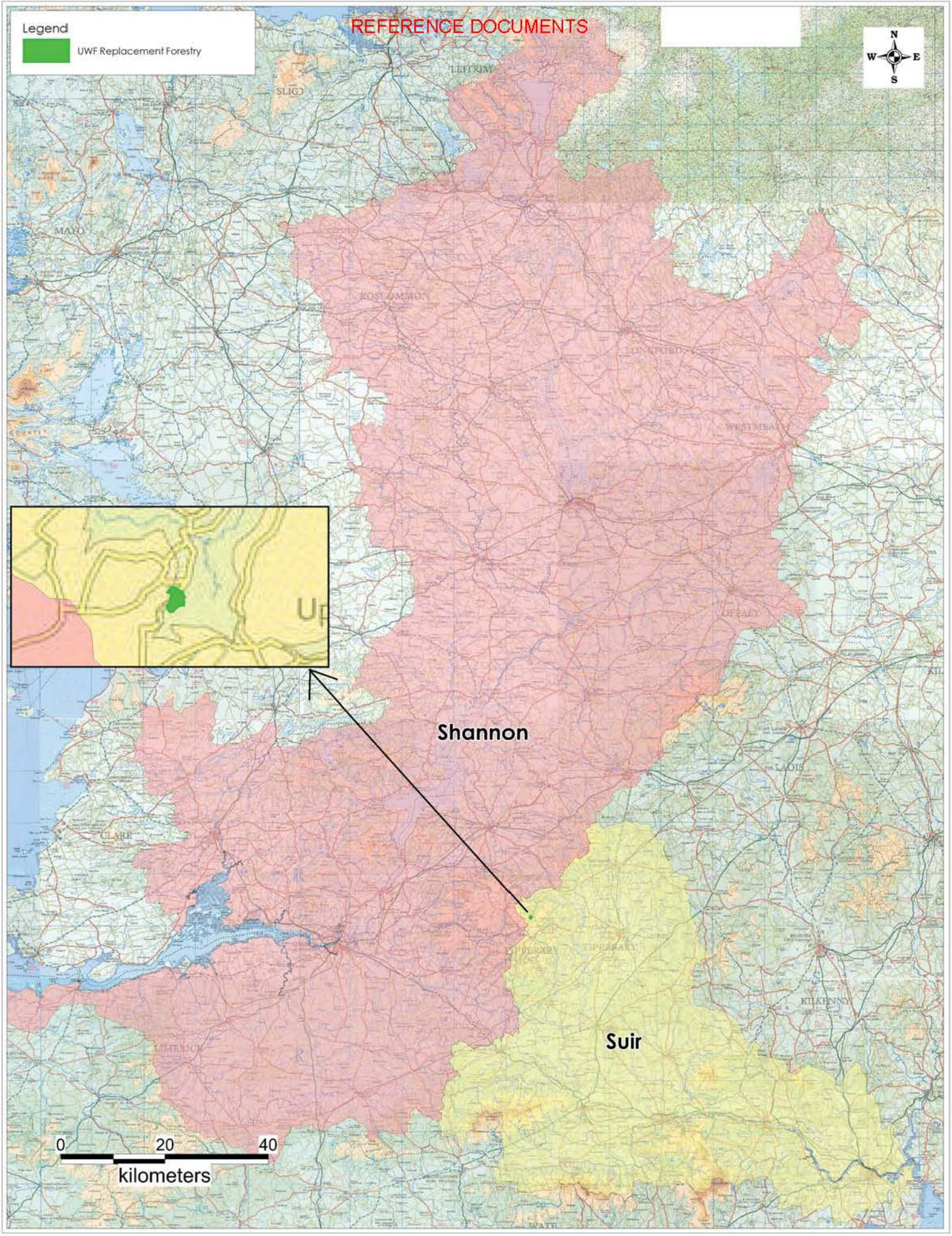
Scale: 1:85,000	Drawn By: GD
Date: 12/03/2018	Checked By: MG



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Job: UWF Replacement Forestry	Sheet Size: A3	Project No: P1299-2
Title: Location of the UWF Replacement Forestry - River-Basin	Scale: 1:650,000	Drawn By: GD
Figure No: Figure RF 11.1.1	Date: 12/03/2018	Checked By: MG

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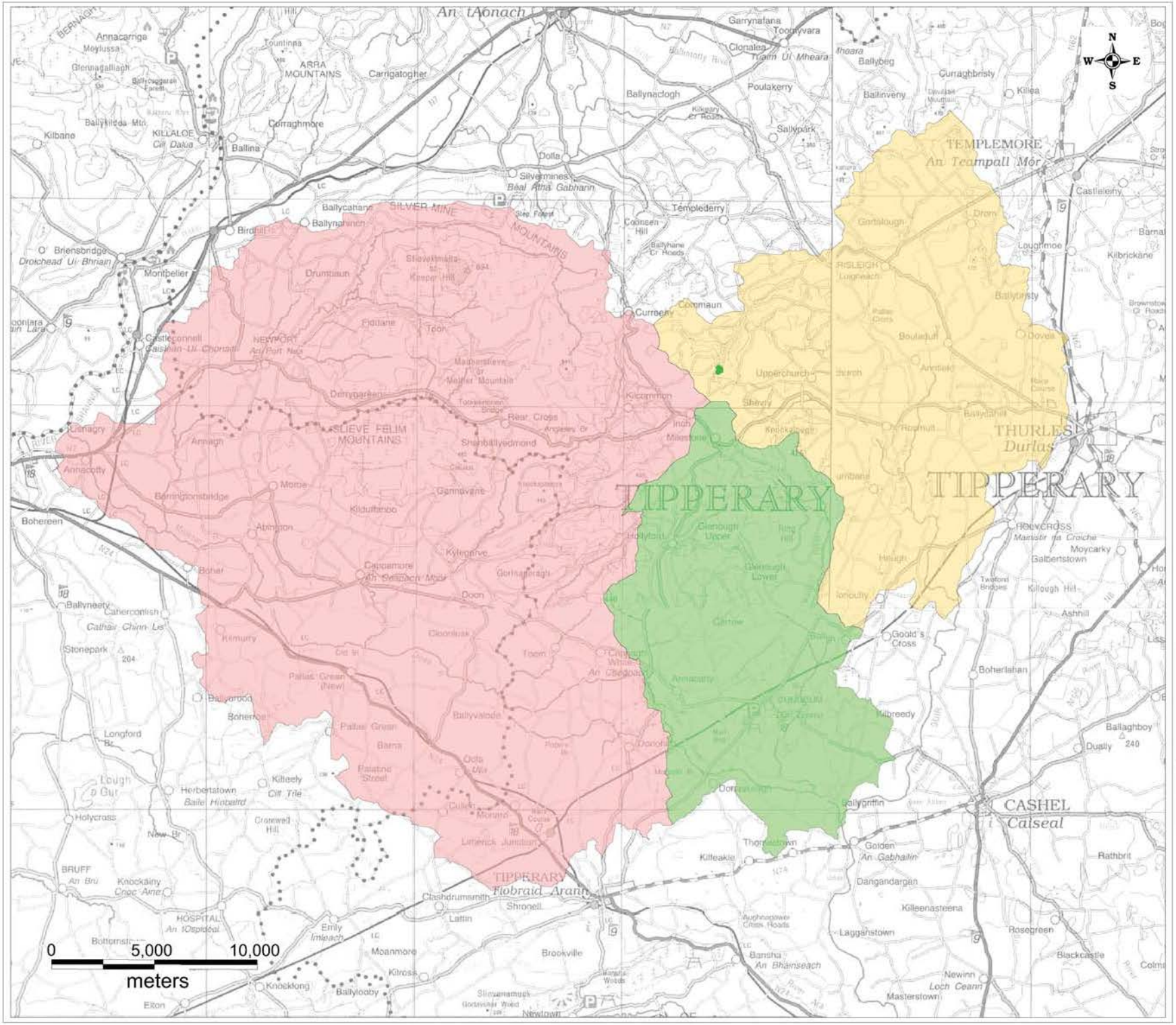

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Client: Ecopower Development Ltd.	
Job: UWF Replacement Forestry	
Title: Location of the UWF Replacement Forestry - Regional Hydrology	
Figure No: Figure RF 11.1.2	
Drawing No: P1299-2-0318-FRF-11-1-2-A3-0A	
Sheet Size: A3	Project No: P1299-2
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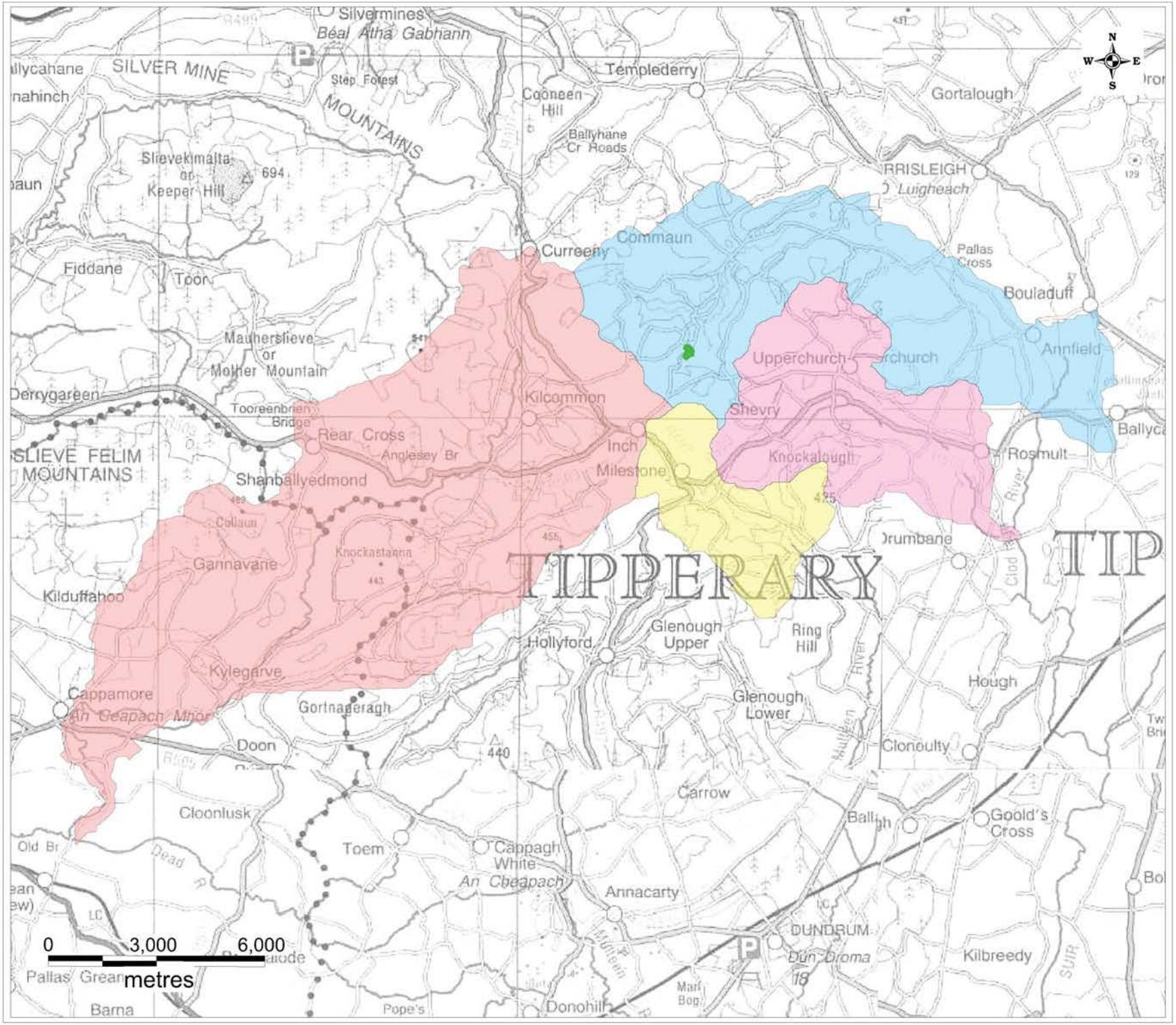

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Client: Ecopower Development Ltd.	
Job: UWF Replacement Forestry	
Title: Local Surface Waterbodies within the UWF Replacement Forestry Study Area	
Figure No: Figure RF 11.2.1	
Drawing No: P1299-2-0318-FRF-11-2-1-A3-0A	
Sheet Size: A3	Project No: P1299-2
Scale: 1:100,000	Drawn By: GD
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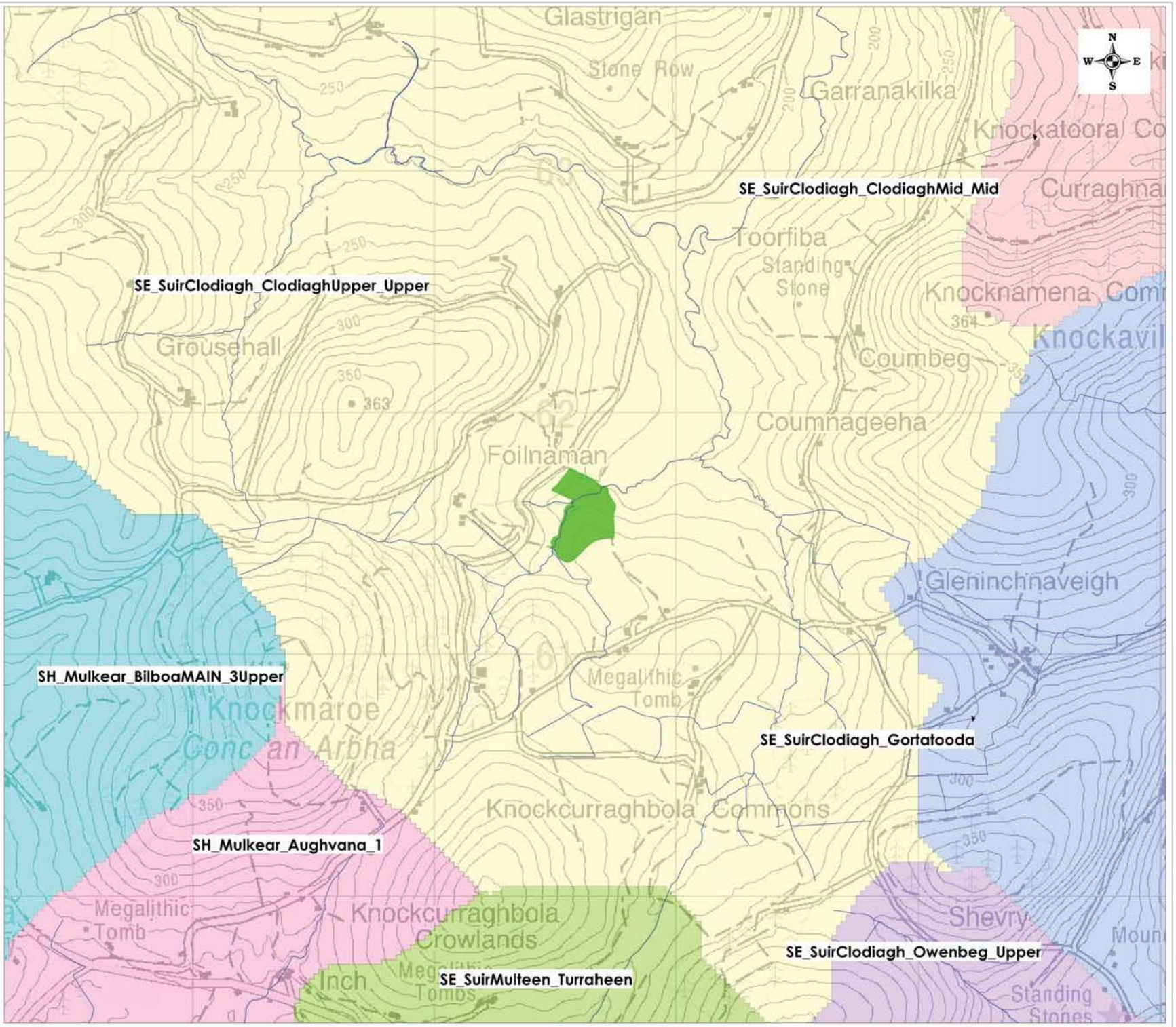

Legend

- Replacement Forestry Border
- Watercourse

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Client: Ecopower Developments Ltd.	
Job: UWF Replacement Forestry	
Title: Local Surface Waterbodies (WFD) within the UWF Replacement Forestry Study Area	
Figure No: Figure RF 11.2.2.	
Drawing No: P1299-2-0318-FRF-11-2-2-A3-0A	
Sheet Size: A3	Project No: P1299-2
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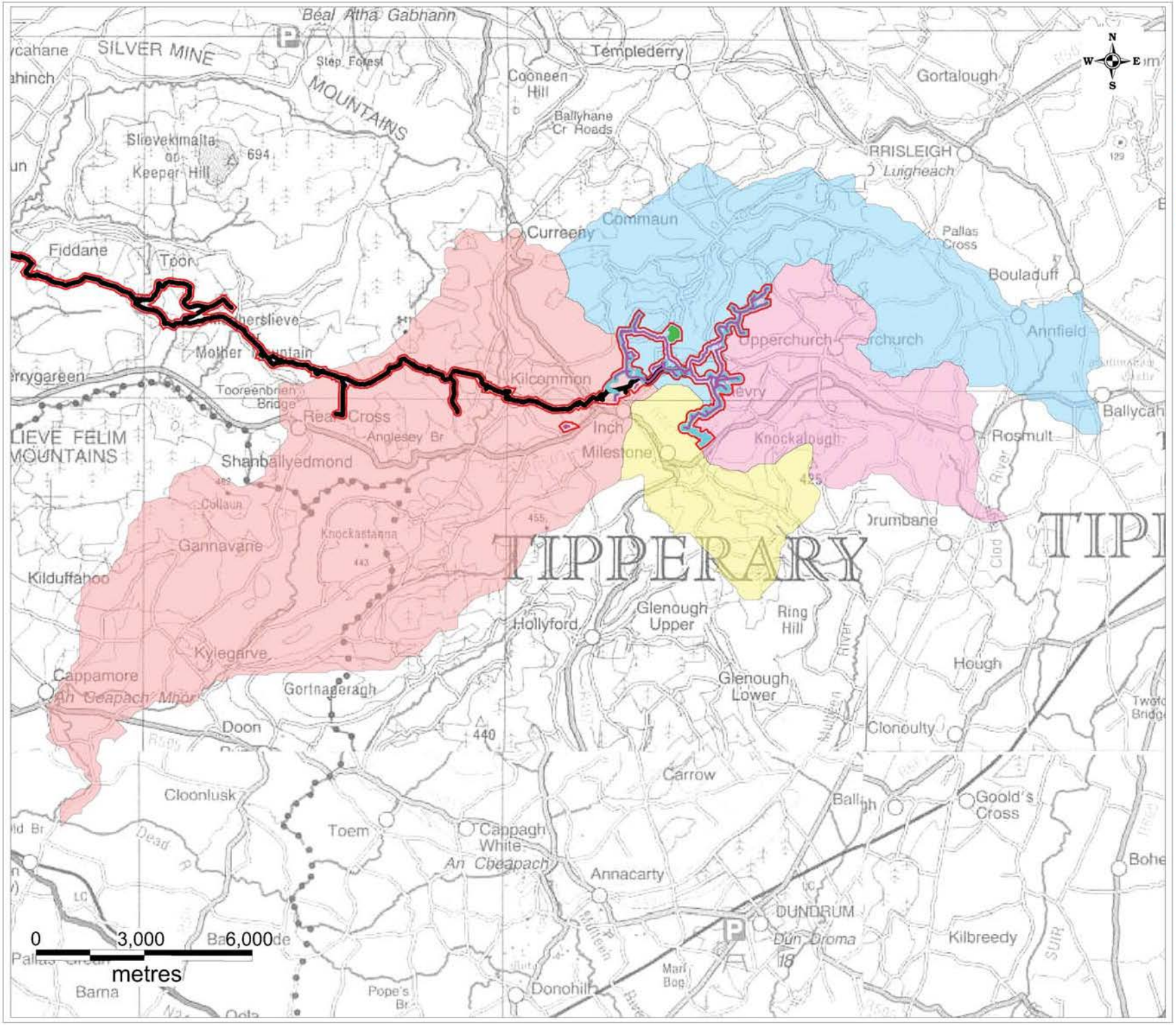

Legend

- UWF Grid Connection Construction Works Area Boundary
- UWF Related Works Construction Works boundary
- Upperchurch Windfarm Construction Works Boundary
- UWF Replacement Forestry Border
- 100m Buffer for the Whole UWF Project
- Owenbeg River
- Turraheen River
- Clodiagh River Local
- Bilboa River

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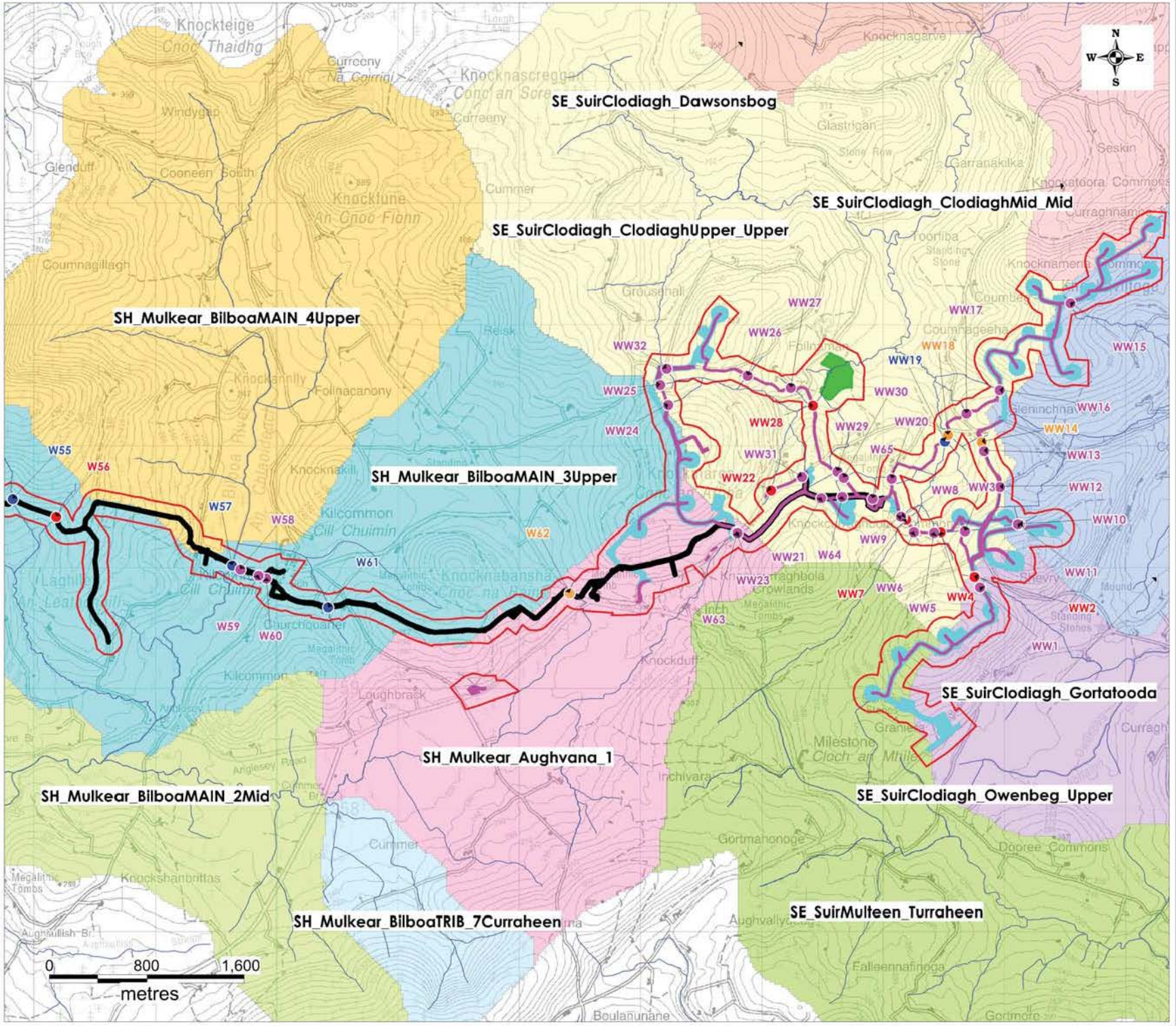
Client: Ecopower Development Ltd.	
Job: UWF Replacement Forestry	
Title: Local Surface Waterbodies within the Cumulative Evaluation Study Area	
Figure No: Figure CE 11.2.1	
Drawing No: P1299-2-0318-FCE-11-2-1-A3-0A	
Sheet Size: A3	Project No: P1299-2
Scale: 1:100,000	Drawn By: GD
Date: 14/03/2018	Checked By: MG



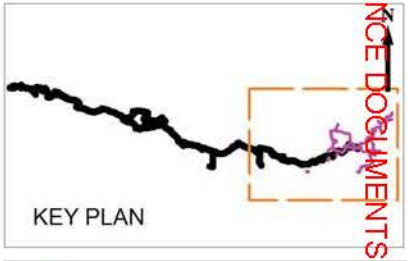
Legend

- UWF Grid Connection Construction Works Area Boundary
- UWF Related Works Construction Works boundary
- Upperchurch Windfarm Construction Works Boundary
- UWF Replacement Forestry Border
- 100m Buffer for the Whole UWF Project
- Watercourse

Watercourse Crossing Class Type

- Class 1_EPA Blueline
- Class 2_EPA Blueline Equivalent
- Class 3_Sub Optimal
- Class 4_Drainage Ditch

*Note: W - Grid Connection Watercourse Crossing
WW - Related Works Watercourse Crossing



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web: www.hydroenvironmental.ie

Client: Ecopower Developments Ltd.	
Job: UWF Replacement Forestry	
Title: Local Surface Waterbodies (WFD) within the Cumulative Evaluation Study Area	
Figure No: Figure CE 11.2.2.	
Drawing No: P1299-2-0318-FCE-11-2-2-A3-0A	
Sheet Size: A3	Project No: P1299-2
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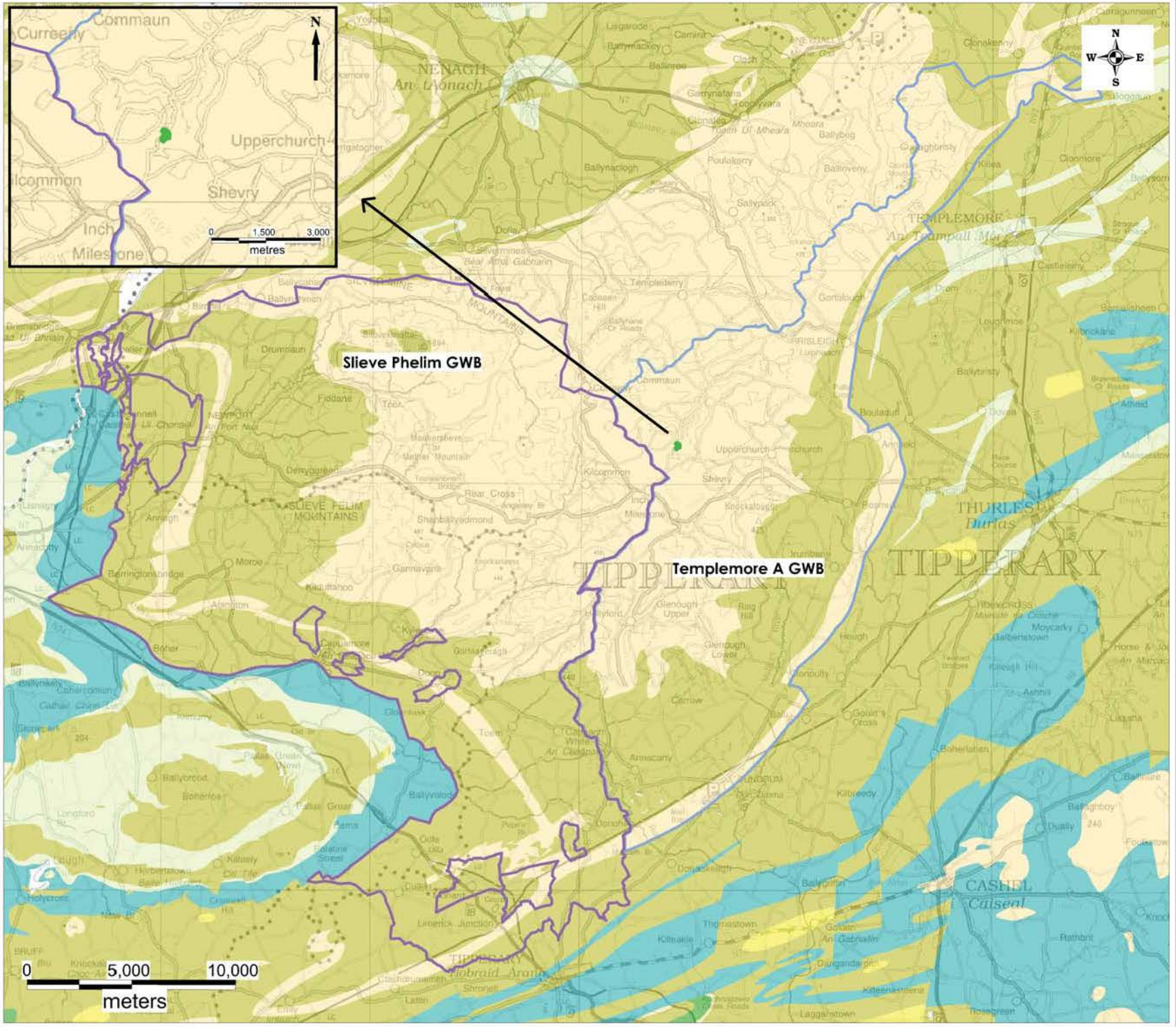
Date: 13/03/2018	Checked By: MG



Legend

UWF Related Works Construction Works Boundary

Groundwater Bodies

- Slieve Phelim GWB Boundary
- Templemore A GWB Boundary

Aquifer Type

- Locally Important Aquifer - Karstified
- Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Locally Important Aquifer - Bedrock which is Generally Moderately Productive
- Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Locally Important Aquifer - Bedrock which is Generally Moderately Productive
- Regionally Important Aquifer - Karstified (diffuse)

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Client: Ecopower Developments Ltd.

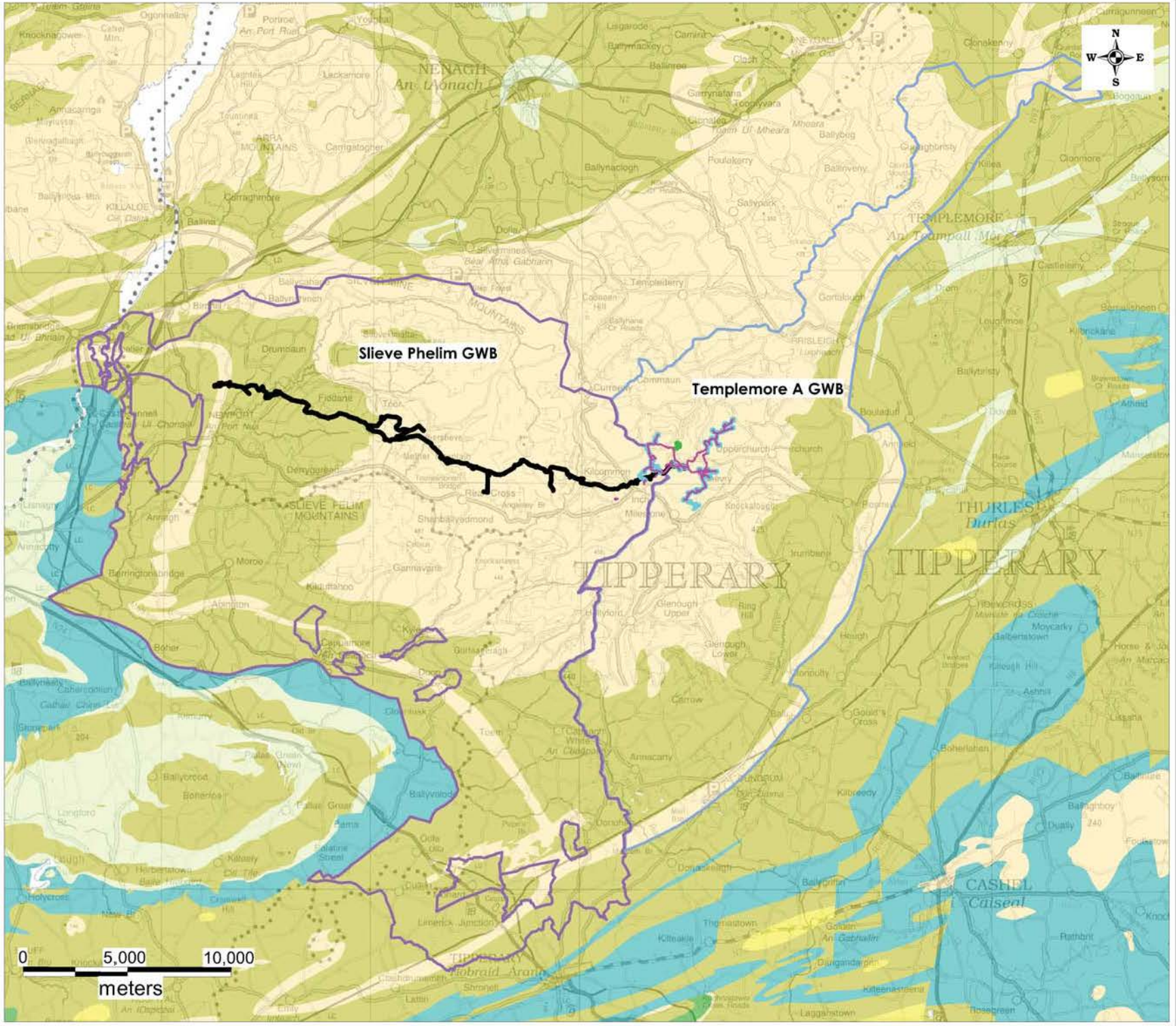
Job: UWF Replacement Forestry

Title: Local Groundwater Bodies within the UWF Replacement Forestry Study Area

Figure No: Figure RF 11.3

Drawing No: P1299-2-0318-FRF-11-3-A3-0A

Sheet Size: A3	Project No: P1299-2
Scale: 1:175,000	Drawn By: GD
Date: 14/03/2018	Checked By: MG



Legend

- UWF Grid Connection Construction Works Area Boundary
- UWF Related Works Construction Works boundary
- Upperchurch Windfarm Construction Works Boundary
- UWF Replacement Forestry Border

Groundwater Bodies

- Slieve Phelim GWB Boundary
- Templemore A GWB Boundary

Aquifer Type

- Locally Important Aquifer - Karstified
- Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Locally Important Aquifer - Bedrock which is Generally Moderately Productive
- Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Locally Important Aquifer - Bedrock which is Generally Moderately Productive
- Regionally Important Aquifer - Karstified (diffuse)

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Client: Ecopower Developments Ltd.

Job: UWF Replacement Forestry

Title: Local Groundwater Bodies within the Cumulative Evaluation Study Area

Figure No: Figure CE 11.3

Drawing No: P1299-2-0318-FCE-11-3-A3-0A

Sheet Size: A3	Project No: P1299-2
Scale: 1:175,000	Drawn By: GD
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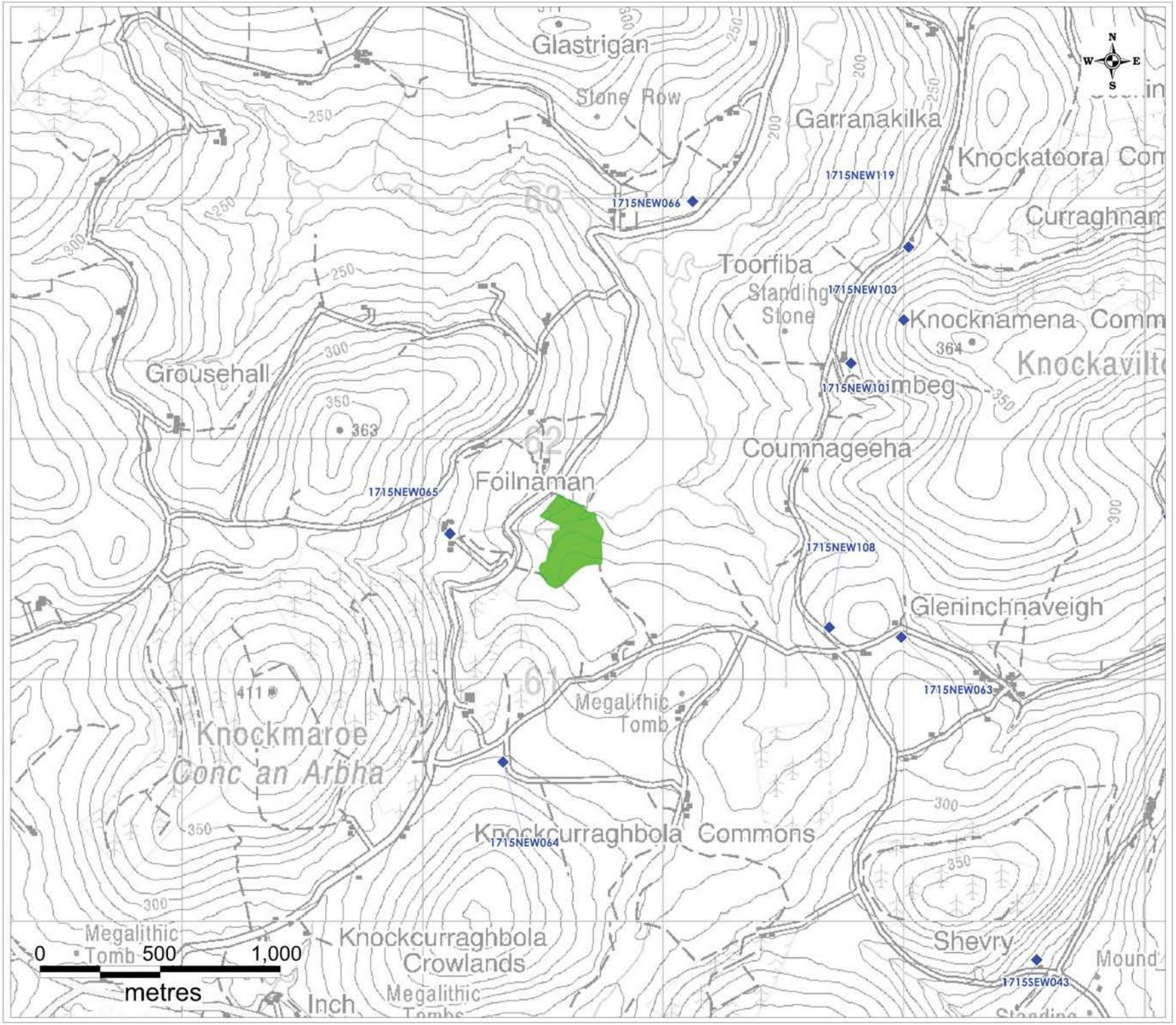

Legend

- UWF Replacement Forestry
- Mapped GSI Wells (accuracy <50m)

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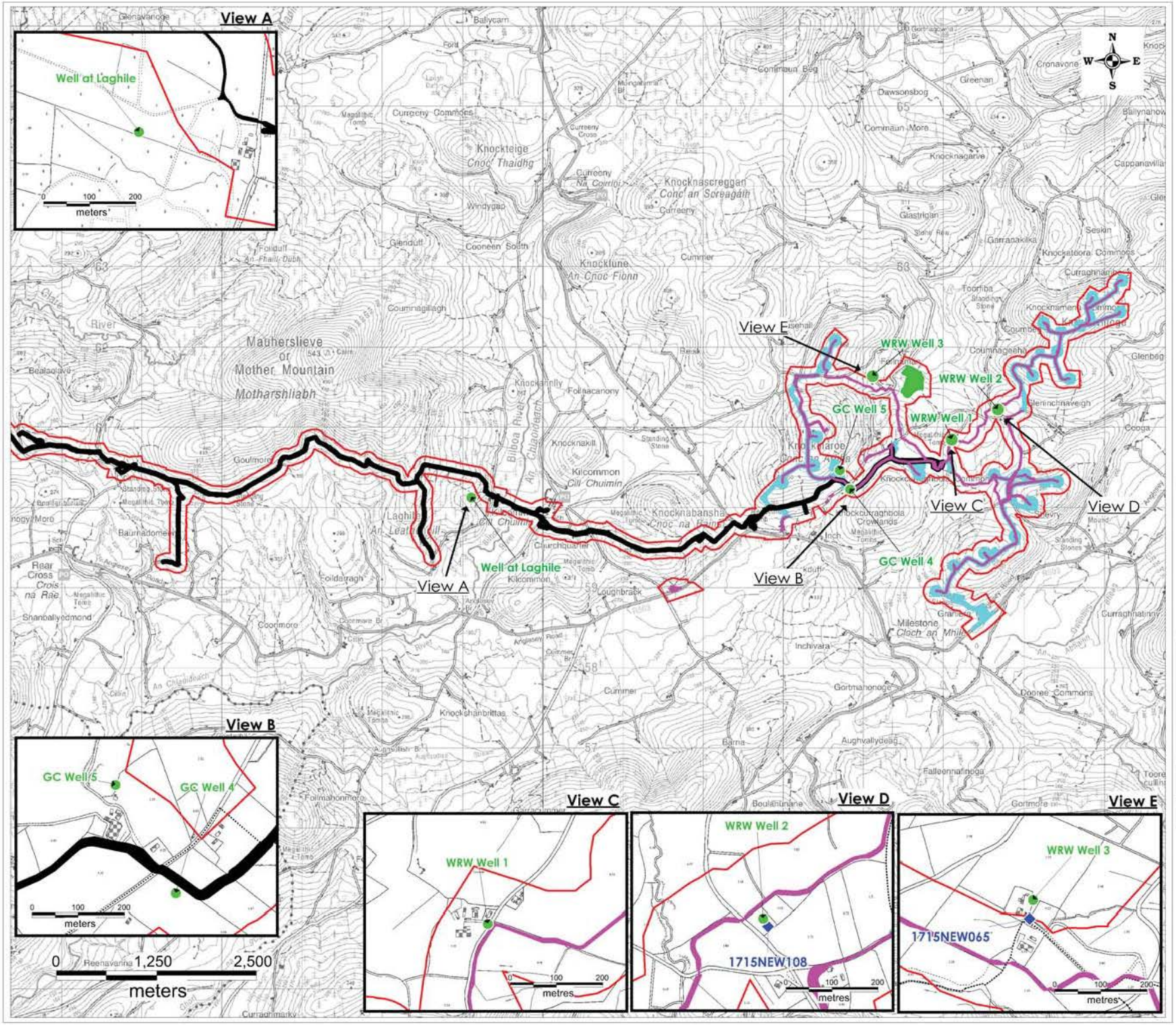
Client: Ecopower Development Ltd.	
Job: UWF Replacement Forestry	
Title: Local Wells & Springs within the UWF Replacement Forestry Study Area	
Figure No: Figure RF 11.4.	
Drawing No: P1299-2-0318-FRF-11-4-A3-0A	
Sheet Size: A3	Project No: P1299-2
Scale: 1:15,000	Drawn By: GD
Date: 14/03/2018	Checked By: MG



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Client: Ecopower Development Ltd.

Job: UWF Replacement Forestry

Title: Local Wells & Springs within the Cumulative Evaluation Study Area

Figure No: Figure CE 11.4

Drawing No: P1299-2-0218-FCE-11-4-2-A3-0A

Sheet Size: A3	Project No: P1299-2
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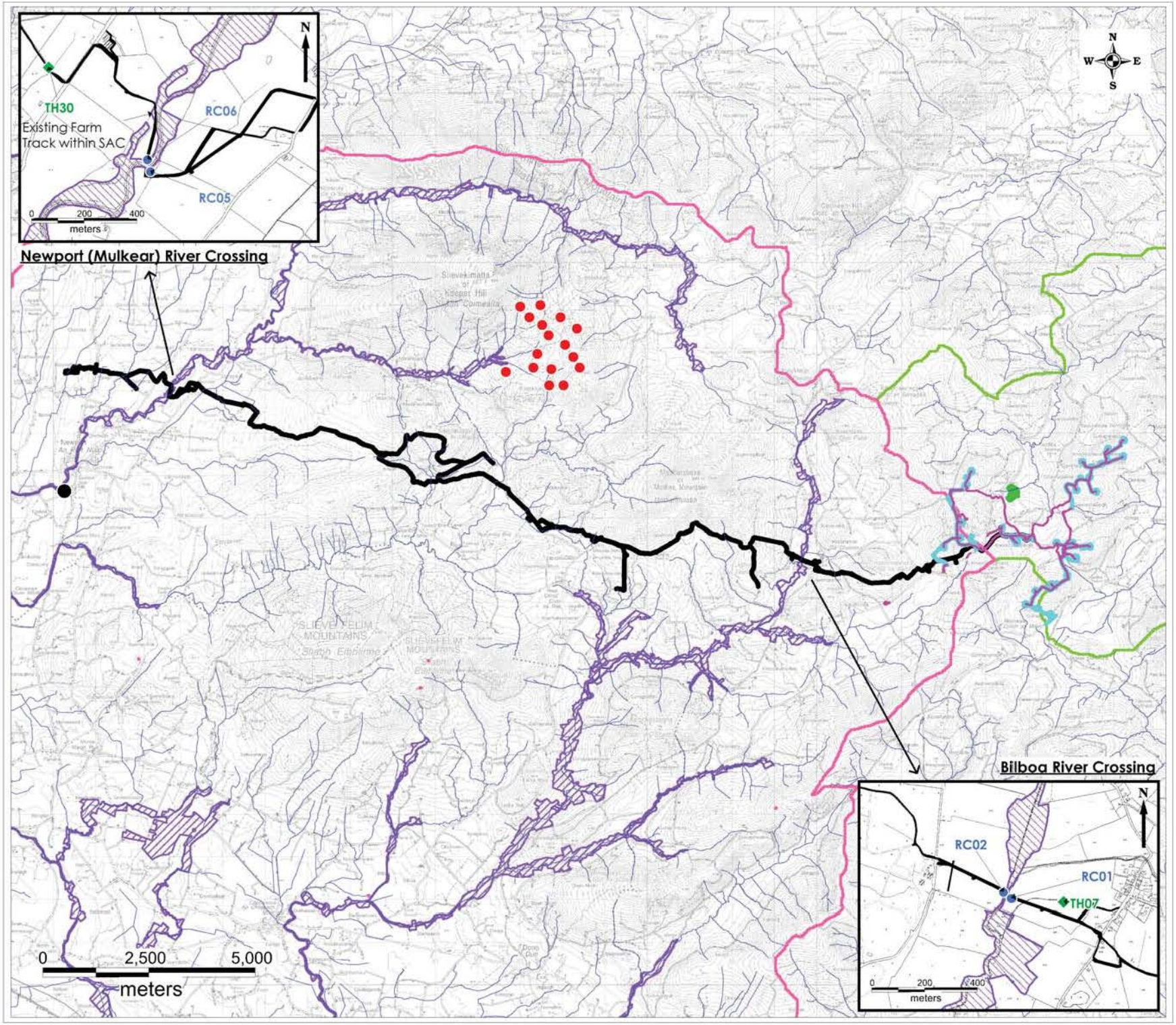

Legend

- UWF Grid Connection Construction Works Area Boundary
- UWF Related Works Construction Works boundary
- Upperchurch Windfarm Construction Works Boundary
- Lower River Shannon SAC
- Bunkimalta WF Turbines
- Proposed Newport Town Distribution Road
- Mulkear River Catchment
- Clodiagh River Catchment
- UWF Replacement Forestry Border
- Watercourse
- Borehole Sampling Locations
- Grid Connection Trial Pits

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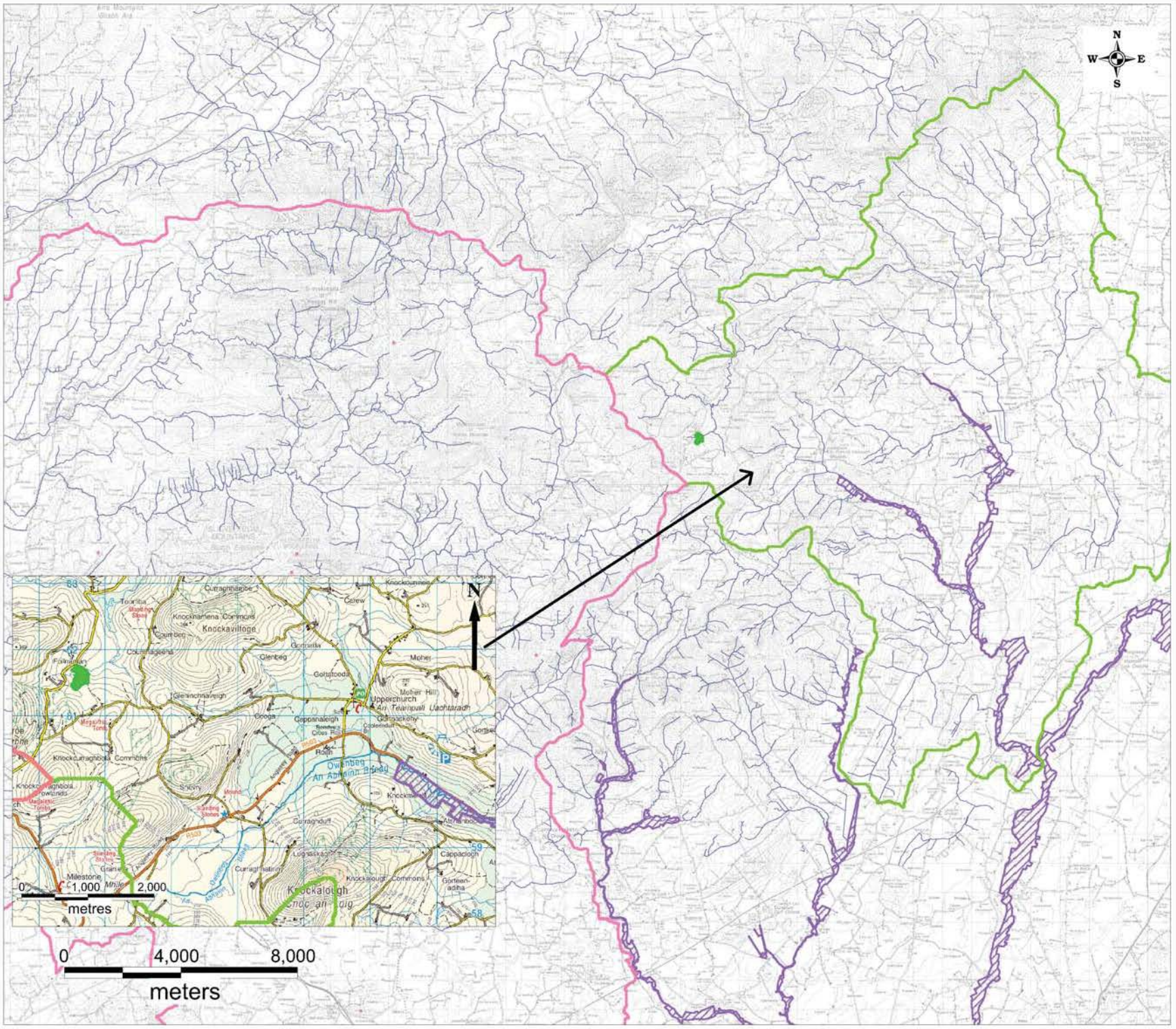
Client: Ecopower Developments Ltd.	
Job: UWF Related Works	
Title: Lower River Shannon SAC within the Cumulative Evaluation Study Area	
Figure No: Figure CE 11.5	
Drawing No: P1299-2-0318-FCE-11-5-A3-0A	
Sheet Size: A3	Project No: P1299-2
Scale: 1:85,000	Drawn By: GD
Date: 13/03/2018	Checked By: MG



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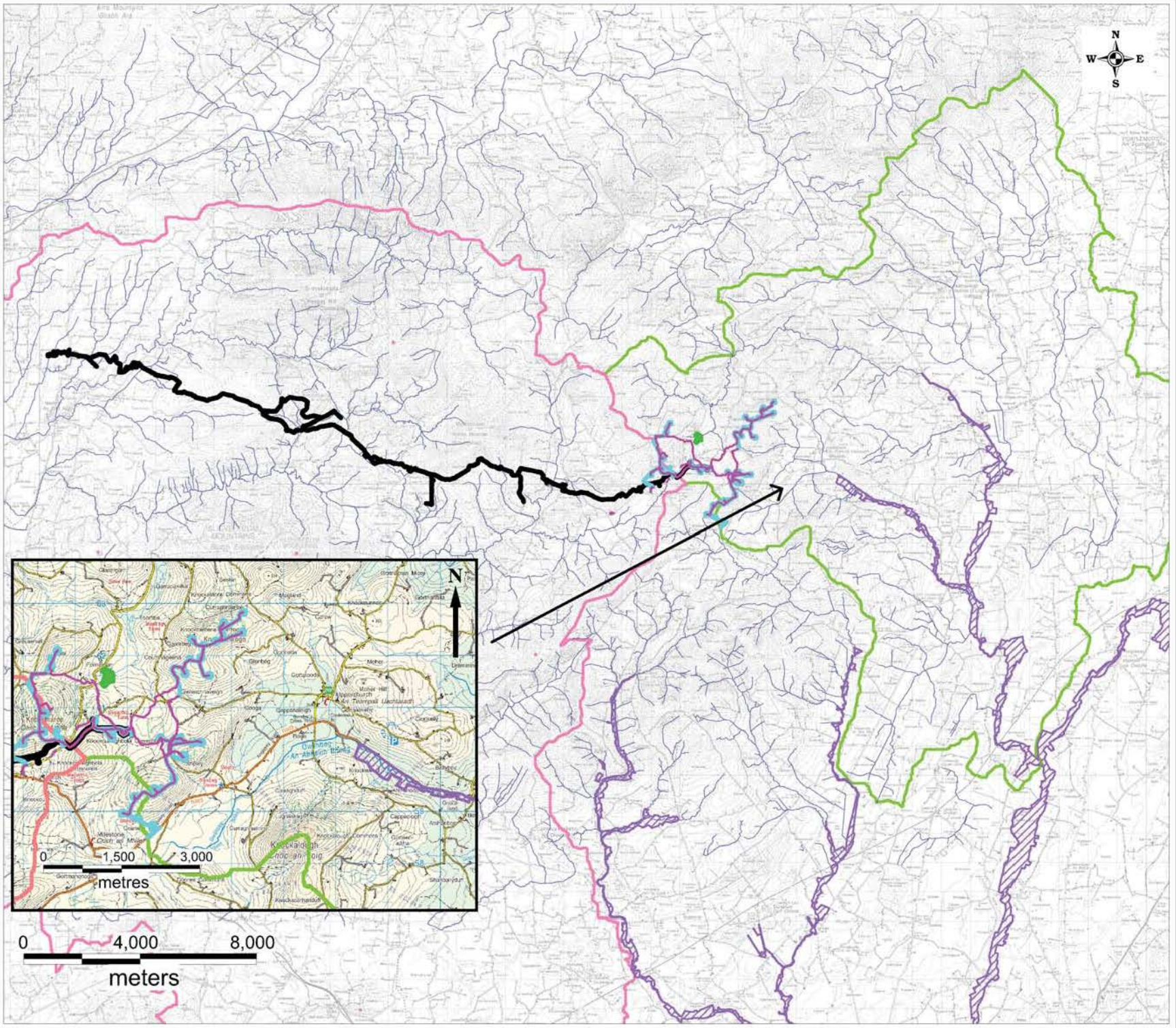
Client: Ecopower Developments Ltd.	
Job: UWF Replacement Forestry	
Title: Lower River Suir SAC within the UWF Replacement Forestry Study Area	
Figure No: Figure RF 11.6	
Drawing No: P1299-2-0318-FRF-11-5-A3-0A	
Sheet Size: A3	Project No: P1299-2
Scale: 1:125,000	Drawn By: GD
Date: 14/03/2018	Checked By: MG



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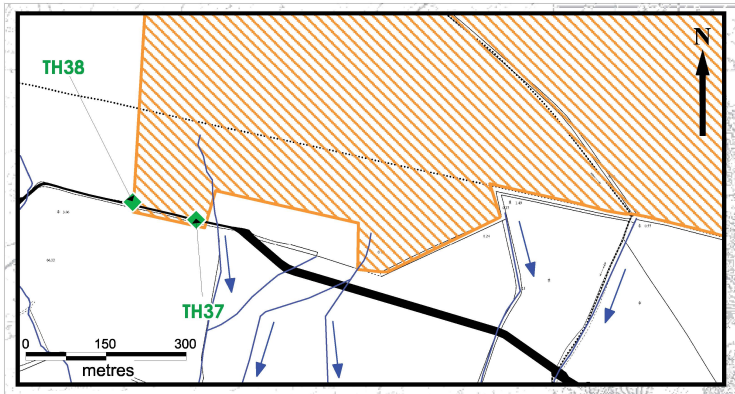
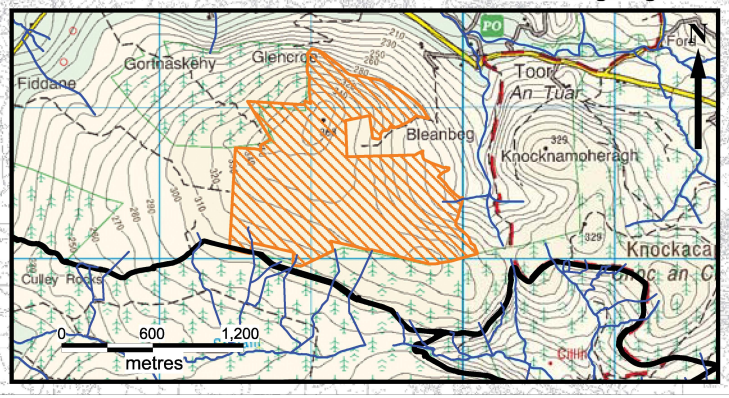
Client: Ecopower Developments Ltd.	
Job: UWF Replacement Forestry	
Title: Lower River Suir SAC within the Cumulative Evaluation Study Area	
Figure No: Figure CE 11.6	
Drawing No: P1299-2-0318-FCE-11-5-A3-0A	
Sheet Size: A3	Project No: P1299-2
Scale: 1:125,000	Drawn By: GD
Date: 14/03/2018	Checked By: MG



Bleanbeg Bog NHA



0 2,000 4,000
meters

Legend

- UWF Grid Connection Construction Works Area Boundary
- Related Works Construction Works boundary
- Upperchurch Windfarm Construction Works Boundary
- Bleanbeg Bog NHA
- Replacement Forestry Border
- Watercourse
- Surface Water Flow Direction
- Grid Connection Trial Pits

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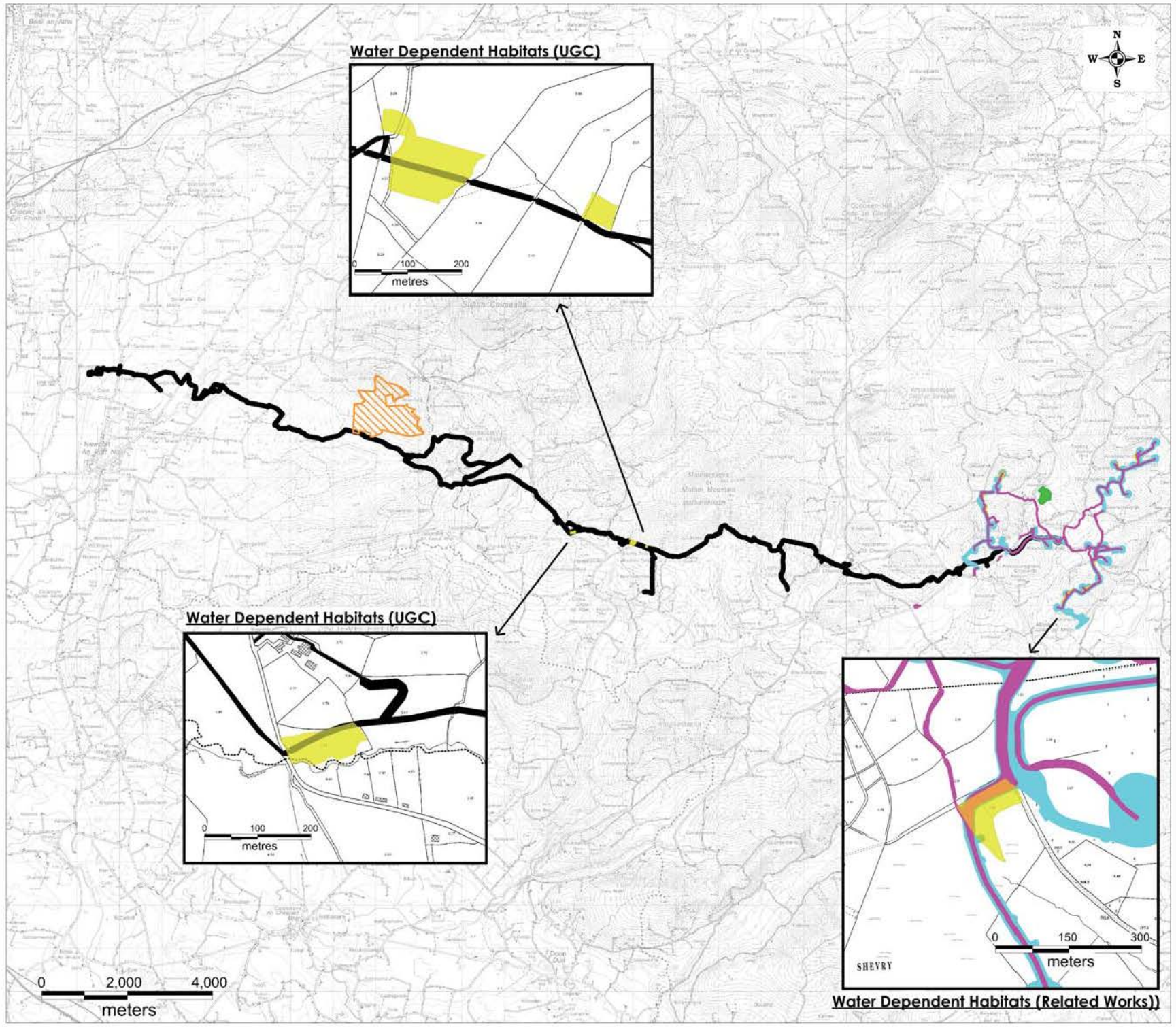
Client: Ecopower Developments Ltd.	
Job: Upperchurch WF Grid Connection	
Title: Bleanbeg Bog NHA within the Cumulative Evaluation Study Area	
Figure No: Figure CE 11.7	
Drawing No: P1299-2-0218-FCE-11-7-A3-0A	
Sheet Size: A3	Project No: P1299-2
Scale: 1:85,000	Drawn By: GD
Date: 12/02/2018	Checked By: MG



Legend

- UWF Grid Connection Construction Works Area Boundary
- Related Works Construction Works boundary
- Upperchurch Windfarm Construction Works Boundary
- Bleanbeg Bog NHA
- Water Dependent Habitats
- Replacement Forestry Border

*Note: Smaller maps show Local Water Dependent Habitats that are intersected or adjacent to Cable Route
Other Water Dependent Habitats are shown on the main map but these are remote from the Cable Route

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Client: Ecopower Developments Ltd.

Job: UWF Replacement Forestry

Title: Local Water Dependent Habitats within the Cumulative Evaluation Study Area

Figure No: Figure CE 11.8

Drawing No: P1299-2-0218-FCE-11-8-A3-0A

Sheet Size: A3	Project No: P1299-2
Scale: 1:85,000	Drawn By: GD
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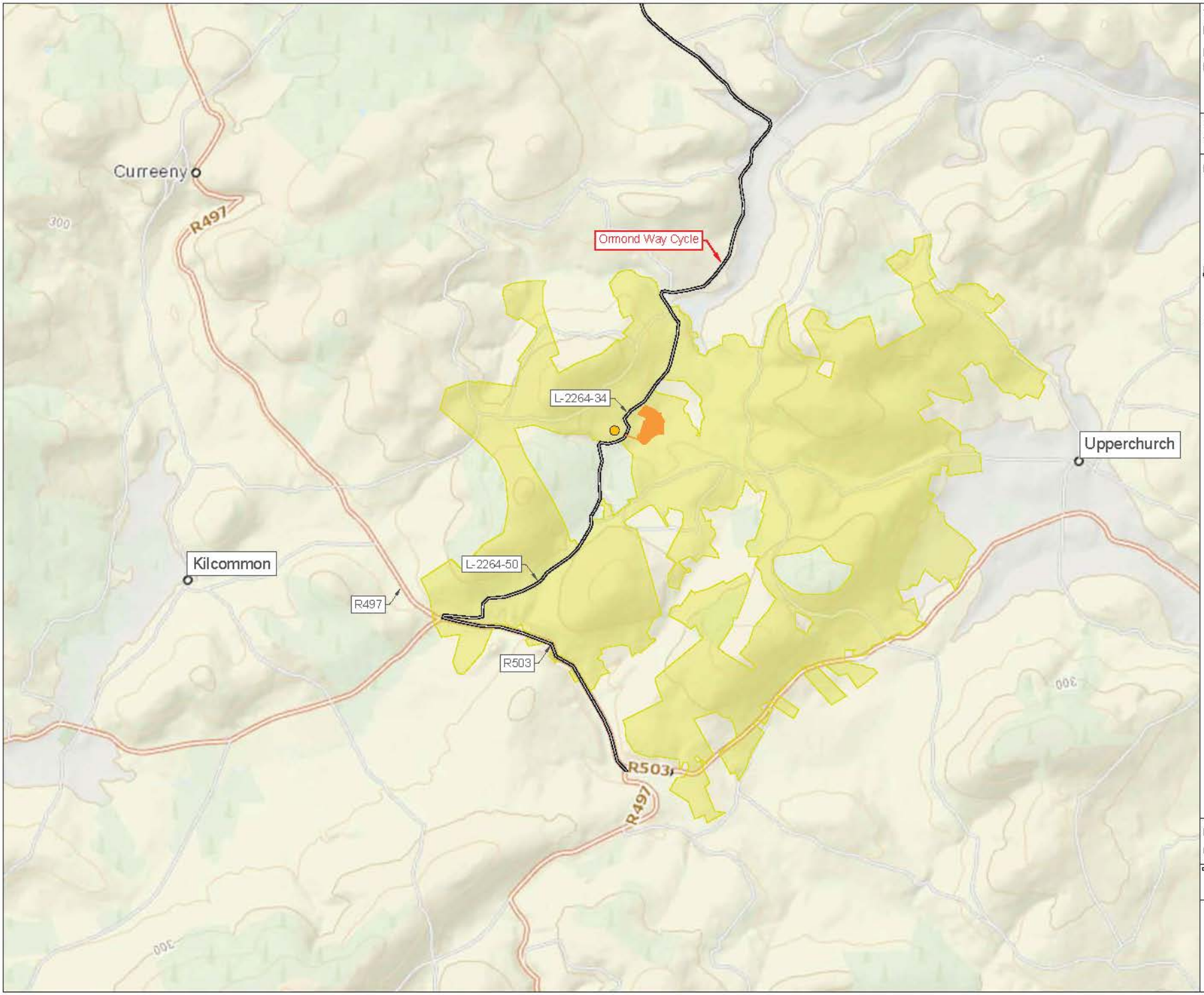

Title:

Figure RF 12.1

Location of the UWF Replacement Forestry

Map Number:
1 of 1

Legend:

- UWF Replacement Forestry Area
- Landholding: Agricultural Land
- Cycling Route
- L-2264-34 Local Road Number
- House between 51m and 100m of UWF Replacement Forestry Area
- Kilcommon Village

REFERENCE DOCUMENTS

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Project:
UWF Replacement Forestry (RF)

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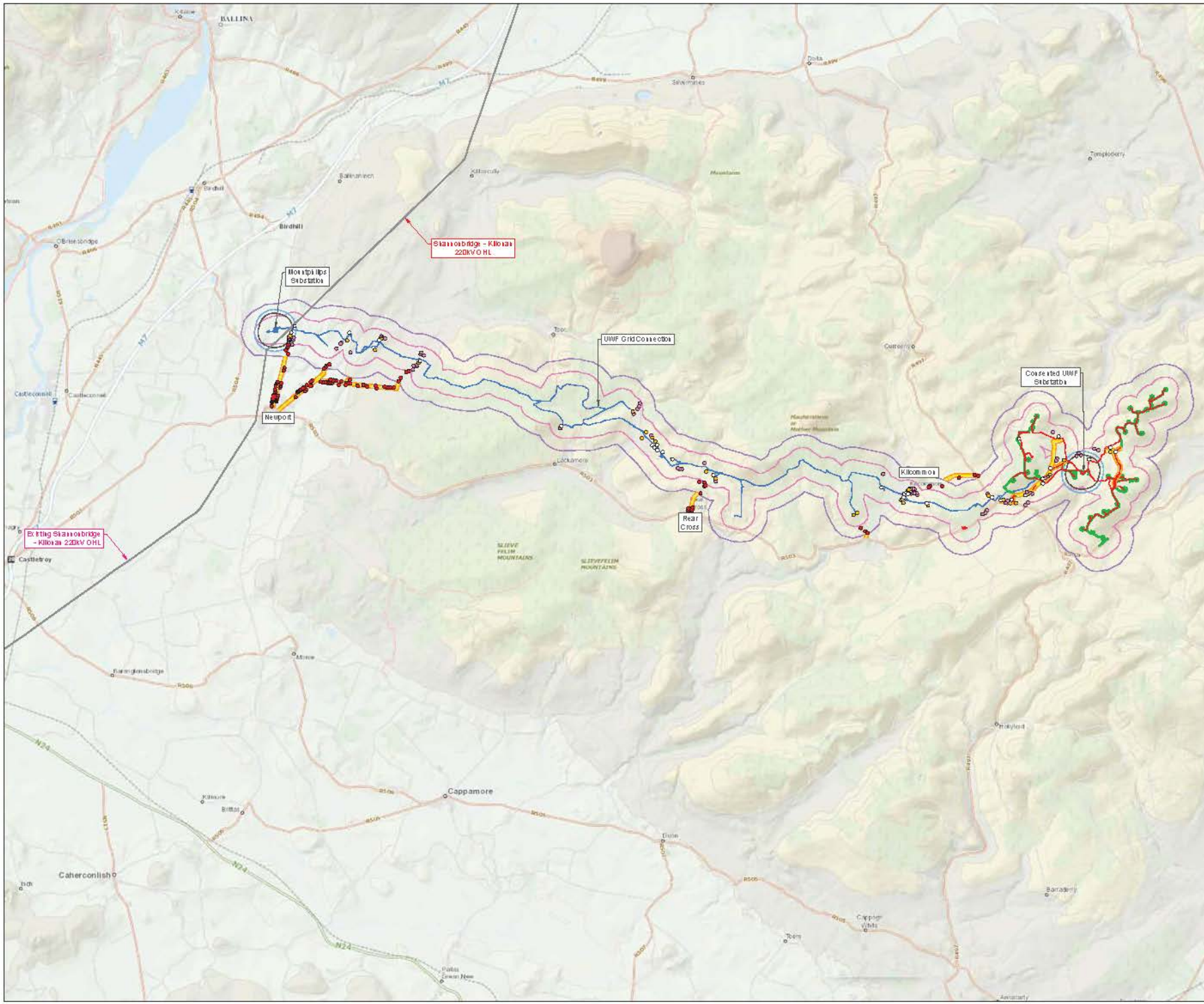

Title:
Figure CE 12.2.1

Local Reisdents & Community (Dust, Noise) within the Cumulative Evaluation Study Area

Map Number:
1 of 1

Legend:

Study Area:

- UWF Grid Connection Construction Works Area
- UWF Related Works Construction Works Area
- Upperchurch Windfarm Construction Works Area
- **Air Quality,Noise & Vibration:** 350m Study Area from all of the Construction Works Areas
- **Air Quality,Noise & Vibration:** 700m Study Area from all of the Construction Works Areas
- **Air Quality,Noise & Vibration:** 400m Study Area from Substations
- **Air Quality,Noise & Vibration:** 500m Study Area from Substations
- **Air Quality,Noise & Vibration:** 50m from the Haul Route Roads
- Haul Route Roads

Survey Results:

- Shannonbridge - Killonan 220kV OHL
- **Air Quality:** Houses 50m from Local Haul Roads
- **Air Quality:** Houses within 50m of Construction Works Area
- **Air Quality:** Houses between 51m and 100m of Construction Works Area
- **Air Quality:** Houses between 101m and 350m of Construction Works Area

N

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Project:
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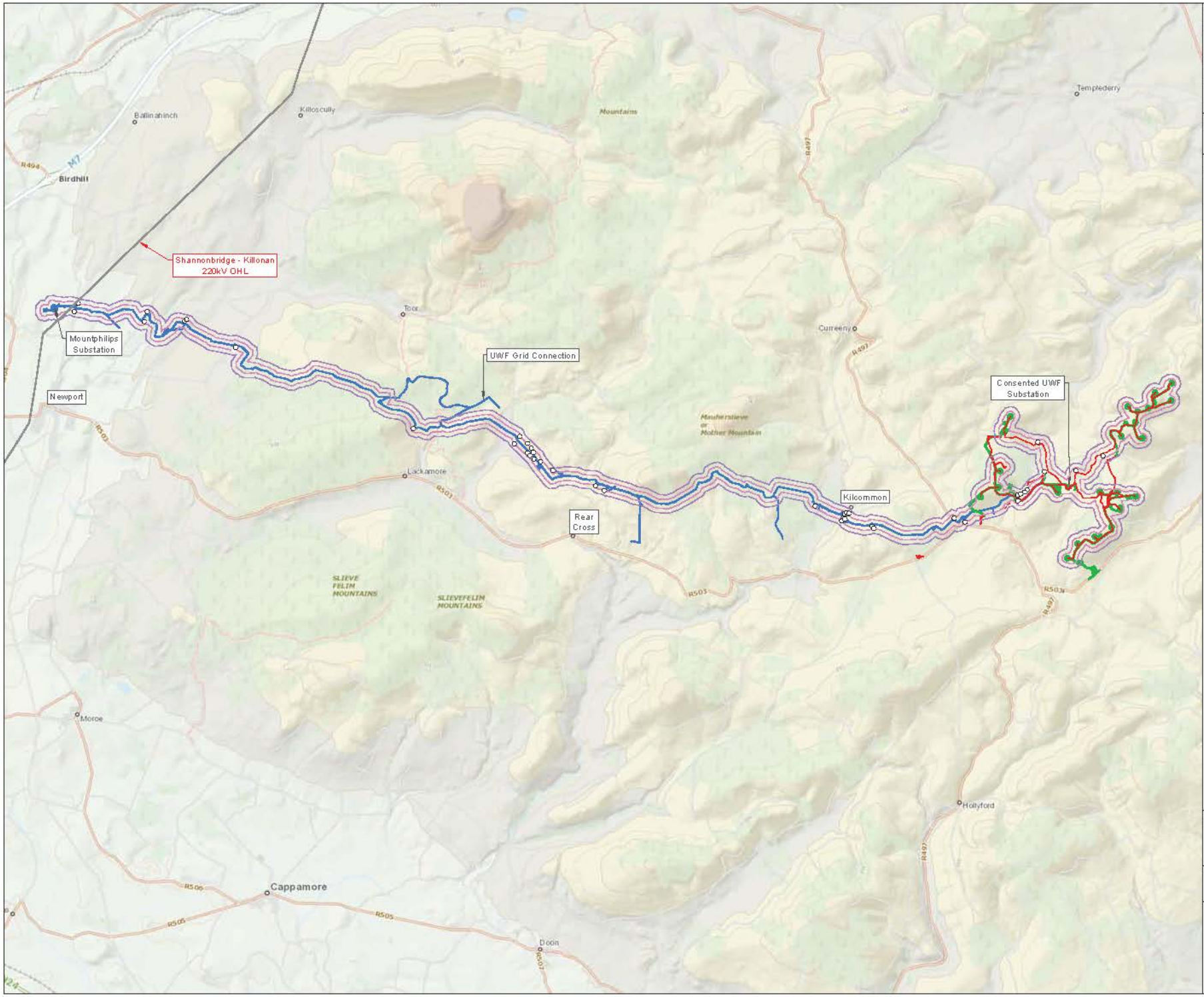

Title:

Figure CE 12.2.2

Local Reisdents & Community (EMF) within the Cumulative Evaluation Study Area

Map Number:
1 of 1

Legend:

Study Area:

- UWF Grid Connection Construction Works Area
- UWF Related Works Construction Works Area
- Upperchurch Windfarm Construction Works Area
- **EMF:** 100m Study Area
  - Mountphilips Substation
  - UWF Grid Connection
  - Internal Windfarm Cabling
  - Consented UWF Turbines
  - Consented UWF Substation
- **EMF:** 200m Study Area
  - Mountphilips Substation
  - UWF Grid Connecion
  - Internal Windfarm Cabling
  - Consented Upperchurch Turbines
  - Consented Upperchurch Substation

Survey Results:

- Shannonbridge - Killonan 220kV OHL
- **EMF:** Houses within the 100m Study Area

N

REFERENCE DOCUMENTS

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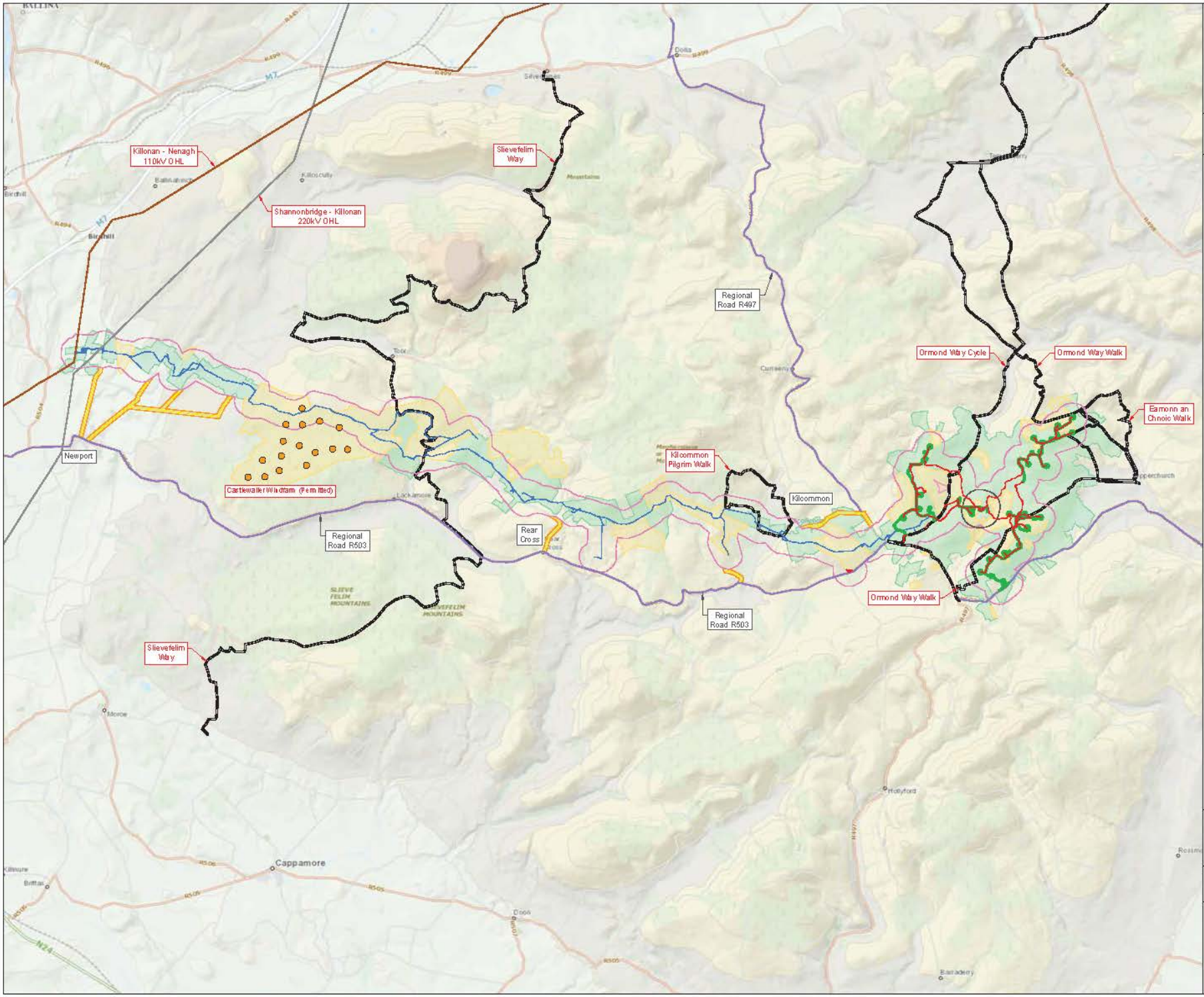

Title:

Figure CE 12.3

Transient People within the Cumulative Evaluation Study Area

Map Number:
1 of 1

Legend:

Study Area:

- UWF Grid Connection Construction Works Area
- UWF Related Works Construction Works Area
- Upperchurch Wndfarm Construction Works Area
- **Air Quality, Noise & Vibration:** 350m Study Area from all of the Construction Works Areas
- **Air Quality, Noise & Vibration:** 50m from the Haul Route Roads
- Haul Route Roads
- **Air Quality, Noise & Vibration:** Regionl Roads
- **Operational Stage Noise:** 400m Study Area
  - Consented Upperchurch Substation

Survey Results:

- **Air Quality, Noise & Vibration:** Landholding - Agricultural Land
- **Air Quality, Noise & Vibration:** Landholding - Forestry
- **Air Quality, Noise & Vibration:** Walking/Cycling Trails
- Shannonbridge - Killonan 220kV OHL
- Killonan - Nenagh 110kV OHL
- Castlewaller Wind Turbines

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Figures for Chapter 13: Climate	Tab 13 (printed version)
No mapping or figures for Chapter 13	

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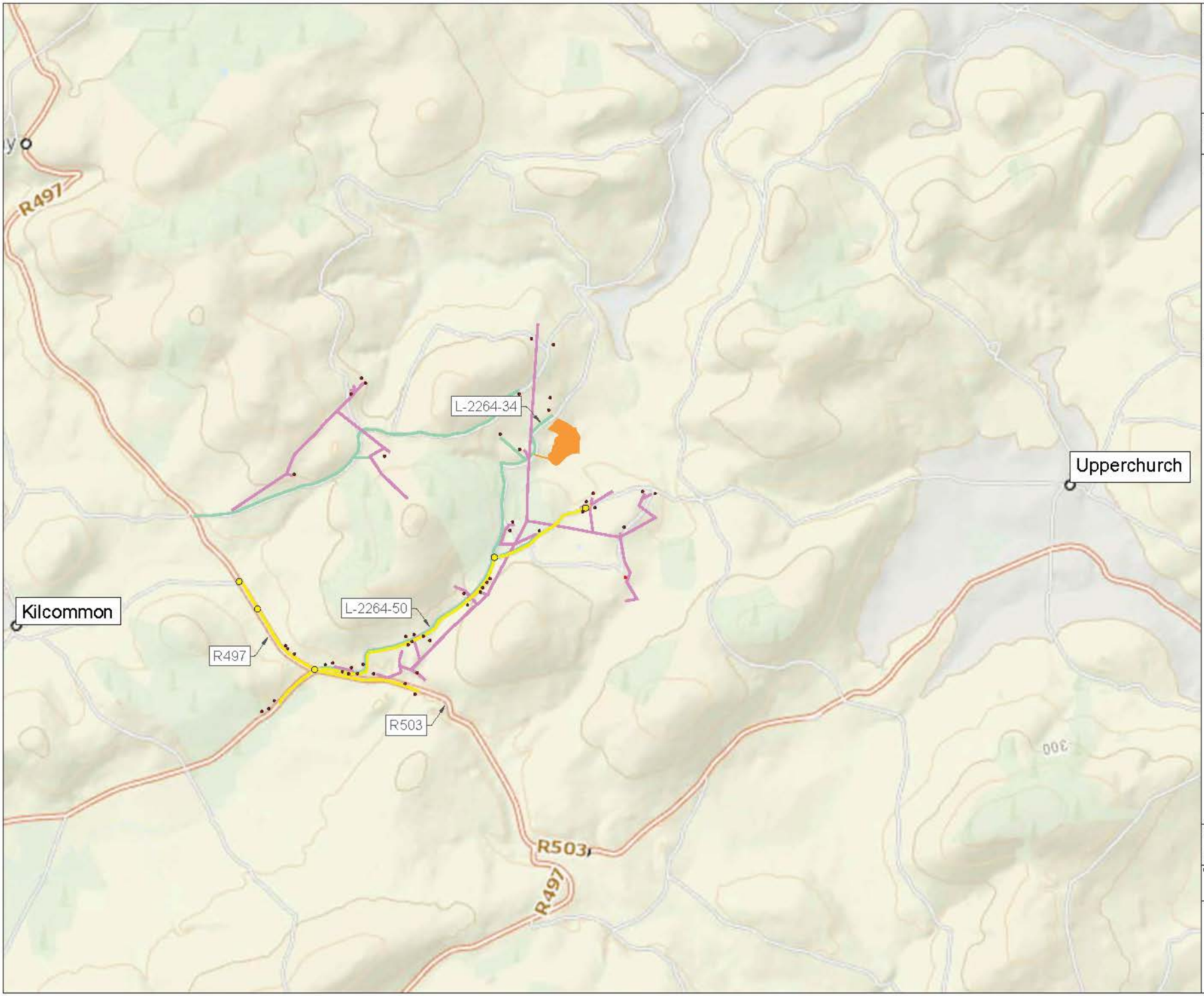

Title:

Figure RF 14.1

Location of the UWF Replacement Forestry

Map Number:
1 of 1

Legend:

- UWF Replacement Forestry Area
- Eir Network
- ESB Networks
- Irish Water Line
- Irish Water Valve
- Built Service Users
- Kilcommon — Village
- L-2264-34 — Local Road Number

REFERENCE DOCUMENTS

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Project:

UWF Replacement Forestry (RF)

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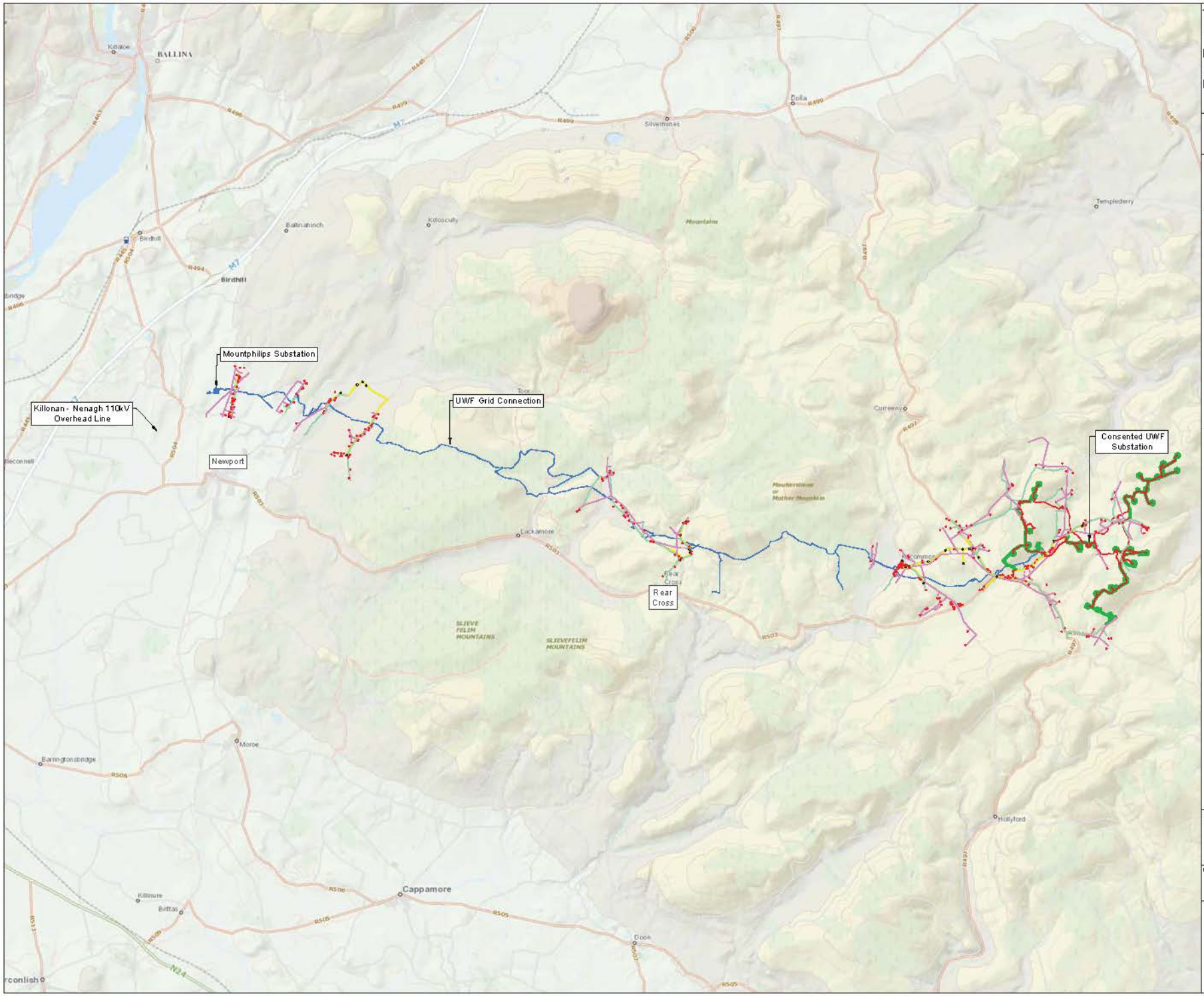

Title:

Figure CE 14.2

Local Residents & Community (Built Services) within the Cumulative Evaluation Study Area

Map Number:
Map 1 of 1

Legend:

Study Area Extents:

- UWF Grid Connection Construction Works Area
- UWF Related Works Construction Works Area
- Upperchurch Windfarm Construction Works Area
- Irish Water Line
- Irish Water Valves
- Eir Network
- ESB Networks

Survey Results:

- Built Service Users

REFERENCE DOCUMENTS

N

Project:
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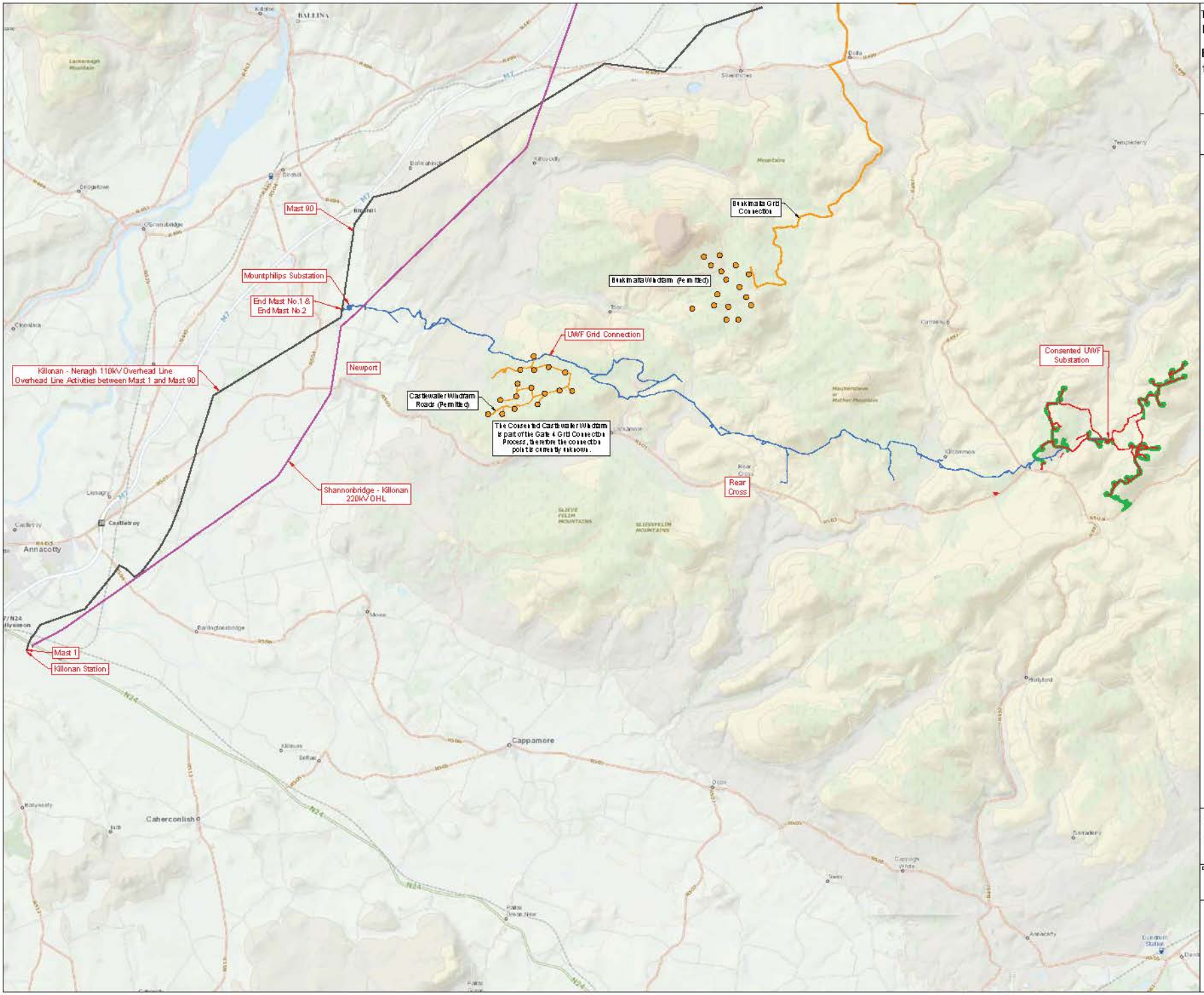

Title:

Figure CE 14.3

Electricity Transmission System within the Cumulative Evaluation Study Area

Map Number:
Map 1 of 1

Legend:

Study Area Extents:

- UWF Grid Connection Construction Works Area
- UWF Related Works Construction Works Area
- Upperchurch Windfarm Construction Works Area
- Killonan to Nenagh 110kV Overhead Line
- Shannonbridge to Nenagh 220kV Overhead Line

Survey Results:

- Other existing and permitted windfarm turbines
- Bunkimalta Windfarm Grid Connection

REFERENCE DOCUMENTS

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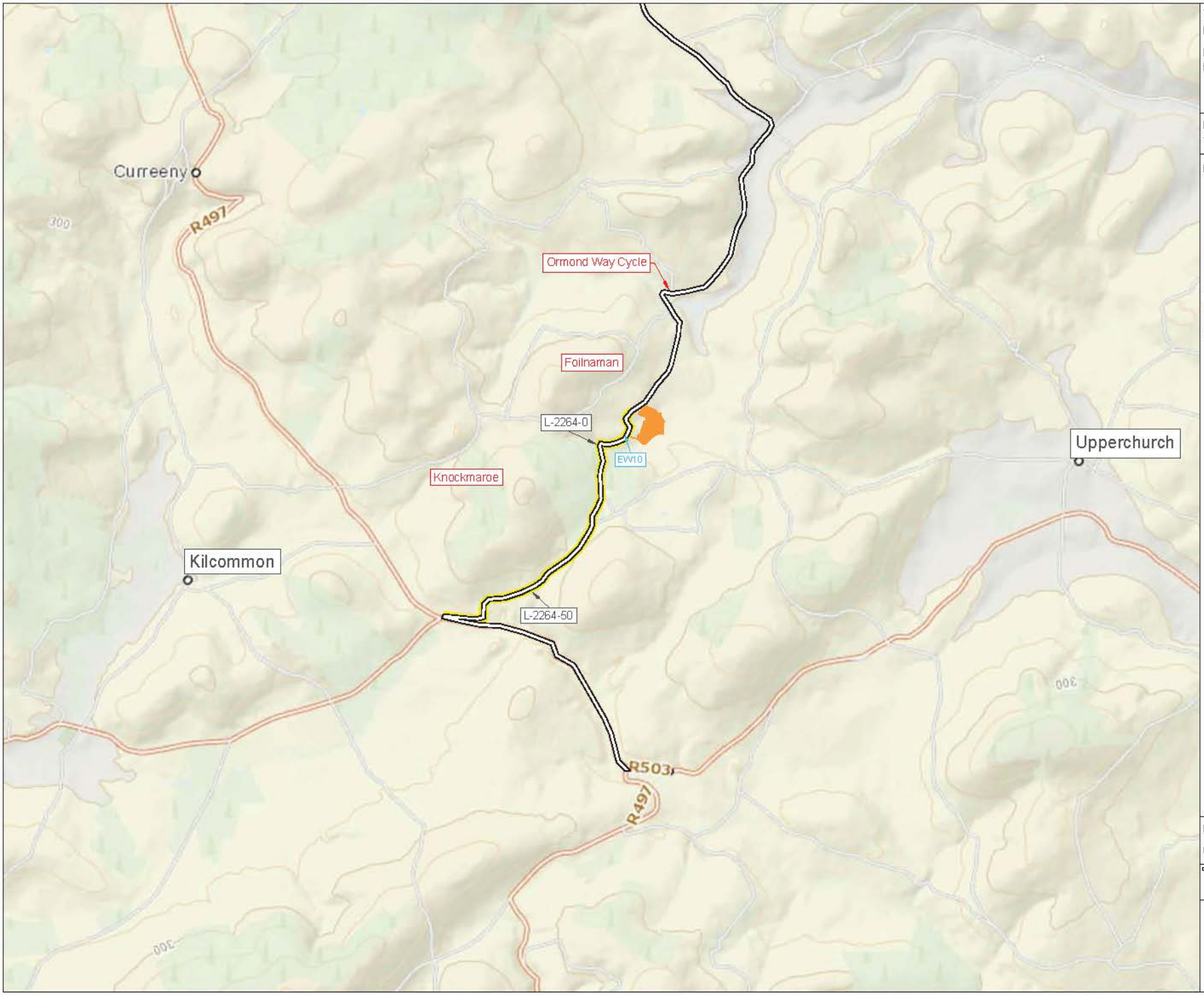

Title:

Figure RF 15.1

Location of the UWF Replacement Forestry

Map Number:
1 of 1

Legend:

- UWF Replacement Forestry Area
- Cycling Route
- Site Entrance
- Local Road
- Local Road Number
- Townlands
- Village

REFERENCE DOCUMENTS

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Project:

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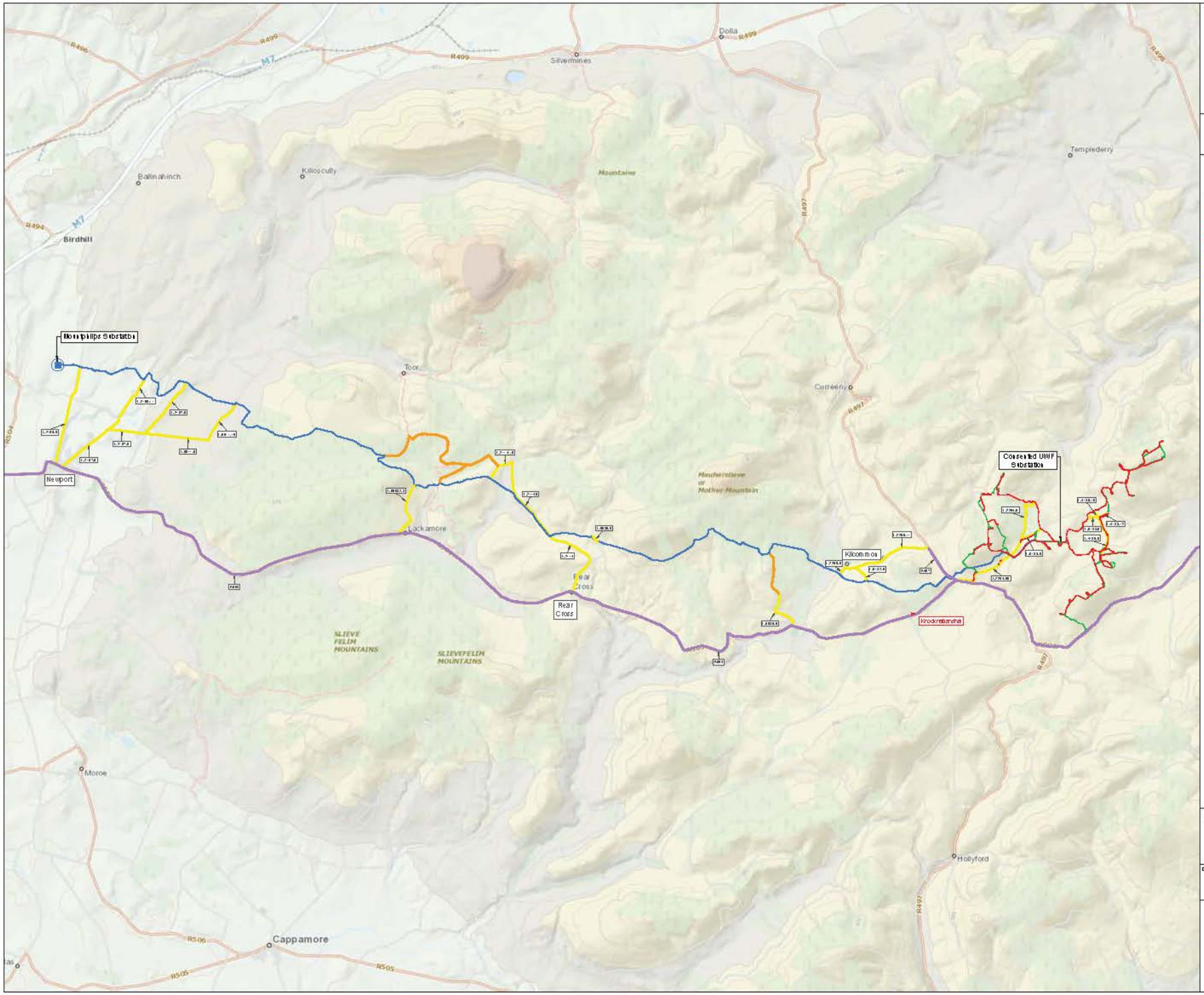

Title:

Figure CE 15.2

Public Roads within the Cumulative Evaluation Study

Map Number:
1 of 1

Legend:

Study Area Extents:

- UWF Grid Connection
- UWF Related Works
- Upperchurch Windfarm
- Public Roads
- Regional Roads
- Existing Access Tracks
- Road Number

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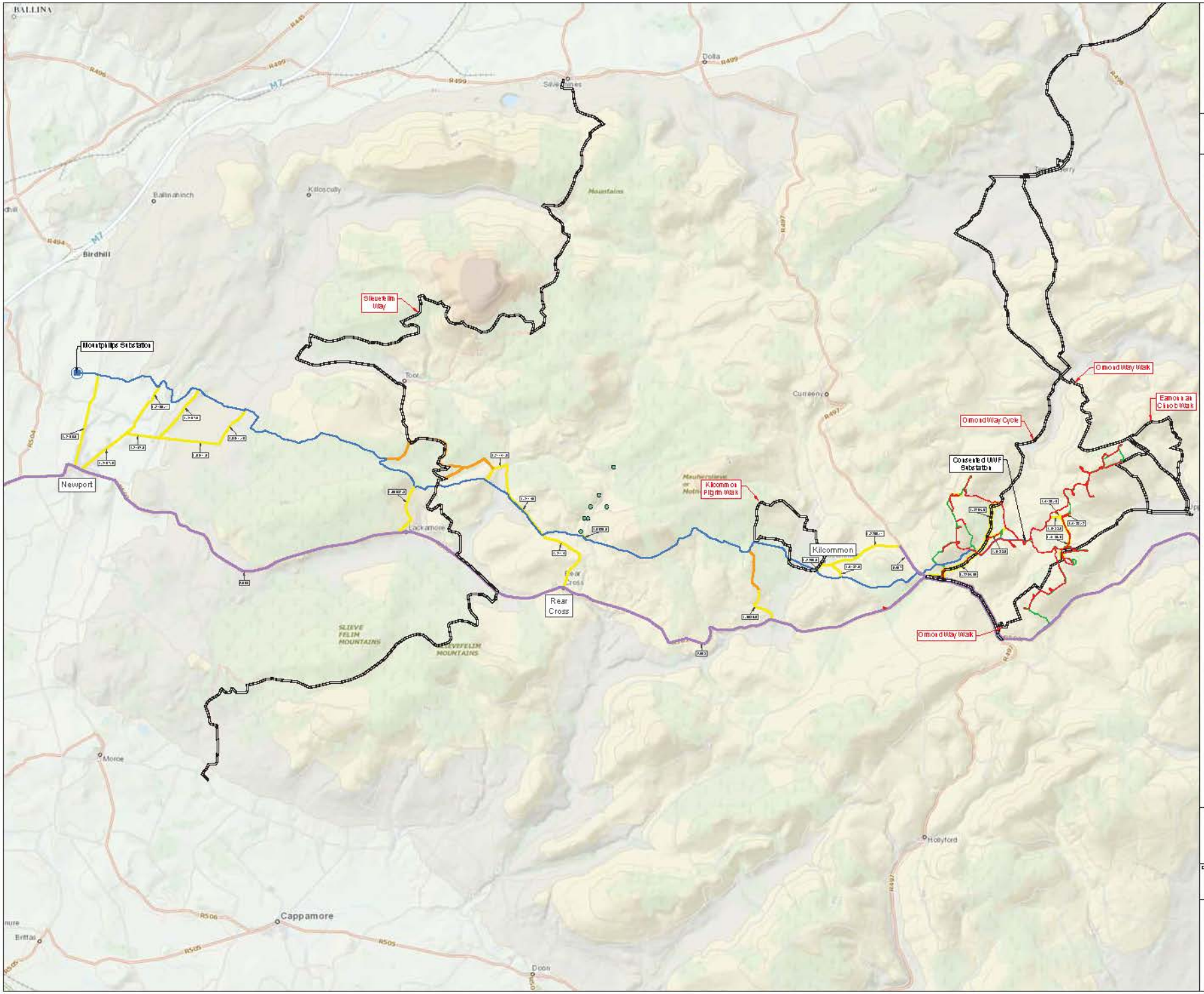


Title:
Figure CE 15.3

Road Users within the Cumulative Evaluation Study

Map Number:
1 of 1

Legend:

Study Area Extents:

- UWF Grid Connection
- UWF Related Works
- Upperchurch Windfarm
- Public Roads
- Regional Roads
- Existing Access Tracks
- Road Number

Survey Results:

- Walking and Cycling Trails
- Residents along the L-6085-0 at Baurnadomeeny

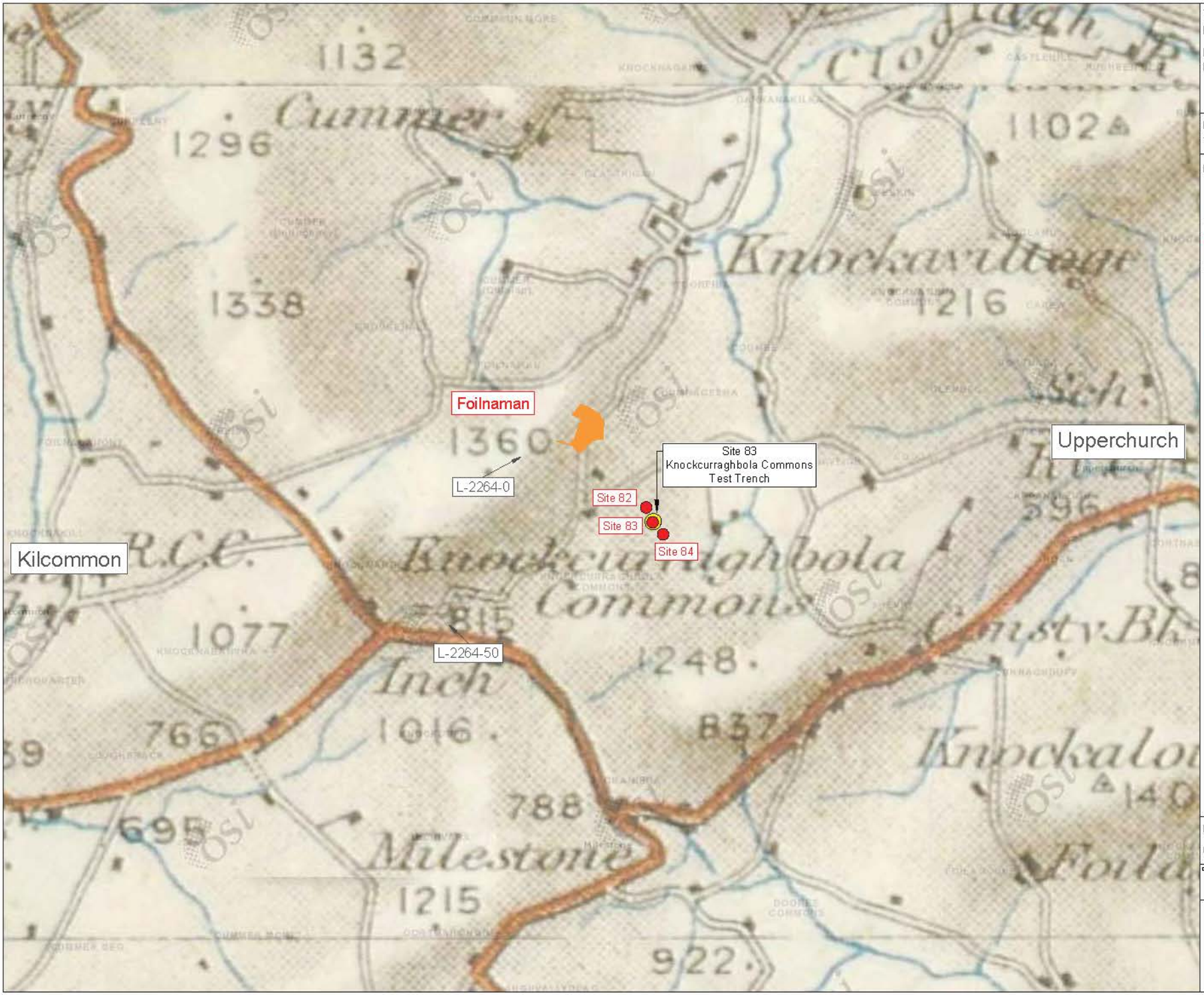
REFERENCE DOCUMENTS

N

Project:
UWF Replacement Forestry (RF)

Drawn By:	Checked By:	Date:	Sheet Size:
AB	JB	14-Feb-18	A4

REFERENCE DOCUMENTS



Title:

Figure RF 16.1

Location of the UWF Replacement Forestry on Historical Mapping

Map Number:
1 of 1

Legend:

- UWF Replacement Forestry Area
- Local Road Number
- Townland
- Village
- Location of Test Trench
- Recorded Legally Protected Sites
- Recorded Legally Protected Sites Identification

REFERENCE DOCUMENTS

N

Project:

UWF Replacement Forestry (RF)

Drawn by:	Checked by:	Date:	Sheet Size:
AB	JB	5-Apr-18	A4

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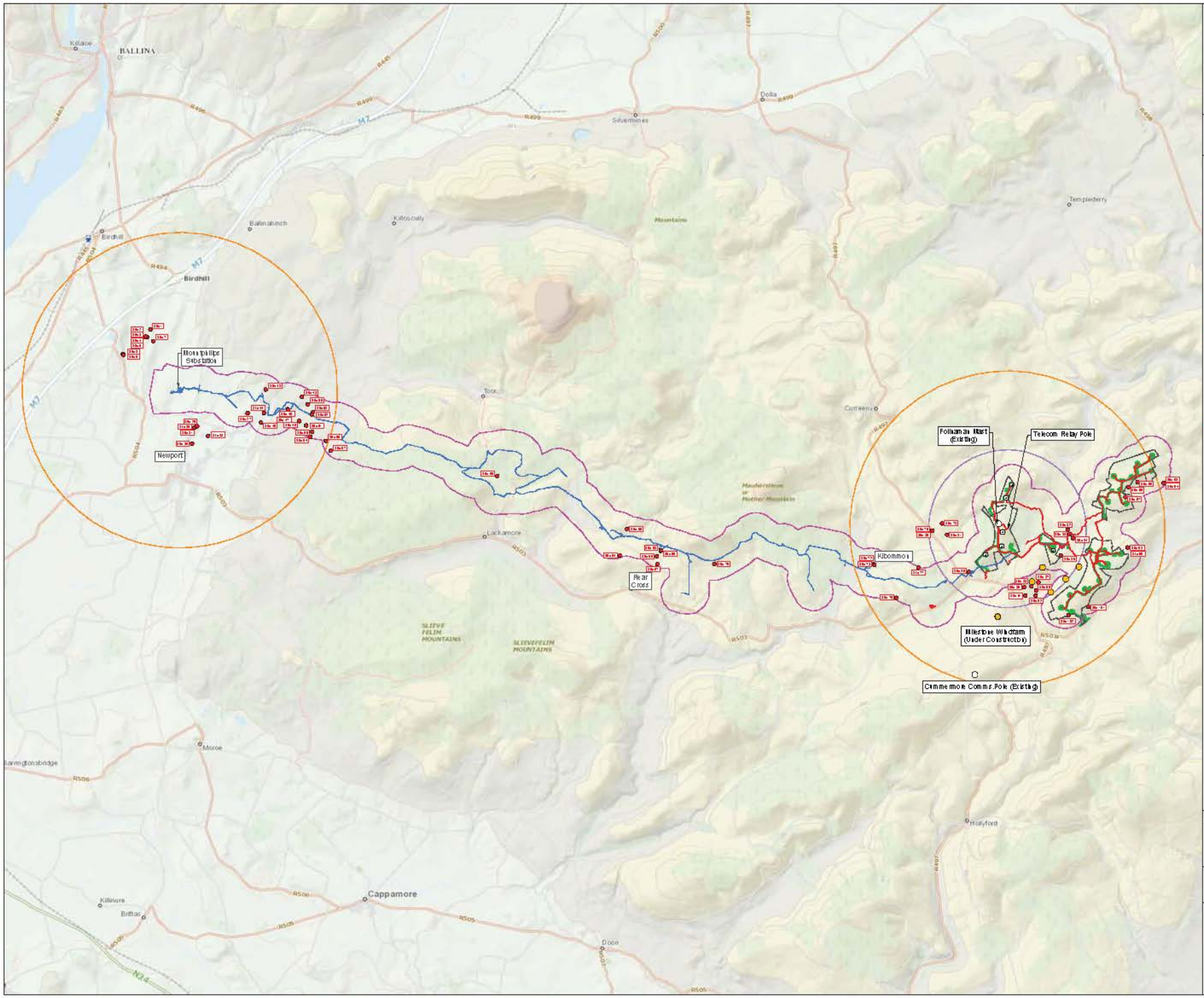

Title:

Figure CE 16.2

Recorded Legally Protected Sites within the Cumulative Evaluation Study Area

Map Number:
Map 1 of 1

Legend:

Study Area Extents :

- UWF Related Works
- UWF Grid Connection
- Upperchurch Windfarm
- 500m Study Area
  - UWF Related Works
  - UWF Grid Connection
- Upperchurch Windfarm 2013 Study Area
- 4km Study Area
  - Mountphilips Substation
  - Telecoms Relay Pole

Survey Results :

- Other existing and permitted projects/activity
- Other existing and permitted windfarm turbines
- Recorded Legally Protected Sites
- Site 04 Recorded Legally Protected Sites Identification
- Consented UWF Turbines within 2km of Telecoms Relay Pole

N

REFERENCE DOCUMENTS

Project:
UWF Replacement Forestry(RF)

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AB	JB	14-Feb-18	A4

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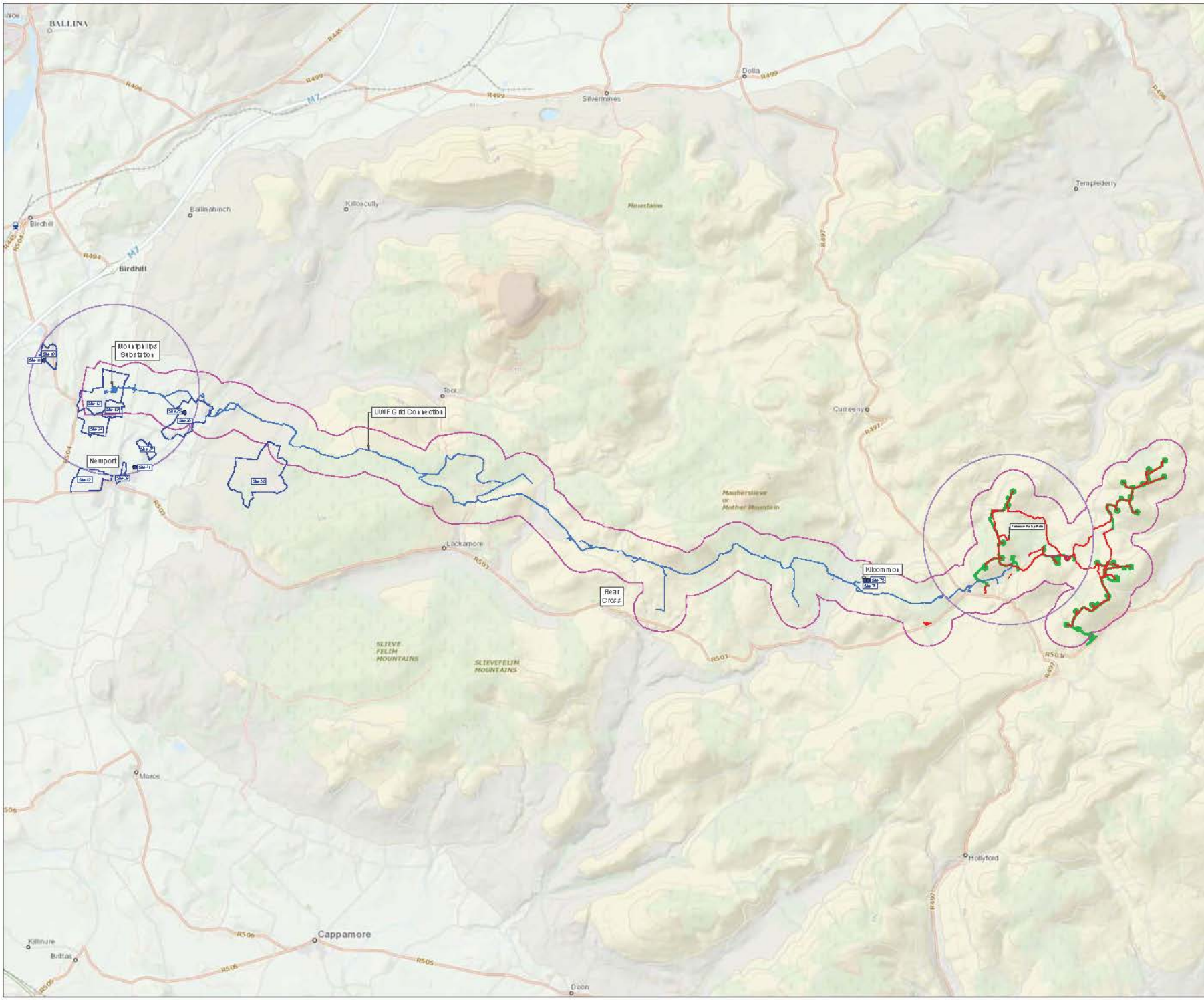

Title:

Figure CE 16.3

Other Recorded Sites within the Cumulative Evaluation Study Area

Map Number:
Map 1 of 1

Legend:

Study Area Extents :

- UWF Grid Connection
- UWF Related Works
- Upperchurch Windfarm
- 500m Study Area
  - UWF Grid Connection
  - UWF Related Works
- 2km Study Area
  - Telecoms Relay Pole
  - Mountphilips Substation

Survey Results :

- Other Protected Sites
- Other Recorded Sites Identification
- Other Recorded Site - Demesne

REFERENCE DOCUMENTS

N

Project:
UWF Replacement Works (RF)

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AB	JB	14-Feb-18	A4

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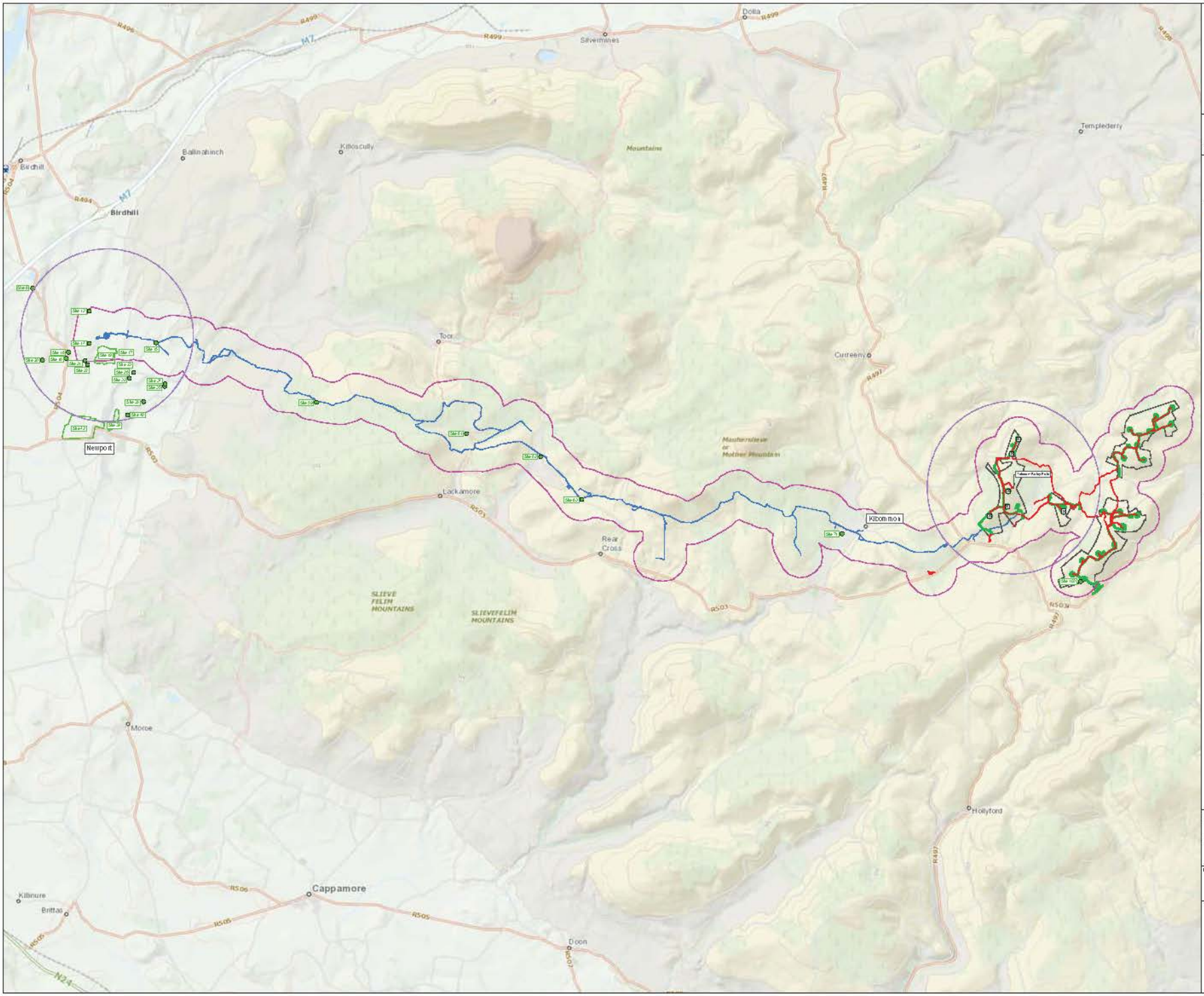

Title:

Figure CE 16.4

Previously Unrecorded Sites within the Cumulative Evaluation Study Area

Map Number:
Map 1 of 1

Legend:

Study Area Extents:

- UWF Grid Connection
- UWF Related Works
- Upperchurch Windfarm
- 500m Study Area
  - UWF Grid Connection
  - UWF Related Works
- Upperchurch Windfarm 2013 Study Area
- 2km Study Area
  - Telecoms Relay Pole
  - Mountphilips Substation

Survey Results:

- Previously Unrecorded Sites
- Site 52 Previously Unrecorded Sites Identification
- Previously Unrecorded Sites - Demesne
- Consented UWF Turbines within 2km of Telecoms Relay Pole

N

Project:
UWF Replacement Forestry (RF)

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AB	JB	14-Feb-18	A4

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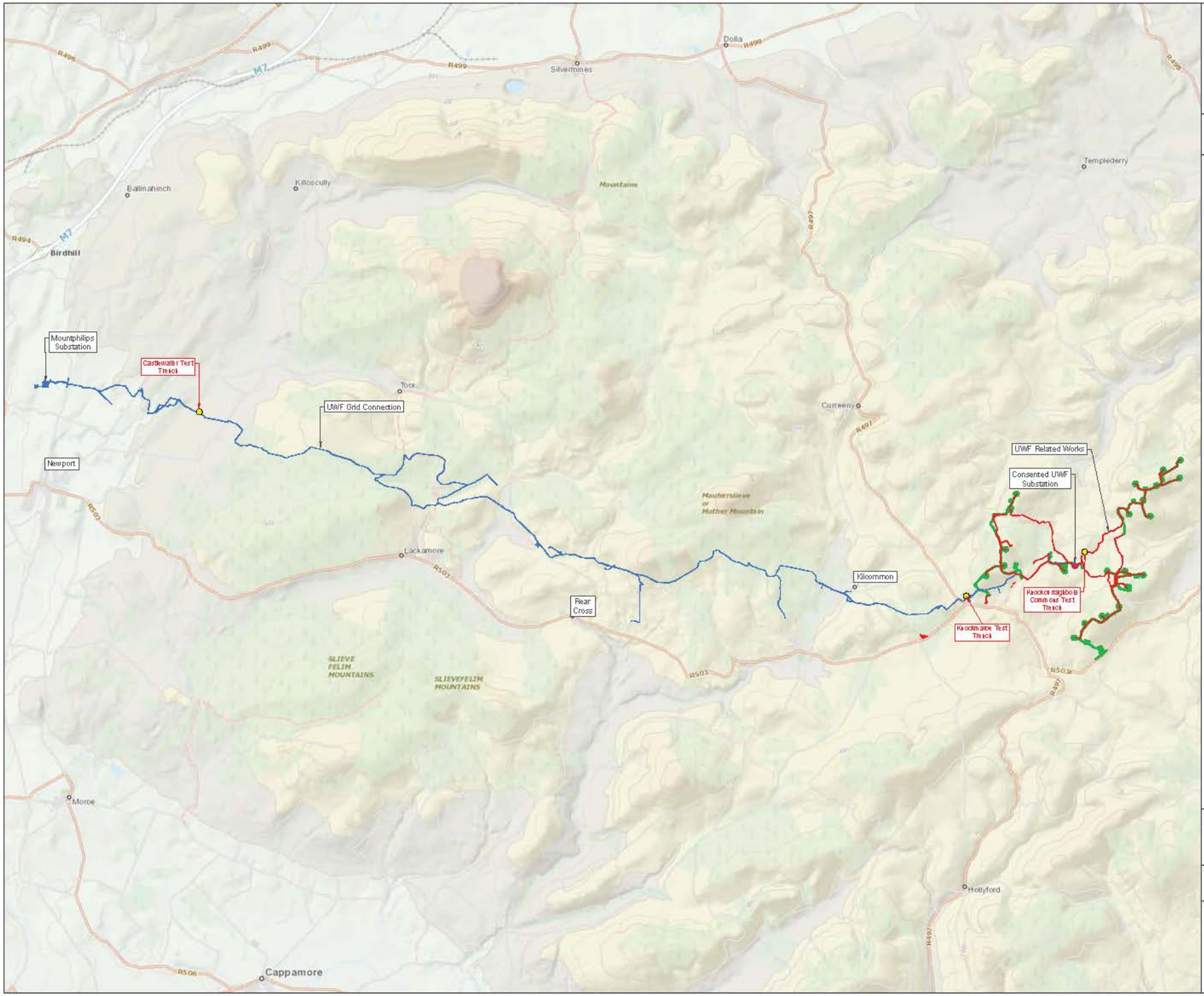
REFERENCE DOCUMENTS



Title:

Figure CE 16.5

Unrecorded Subsurface Sites within the Cumulative Evaluation Study Area

Map Number:
Map 1 of 1

Legend:

Study Area Extents :

- UWF Related Works
- UWF Grid Connection
- Upperchurch Windfarm

Survey Results :

- Location of Test Trench

REFERENCE DOCUMENTS

N

Project:
UWF Replacement Forestry (RF)

Drawn By:	Checked By:	Date:	Sheet Size:
AB	JB	14-Feb-18	A4

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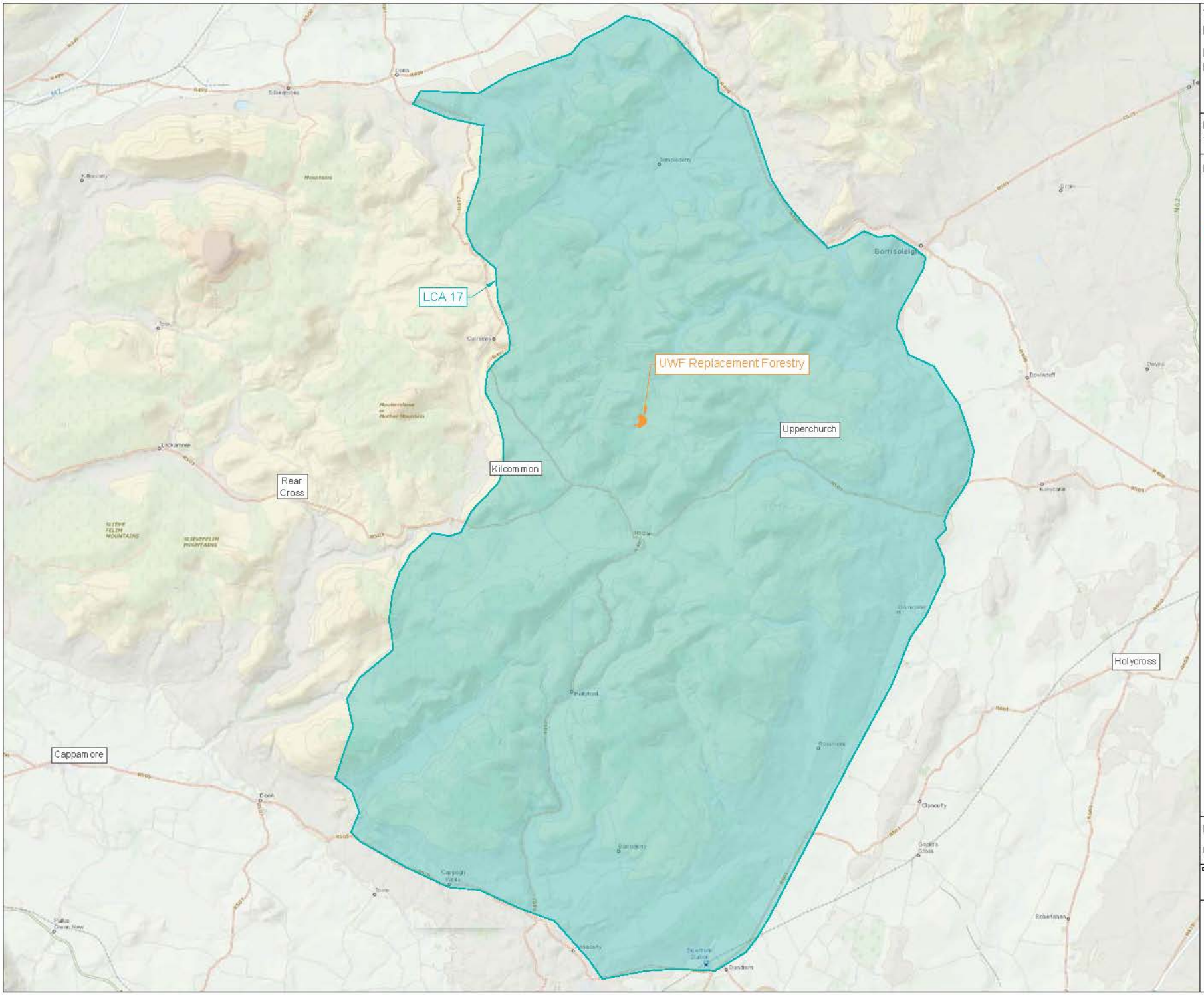

Title:

Figure RF 17.1

Location of the UWF Replacement Forestry

Map Number:
1 of 1

Legend:

- UWF Replacement Forestry Area
- LCA 17 Upperchurch, Kilcommon & Hollyford Mountain Mosaic
- Kilcommon — Village

REFERENCE DOCUMENTS

N

Project:

UWF Replacement Forestry (RF)

Drawn by:	Checked by:	Date:	Sheet Size:
AB	JB	5-Apr-18	A4

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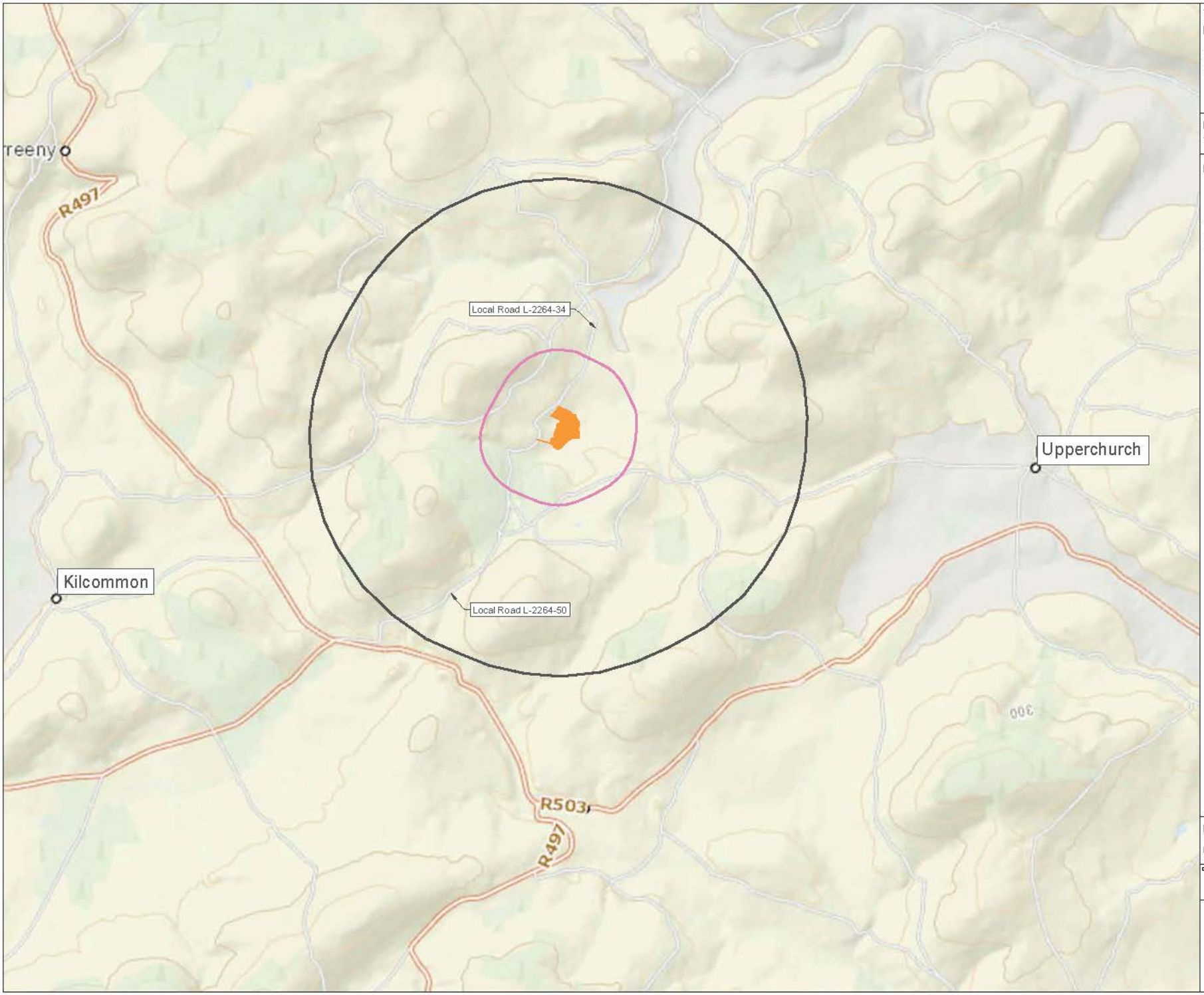

Title:

Figure RF 17.2

Landscape Character within the UWF Replacement Forestry Study Area

Map Number:
1 of 1

Legend:

- UWF Replacement Forestry Area
- Local Road Number
- Village
- 500m Study Area from the UWF Replacement Forestry
- 2km Study Area from the UWF Replacement Forestry

REFERENCE DOCUMENTS

N

Project:

UWF Replacement Forestry (RF)

Drawn By:	Checked By:	Date:	Sheet Size:
AB	JB	5-Apr-18	A4

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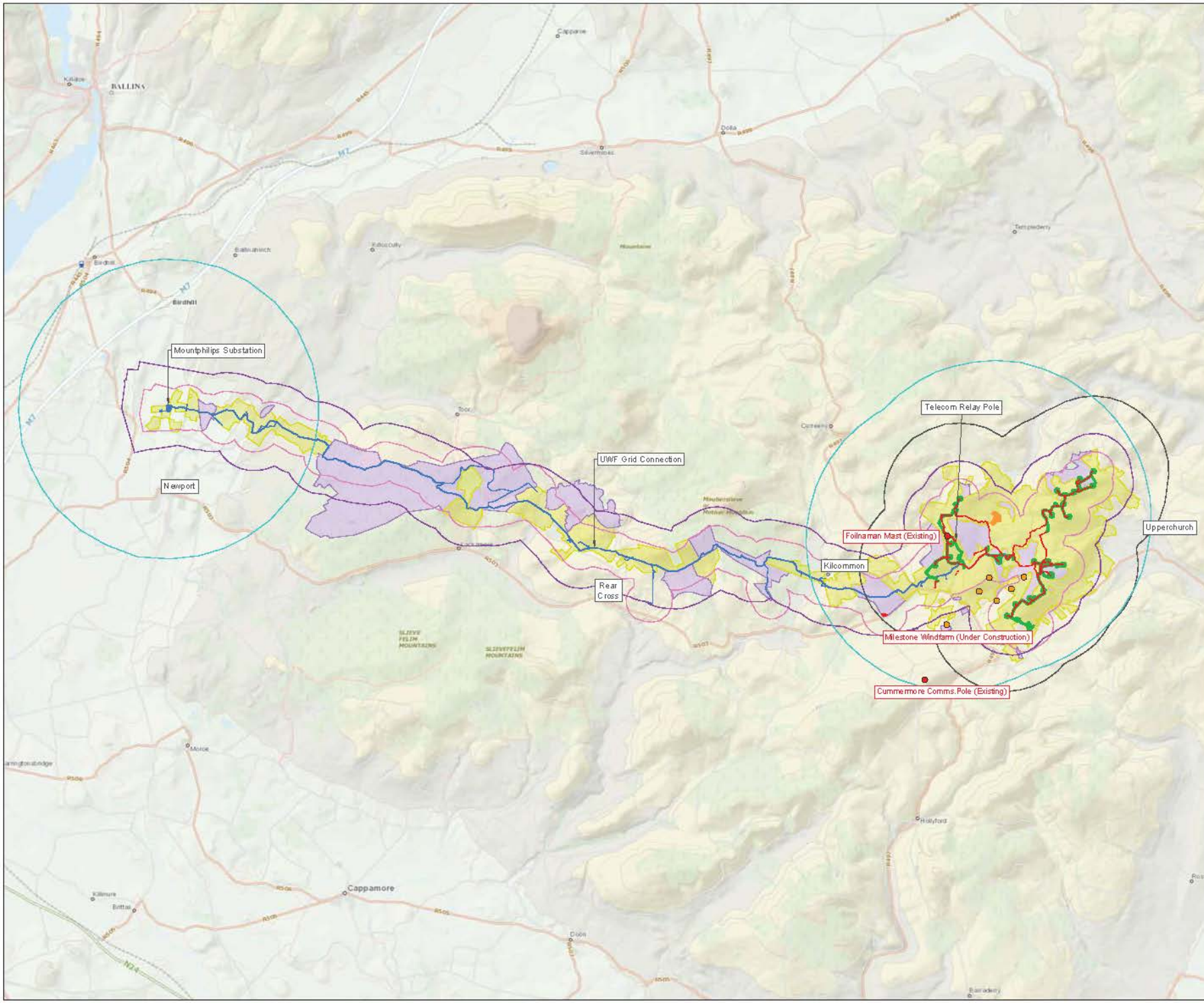

Title:

Figure CE 17.2

Landscape Character within the Cumulative Evaluation Study Area

Map Number:
1 of 1

Legend:

Study Area:

- UWF Replacement Forestry Area
- UWF Grid Connection Construction Works Area
- UWF Related Works Construction Works Area
- Upperchurch Windfarm
- 1km Study Area
  - UWF Grid Connection
  - Internal Windfarm Cabling
  - Realigned Windfarm Roads
- 2km Study Area
  - Telecom Relay Pole
  - UWF Replacement Forestry
  - Consented UWF Substation and UWF Wind Turbines
- 4km Study Area
  - Mountphilips Substation
  - Telecom Relay Pole
  - UWF Replacement Forestry
- 500m Study Area from Construction Works Areas

Survey Results:

- Existing Milestone Windfarm
- Other existing and permitted projects/activity
- Landholding - Agricultural Land
- Landholding - Forestry Land

REFERENCE DOCUMENTS

Project:

UWF Replacement Forestry (RF)

Drawn by:	Checked by:	Date:	Sheet Size:
AB	JB	5-Apr-18	A4

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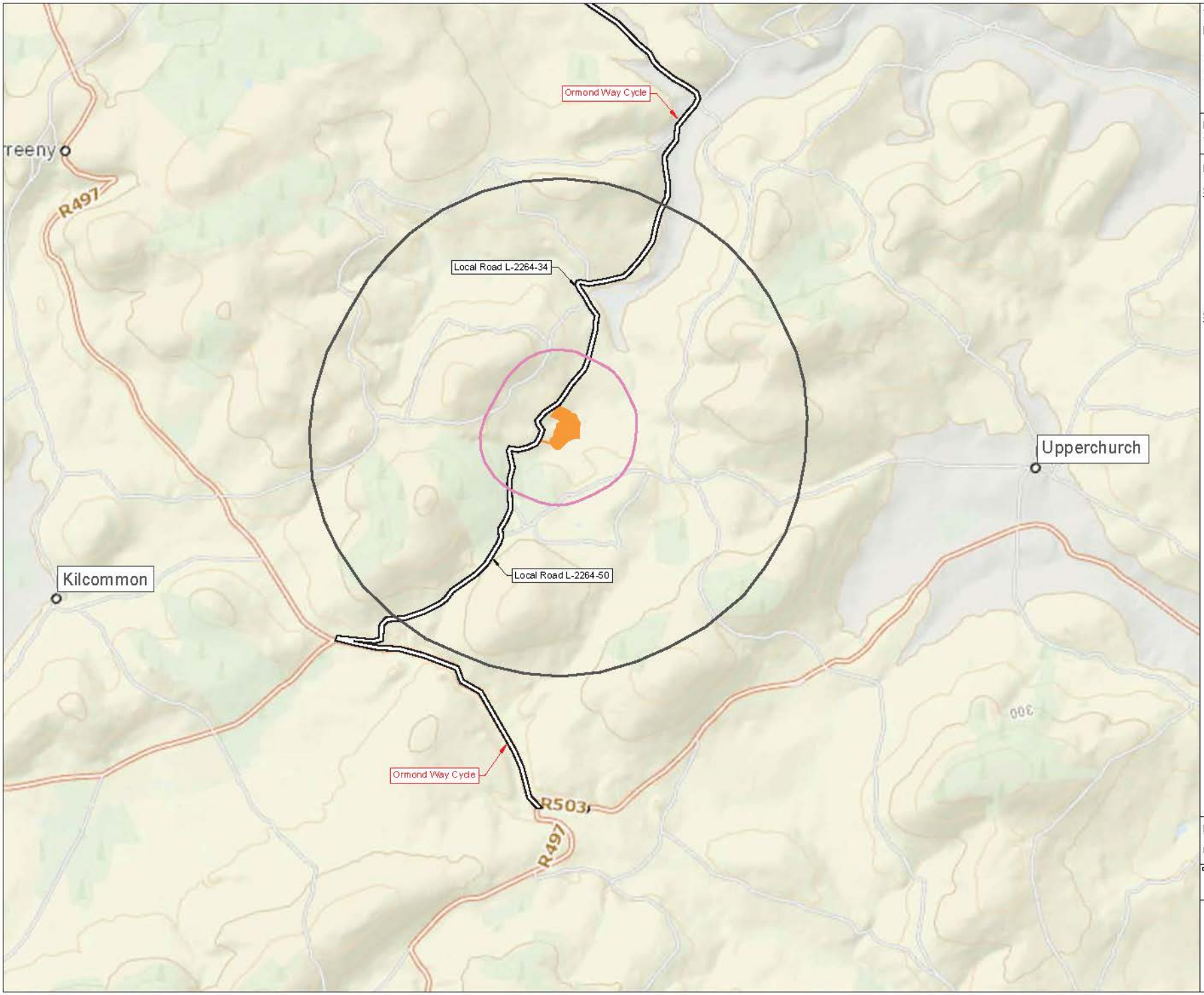

Title:

Figure RF 17.3

Visual Amenity within the UWF Replacement Forestry Study Area

Map Number:
1 of 1

Legend:

Study Area:

- UWF Replacement Forestry Area
- 500m Study Area from the UWF Replacement Forestry
- 2km Study Area from the UWF Replacement Forestry

Survey Results:

- Cycling Route

REFERENCE DOCUMENTS

N

Project:

UWF Replacement Forestry (RF)

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AB	JB	5-Apr-18	A4

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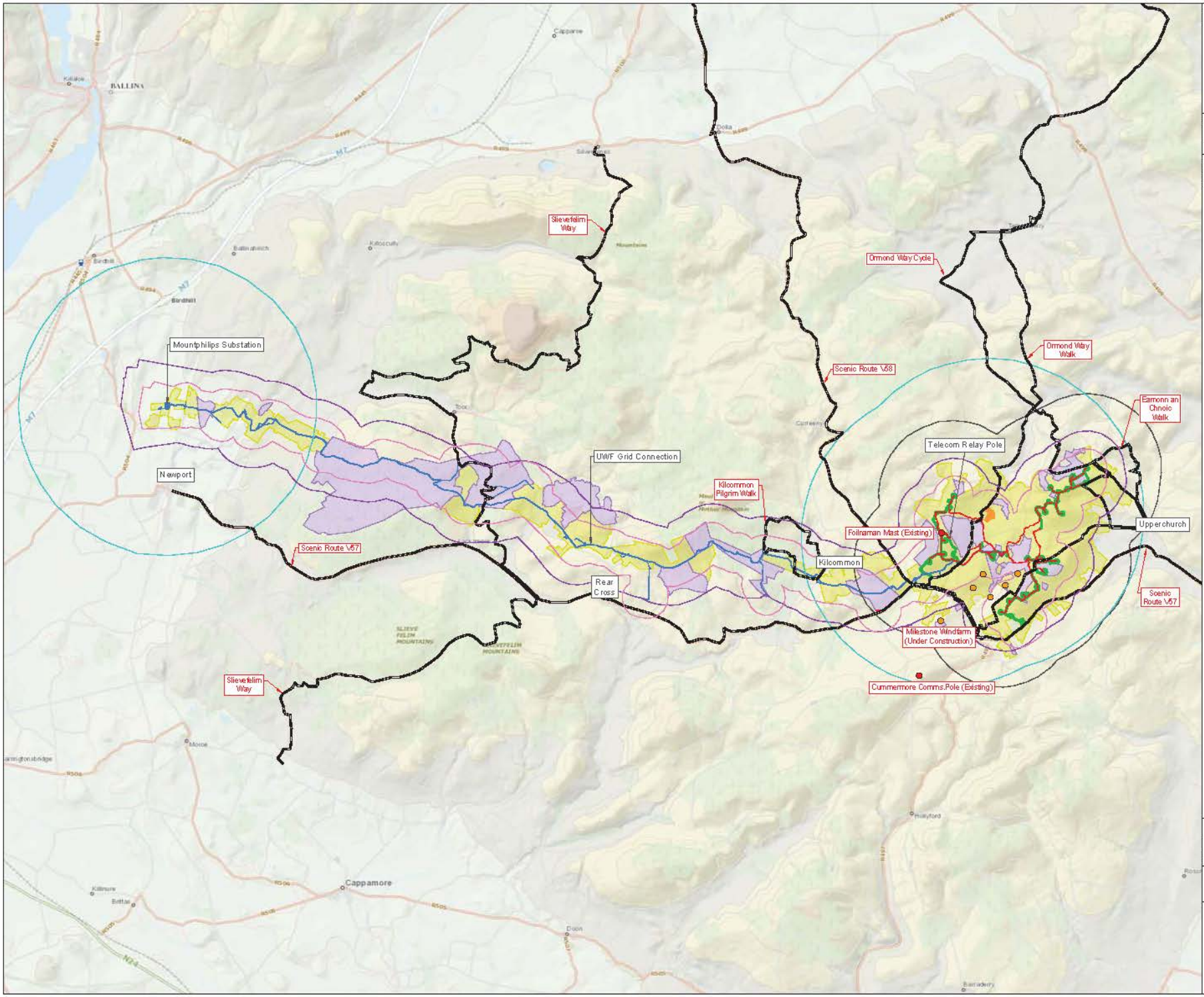

Title:

Figure CE 17.3

Visual Amenity within the Cumulative Evaluation Study Area

Map Number:
1 of 1

Legend:

Study Area:

- UWF Replacement Forestry Area
- UWF Grid Connection Construction Works Area
- UWF Related Works Construction Works Area
- Upperchurch Windfarm
- 1km Study Area
  - UWF Grid Connection
  - Internal Windfarm Cabling
  - Realigned Windfarm Roads
- 2km Study Area
  - Telecom Relay Pole
  - UWF Replacement Forestry
  - Consented UWF Substation and UWF Wind Turbines
- 4km Study Area
  - Mountphilips Substation
  - Telecom Relay Pole
  - UWF Replacement Forestry
- 500m Study Area from Construction Works Areas

Survey Results:

- Existing Milestone Windfarm
- Other existing and permitted projects/activity
- Landholding - Agricultural Land
- Landholding - Forestry Land
- Walking/Cycling and Scenic Routes

REFERENCE DOCUMENTS

N

Project:

UWF Replacement Forestry (RF)

Drawn By:	Checked By:	Date:	Sheet Size:
AB	JB	5-Apr-18	A4

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REFERENCE DOCUMENTS

Figures for Chapter 18: Interaction of the Foregoing	Tab 18 (printed version)
No mapping or figures for Chapter 18	

REFERENCE DOCUMENTS

Figures for Chapter 19: Monitoring Arrangements	Tab 19 (printed version)
No mapping or figures for Chapter 19	

REFERENCE DOCUMENTS

Figures for Chapter 20: Executive Summary	Tab 20 (printed version)
No mapping or figures for Chapter 20	

REFERENCE DOCUMENTS

Upperchurch Windfarm Replacement Forestry (UWF Replacement Forestry)

UWF Replacement Forestry EIA Report (EIAR)

VOLUME C4: EIAR APPENDICES

(Part 1 of 3)

EIA Report Authors:

EIAR Coordinator:

February 2018

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Appendix 2.2	Environmental Topic Authors Statements of Competency
Appendix 2.3	Scoping of Other Projects or Activities
Appendix 2.4	Completed EIA Report Checklist
Appendix 3.1	Consultation with Competent Authorities
Appendix 4.1	*Chapter 4 has no appendices*
Appendix 5.1	Description of Development (UWF Grid Connection)
Appendix 5.2	Description of Development (UWF Related Works)
Appendix 5.3	Compiled Description of Upperchurch Windfarm
Appendix 5.4	Description of UWF Other Activities
Appendix 5.5	A Guide to Risk Assessment in Major Emergency Management Jan 2010
Appendix 6.1	Central Statistics Office Data
Appendix 7.1	*Chapter 7 has no appendices*
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Appendix to Chapter 1: Introduction to the UWF Replacement Forestry EIAR

No Appendices for Chapter 1

Appendix to Chapter 2: The EIA Report Process

The data and descriptions in this appendices have informed Chapter 2: The EIAR Process including Scoping of the EIA Report.

Appendics to Chapter 2	Section Heading
A2.1	Review of Compliance with Legislation
A2.2	Environmental Topic Authors Statements of Competency
A2.3	Scoping of Other Projects or Activities
A2.4	Completed EIA Report Checklist

Appendix 2.1: Review of Compliance with Legislation

2011/92/EU as amended by Directive 2014/52/EU (the EIA Directive)

The data and descriptions in this appendix have informed Chapter 2: The EIAR Process including Scoping.

The information presented in this Appendix 2.1 is outlined below and the relevant element(s) of the Whole UWF Project are also identified.

Section Heading	Relevant Individual Project Element
Compliance with Legislation	UWF Replacement Forestry

List of Tables

Table No.	Table Title
Table 1	Compliance with Article 5 of the EIA Directive (Information to be provided by the developer in the EIA Report)
Table 2	Compliance with Annex IIA (INFORMATION REFERRED TO IN ARTICLE 4(4))
Table 3	Compliance with Annex IV - INFORMATION REFERRED TO IN ARTICLE 5(1)

A2.1 .1 COMPLIANCE WITH LEGISLATION

A2.1 .1.1. Introduction

Environmental Impact Assessment (EIA) is a key instrument of European Union environmental policy. Since the passage of the first EIA Directive in 1985 (Directive 85/337/EEC) both the law and the practice of EIA have evolved. The currently governing EIA Directive is Directive 2011/92/EU (as amended by Directive 2014/52/EU) and is referred to in this chapter, as the EIA Directive.

This EIA Report is the result of the activities of many people, each of whom made different and distinctive contributions. A review of the complete EIA Report documentation was carried out by the EIA Report co-ordinator Lead Assessor, to ensure that all of the requirements of the EIAR Directive for the EIA Report, are met.

This review is presented in Tables 1 to 3 below.

Note: Not all of the EIA Directive requirements are the responsibility of the developer. The review only examines the completeness of the information presented in the EIA Report, for compliance with the responsibilities of the developer (the Planning Applicant).

Table 1: Compliance with Article 5 of the EIA Directive (Information to be provided by the developer in the EIA Report)

Article Paragraph #	Requirement of the EIA Directive	Location of information provided in the EIA Report to comply with EIA Directive requirement
Article 5, Paragraph 1	Where an environmental impact assessment is required, the developer shall prepare and submit an environmental impact assessment report. The information to be provided by the developer shall include at least:	
	a) a description of the project comprising information on the site, design, size and other relevant features of the project;	**Volume C2: EIAR Main Report:** Chapter 5: Description of the Development **Volume C3: EIAR Figures RF 5.1 to RF 5.3** **Whole UWF Project (Other Elements)** **EIAR Volume C4: EIAR Appendices** Appendix 5.3 Description of the UWF Grid Connection Appendix 5.4 Description of the UWF Related Works Appendix 5.5 Compiled Description of the consented Upperchurch Windfarm Appendix 5.6 Description of UWF Other Activities
	(b) a description of the likely significant effects of the project on the environment;	**EIAR Volume C2: Main Report:** Impacts on individual environmental topics are presented in Individual Sensitive Aspect sections from Section X.2 – Section X.X.1 Evaluation, Section X.X.2: Cumulative, Section X.X.5: Mitigation Measures, Section X.X.6: Evaluation of Residual Impacts, Section X.X.8: Summary of the Impacts. **Environmental Topic Chapters 6 – 17** Chapter 6: Population, Chapter 7: Human Health Chapter 8: Biodiversity Chapter 9: Land Chapter 10: Soil Chapter 11: Water Chapter 12: Air Chapter 13: Climate Chapter 14: Built Services Chapter 15: Roads and Traffic Chapter 16: Cultural Heritage

REFERENCE DOCUMENTS

Article Paragraph #	Requirement of the EIA Directive	Location of information provided in the EIA Report to comply with EIA Directive requirement
		Chapter 17: The Landscape [1]Note: 'X.X' represents the chapter number and main section number, e.g. Section 6.2 is the second section in Chapter 6: Population.
	(c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;	**EIAR Volume C2: Main Report** **Chapter 5: Description of Development,** Section 5.2.4: Environmental Protection Measures designed into the UWF Replacement Forestry. **Chapters 6 to 17** Project Design Environmental Protection Measures for individual sensitive aspects are presented in the Individual Sensitive Aspect sections from Section X.2. Mitigation Measures are in Section X.X.5. **EIAR Volume C4: EIAR Appendices** **Appendix 5.1** UWF Replacement Forestry Best Practice Measures **EIAR Volume C2: Main Report** **Chapter 4: Alternatives Considered** (*for Environmental Protection Measures incorporated into the Project Design*)
	(d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;	**EIAR Volume C2 Main Report:** Chapter 4: Alternatives Considered
	(e) a non-technical summary of the information referred to in points (a) to (d); and	**Volume C1: EIAR Non-Technical Summary**
	(f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.	**Refer to Table 3 herein**
Article 5, Paragraph 3	In order to ensure the completeness and quality of the environmental impact assessment report:	**Volume C2: EIAR Main Report:** **Chapter 2: The EIA Report: Section 2.2.4 The EIAR Team** Table 2-2 The EIAR Team (*comprises the list of Competent Experts who prepared the EIA Report)* **Appendix 2-2 Environmental Topic Authors Statement of Competency**

REFERENCE DOCUMENTS

Article Paragraph #	Requirement of the EIA Directive	Location of information provided in the EIA Report to comply with EIA Directive requirement
	(a) the developer shall ensure that the environmental impact assessment report is prepared by competent experts;	

Table 2: Compliance with Annex IIA (INFORMATION REFERRED TO IN ARTICLE 4(4))

INFORMATION TO BE PROVIDED BY THE DEVELOPER ON THE PROJECTS LISTED IN ANNEX II – **3. ENERGY INDUSTRY (i) Installations for the harnessing of wind power for energy production (wind farms)**		
Annex IIA Paragraph #	**Requirement of the EIA Directive**	**Location of information provided in the EIAR to comply with EIA Directive requirement**
Annex IIA Paragraph 1	A description of the project, including in particular:	
	(a) a description of the physical characteristics of the whole project and, where relevant, of demolition works;	**Volume C2: EIAR Main Report:** **Chapter 5: Description of the Development** **Volume C3: EIAR Figures RF 5.1 to Figure RF 5.3** **Whole UWF Project (Other Elements)** **EIAR Volume C4: EIAR Appendices** **Appendix 5.3** Description of the UWF Grid Connection **Appendix 5.4** Description of the UWF Related Works **Appendix 5.5** Compiled Description of the Consented Upperchurch Windfarm **Appendix 5.6** Description of UWF Other Activities
	(b) a description of the location of the project, with particular regard to the environmental sensitivity of geographical areas likely to be affected.	**EIAR Volume C2: Main Report:** **Environmental Topic Chapters 6 – 17:** The study area is described Section X.X.1 for each individual Sensitive Aspect section from Section X.2.

REFERENCE DOCUMENTS

INFORMATION TO BE PROVIDED BY THE DEVELOPER ON THE PROJECTS LISTED IN ANNEX II – **3. ENERGY INDUSTRY (i) Installations for the harnessing of wind power for energy production (wind farms)**		
Annex IIA Paragraph #	**Requirement of the EIA Directive**	**Location of information provided in the EIAR to comply with EIA Directive requirement**
		EIAR Volume C3: EIAR Figures: *(where relevant, the locational context is Figure X.1 for chapter 6 to 17)*
Annex IIA Paragraph 2	A description of the aspects of the environment likely to be significantly affected by the project.	**EIAR Volume C2: Main Report:** **Environmental Topic Chapters 6 – 17**: The Sensitive Aspects of the Topic are listed in X.1.3 and X.1.4. Also in the Evaluation Sections for Individual Sensitive Aspects from Section X.2
Annex IIA Paragraph 3	A description of any likely significant effects, to the extent of the information available on such effects, of the project on the environment resulting from:	
	(a) the expected residues and emissions and the production of waste, where relevant;	**Volume C2: EIAR Main Report:** **Chapter 5: Description of the Development**: Section 5.4.2 Emissions Section 5.4.3 Wastes **EIAR Volume C4: EIAR Appendices** Section 5.4.2 and Section 5.4.3 of the descriptions of the Other Elements of the Whole UWF Project in **Appendices 5.3, 5.4, 5.5 and 5.6** (*for emissions & wastes*) **EIAR Volume C2: Main Report** **Environmental Topic Chapters 6 – 17**: Sensitive Aspect Evaluation starting at Section X.2

REFERENCE DOCUMENTS

INFORMATION TO BE PROVIDED BY THE DEVELOPER ON THE PROJECTS LISTED IN ANNEX II – **3. ENERGY INDUSTRY (i) Installations for the harnessing of wind power for energy production (wind farms)**		
Annex IIA Paragraph #	**Requirement of the EIA Directive**	**Location of information provided in the EIAR to comply with EIA Directive requirement**
	(b) the use of natural resources, in particular soil, land, water and biodiversity.	**Volume C2: EIAR Main Report:** **Chapter 5: Description of the Development:** Section 5.4.1 Use of Natural Resources; Section 5.4.1.1 Land, 5.4.1.2 Biodiversity, 5.4.1.3 Water, 5.4.1.4 Soils **EIAR Volume C4: EIAR Appendices** Section 5.4.1 of the descriptions of the Other Elements of the Whole UWF Project in **Appendices 5.1, 5.2, 5.3 and 5.4** **EIAR Volume C2: Main Report** **Environmental Topic Chapters 6 – 17**: starting at Section X.2 (Sensitive Aspect Evaluation)

Table 3: Compliance with Annex IV - INFORMATION REFERRED TO IN ARTICLE 5(1)

(INFORMATION FOR THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT)		
Annex IV Paragraph #	**Requirement of the EIA Directive**	**Location of information provided in the EIAR to comply with EIA Directive requirement**
Annex IV Paragraph 1	A Description of the project, including in particular:	
	(a) a description of the location of the project;	**Volume C2: EIAR Main Report:** **Chapter 5: Description of the Development** - Section 5.2.2: Location and overview description **EIAR Volume C3: EIAR Figures for Chapter 5**

REFERENCE DOCUMENTS

(INFORMATION FOR THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT)		
Annex IV Paragraph #	**Requirement of the EIA Directive**	**Location of information provided in the EIAR to comply with EIA Directive requirement**
	(b) a description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;	**EIAR Volume C2: Main Report:** **Chapter 5: Description of the Development** Section 5.2: Characteristics of the UWF Replacement Forestry Section 5.3: Life Cycle Stages of the UWF Replacement Forestry Section 5.3.1: Planting Stage Section 5.3.2: Growth Stage Section 5.3.3: Changes to the Project Section 5.4: Use of Natural Resources, Emissions and Wastes Section 5.4.1 Use of Natural Resources; Section 5.4.1.1 Land Section 5.6: Cumulative Descriptions (*The Whole Upperchurch Windfarm Project*) **EIAR Volume C3: EIAR Figures for Chapter 1 and Figures for Chapter 5**
	(c) a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;	**Volume C2: EIAR Main Report:** **Chapter 5: Description of the Development**: Section 5.3.2 Growth Stage Section 5.4.1 Use of Natural Resources; Section 5.4.1.1 Land, 5.4.1.2 Biodiversity, 5.4.1.2.1 Invasive Species Management, 5.4.1.3 Water, 5.4.1.4 Soils
	(d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases	**Volume C2: EIAR Main Report:** **Chapter 5: Description of the Development**: Section 5.4.2 Emissions Section 5.4.3 Wastes **EIAR Volume C4: EIAR Appendices** **Appendices 5.1, 5.2 5.3 and 5.4** (Section 5.4.2 and 5.4.3)

REFERENCE DOCUMENTS

(INFORMATION FOR THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT)		
Annex IV Paragraph #	**Requirement of the EIA Directive**	**Location of information provided in the EIAR to comply with EIA Directive requirement**
Annex IV Paragraph 2	A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects	**Volume C2: EIAR Main Report** **Chapter 4:** Alternatives Considered
Annex IV Paragraph 3	A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge	**Volume C2: EIAR Main Report:** **Environmental Topic Chapters 6 – 17:** Section X.2.2 Location and Overview Description. The environment is also described in Section X.X.1 for each individual Sensitive Aspect section from Section X.2.
Annex IV Paragraph 4	A description of the factors specified in Article 3(1) likely to be significantly affected by the project: Population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydro morphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.	**EIAR Volume C2: Main Report** **Environmental Topic Chapters 6 – 17:** Section X.2.2 Location and Overview Description. The environment is also described in Section X.X.1 for each individual Sensitive Aspect section from Section X.2. **Chapter 6: Population** (*Local Economy*) **Chapter 7: Human Health** (*Compilation of human health impacts of from the topic chapters Population, Water, Air (air quality, noise, EMF), Roads (Road Users), Material Assets (Built Services Users*). **Chapter 8: Biodiversity** (*including flora & fauna*) **Chapter 9**: Land (*including land-take*) **Chapter 10: Soil** (*including organic matter, erosion, compaction, sealing*)

REFERENCE DOCUMENTS

(INFORMATION FOR THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT)		
Annex IV Paragraph #	**Requirement of the EIA Directive**	**Location of information provided in the EIAR to comply with EIA Directive requirement**
		Chapter 11: Water (*including hydro morphological changes, quantity and quality*) **Chapter 12: Air** (*Airborne dust, Noise, EMF*) **Chapter 13: Climate** (including *greenhouse gas emissions*), **Chapter 14: Material Assets** (*Built Services – Electricity, Water and Communications Services*) **Chapter 15: Material Assets** (*Roads*) **Chapter 16: Cultural Heritage** (*including architectural and archaeological aspects)* **Chapter 17: The Landscape** **Volume C3: EIAR Figures** for each chapter.
Annex IV Paragraph 5	A description of the likely significant effects of the project on the environment resulting from, inter alia: (a) the construction and existence of the project, including, where relevant, demolition works; (b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;	**(a) Volume C2: EIAR Main Report:** **Chapter 5: Description of the Development**: Section 5.2 Characteristics of UWF Replacement Forestry Section 5.3 Life Cycle Stages **(b) Volume C2: EIAR Main Report** **Chapter 5: Description of the Development**: Section 5.4 Use of Natural Resources: 5.4.1 Land, 5.4.2 Biodiversity, 5.2.3 Water, 5.2.4 Soils. **Volume C2: EIAR Main Report** Chapter 8: Biodiversity, Chapter 9: Land Chapter 10: Soils Chapter 11: Water **(c) Volume C2: EIAR Main Report:**

REFERENCE DOCUMENTS

(INFORMATION FOR THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT)		
Annex IV Paragraph #	**Requirement of the EIA Directive**	**Location of information provided in the EIAR to comply with EIA Directive requirement**
	(c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;	**Chapter 5: Description of the Development**: Section 5.4.2 Emissions, Section 5.4.3 Wastes **Chapter 12: Air** Sensitive Aspect Evaluation from Section 12.2.1 **Chapter 10: Soil** Sensitive Aspect Evaluation from Section 10.2.1 **Chapter 11: Water** Sensitive Aspect Evaluation from Section 11.2.1 **Chapter 8: Biodiversity** Sensitive Aspect Evaluation from Section 8.2.1 **Chapter 13: Climate** Sensitive Aspect Evaluation from Section 13.2.1
	(d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);	**(d) EIAR Volume C2: Main Report:** **Chapter 5: Description of the Development** Section 5.5 Vulnerability to Major accidents and Risk to Human Health **Chapter 7: Human Health** Sensitive Aspect Evaluation from Section 7.2.1 **Chapter 16: Cultural Heritage** Sensitive Aspect Evaluation from Section 16.2.1
	(e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;	**(e) Volume C2: EIAR Main Report:** **Chapter 5: Description of the Development:** Section 5.6: Cumulative Descriptions Section 5.6.1: Other Elements of the Whole Upperchurch Windfarm Project Section 5.6.2: Secondary Projects

REFERENCE DOCUMENTS

(INFORMATION FOR THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT)		
Annex IV Paragraph #	**Requirement of the EIA Directive**	**Location of information provided in the EIAR to comply with EIA Directive requirement**
		Section 5.6.3: Description of Other Projects or Activities **Environmental Topic Chapters 6 – 17**: Impacts on individual environmental topics are presented in Individual Sensitive Aspect sections from Section X.2 –Section X.X.2: Cumulative,
	(f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change; (g) the technologies and the substances used. The description of the likely significant effects on the factors specified in Article 3(1) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium- term and long-term, permanent and temporary, positive and negative effects of the project. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project	**(f) EIAR Volume C2: Main Report:** **Chapter 13: Climate** Individual Sensitive Aspect sections from Section X.2 **(g) EIAR Volume C2: Main Report:** **Chapter 5: Description of Development** Section 5.2.: Characteristics of UWF Replacement Forestry Section 5.3: Life Cycle Stages of the UWF Replacement Forestry **Environmental Topic Chapters 6 – 17**: Sensitive Aspect Evaluation from Section X.2.1 Description of European or National environmental protection objectives, in Section X.1.8*: Methodology for Evaluating 'Topic' Effects*, where relevant.
Annex IV Paragraph 6	A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved	**EIAR Volume C2: Main Report:** **Environmental Topic Chapters 6 – 17**: Section X.1.7: Sources of Baseline Information Section X.1.7.1: Certainty and Sufficiency of Information Provided Section X.1.8: Methodology for Evaluating '*Topic*' Effects

REFERENCE DOCUMENTS

(INFORMATION FOR THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT)		
Annex IV Paragraph #	**Requirement of the EIA Directive**	**Location of information provided in the EIAR to comply with EIA Directive requirement**
Annex IV Paragraph 7	A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.	**EIAR Volume C2: Main Report** **Chapter 5: Description of Development,** Section 5.2.4: Environmental Protection Measures designed into the UWF Replacement Forestry. **Environmental Topic Chapters 6 - 17** Sensitive Aspect Evaluation from Section X.2.1 - Section X.X.3 Project Design Environmental Protection Measures, Section X.X.5 Mitigation Measures X.X.7 Application of Best Practice **Chapter 4: Alternatives Considered** (*for Environmental Protection Measures incorporated into the Project Design*) **Chapter 19:** Monitoring Arrangements **EIAR Volume C4: EIAR Appendices** **Appendix 5.2** Invasive Species Management Plan
Annex IV Paragraph 9	A non-technical summary of the information provided under Points 1 to 8 of Paragraph 9	**Volume C1: EIAR Non-Technical Summary**
Annex IV Paragraph 10	A reference list detailing the sources used for the descriptions and assessments included in the report.	**Volume C2: EIAR Main Report:** **Chapters 6 to 17** Reference List at the end of each topic chapter. Section X.1.7 Sources of Baseline Information and Section X.1.8 Methodology for Evaluating 'topic' Effect **Chapter 2:** Section 2.4: Descriptive Terminology Used in this EIA Report

REFERENCE DOCUMENTS

Appendix to Chapter 2: The EIAR Process including Scoping

Appendix 2.2: Environmental Topic Authors Statements of Competency

Appendix 2.2 Section	Section Heading	Relevant EIA Report
A2.2.1	Environmental Topic Authors Statements of Competency	UWF Grid Connection UWF Related Works UWF Replacement Forestry

The promoter engaged the services of suitably qualified and experienced Competent Experts to appraise the likely effects, on all the Environmental Factors of the subject development so that relevant and complete information is provided to the Competent Authority.

A summary statement of competency is provided in Section X.1.2 of each of the Environmental Topic Chapters 6 – 17.

This appendix comprises the full text of these statements.

A2.2 .1 Statements of Competence

CHAPTER 6 POPULATION (SOCIO-ECONOMICS)

The report on the Socio-Economic aspect of Population and Human Health was written by John Lawlor (M. Econ. Sc. Hons), Director at EY-DKM Economic Advisory Services (EY-DKM) and Ciara Morley (Ph.D. Finance), Senior Consultant with EY-DKM.

John has over 20 years' experience of economic analysis with DKM, and prior to that worked in the Environmental Policy Research Centre of the ESRI. Ciara works on issues in the Irish and global economy and in the areas of urban economics, transport, construction and tourism, and also previously worked in the ESRI. EY-DKM Economic Advisory Services was recently formed following the acquisition of DKM Economic Consultants by EY. This has brought together the premier economics consultancy company in Ireland alongside one of the world's largest consultancy firms.

CHAPTER 7 HUMAN HEALTH

The report on the Human Health aspect of Population and Human Health has been written by Dr. Andrew Buroni PhD, MSc, BSc (Hons), Fellow of the Royal Society of Medicine, Fellow of the Royal Society of Public Health of RPS Group.

Andrew is RPS' Health and Social Impact Assessment Practice Leader with over 17 years of project experience on leading international Health and Social Impact Assessment in the energy, oil and gas, waste management, transport, civil aviation, spatial planning, regeneration and sustainable development sectors.

RPS HIA Team

The RPS Health and Social Impact Assessments (HIA) team is the market leader for robust planning focussed HIA services, with an unrivalled catalogue of major HIA examples, and an unmatched level of proven HIA expertise and experience. The RPS HIA team has scoped, designed, performed and presented evidence at public inquiry, oral hearing and issue specific hearing on a wide array of projects ranging from airport expansions, national waste management strategies and surface mines, through to new nuclear power stations, gas fired and biomass power stations, energy from waste facilities, windfarms and national electricity grid infrastructure.

A small sample of recent project examples that offer transferable knowledge and added value to this study are summarised in the table below.

Sample of recent RPS grid connection and wind farm project examples.

Project	Description
Eirgrid Electromagnetic field (EMF) health research and monitoring programme	Development of a comprehensive non ionising radiation and health evidence base with Dr Michael Repacholi (the inaugural chair of the International Commission on Non-Ionizing Radiation Protection and former EMF Task Group leader for the World Health Organisation), and detailed EMF monitoring programme to inform national grid infrastructure and constitute a nation-wide health and EMF proof of evidence for every type

Project	Description
	of national grid infrastructure in Ireland.
Grid 25	HIA services to inform the Grid 25 infrastructure project including community and stakeholder engagement, public relations support, provision of health and wellbeing planning principles and addressing risk perceptions through a robust evidence based HIA.
Hornsea Windfarm	HIA support and the provision of a focused EMF health assessment to address the remaining key community and stakeholder health concern of risk from changes in exposure to EMF and from Electro Magnetic Interference (EMI).
Atlantic Array Windfarm	
Tamnamore to Omagh Power Line	
Burbo Bank Windfarm	
Moorside, Sizewell C and Hinkley Point C New Nuclear power Stations	HIA for the construction, operation and grid connection of three new nuclear power stations, including the assessment from changes in air quality, noise, transport, social/socio-economic, ionising and non-ionising radiation for the main applications and all associated developments.
Transport Health Assessment Guidance for the Department of Health and Department for Transport	Research and development of transport focused HIA guidance to inform and test every transport plan in England (covering changes in air quality, noise, risk of accident and injury, community severance, physical activity etc).

On the above basis, the HIA team, has significant, proven and transferable expertise and experience pertinent to the construction and operation of the proposed project.

CHAPTER 8 BIODIVERSITY

The report on the Environmental Factor, Biodiversity, has been written by Inis Environmental Consultants Ltd.

Staff profiles outlining the competencies of the author(s) and field surveyors who collected data to inform the current assessment are presented below.

Howard Williams

Howard joined ESB as a biologist in 1998. In 2000, he established INIS Environmental Consultants Ltd. where he now acts as CEO and Principal Ecologist. He is a Chartered Environmentalist and a Chartered Biologist and has written and managed many Construction Environmental Management Plans, Article 6 Appropriate Assessments and Ecological Impact Assessments for over 50 wind farm projects. Howard is an expert in the field of avian ecology in addition to having considerable knowledge and experience producing management strategies/prescriptions for a range of protected species, both terrestrial and aquatic. As an expert in his field, Howard has published scientific papers on Hen Harriers and their interaction with wind farms, in peer reviewed journals and is currently compiling papers on fatality monitoring strategies at wind farm facilities.

Education
BSc. Biological Sciences (1993 – 1997) National University of Ireland, Cork

Professional Accreditation
Chartered member of the Royal Society of Biology (CBiol)
Chartered member of the Society for the Environment (CEnv)
Member of the Chartered Institute of Ecology and Environmental Management (MCIEEM)
Full member of the Institute of Fisheries Management (MIFM)

Chris Cullen

Chris is an Ecologist and Associate Member of the Chartered Institute of Ecology and Environmental Management. He holds a Higher National Diploma in Engineering and a further Diploma in Field Ecology. Chris has a broad range of experience within the environmental sector. He is a specialist in Ornithological surveys and assessments, however, he also has experience in Project Management, Appropriate Assessment, Expert Witness testimony, Cumulative Impact Assessment, Habitat Mapping, Mitigation Development, EIA, Collision Risk Modelling, Biomonitoring, Education, Public Speaking and a broad range of survey methodologies. His Engineering background has given him a lot of experience in teamwork and participation in team driven projects, project management and undertaking tasks with high levels of responsibility. Chris has had a number of papers published in peer reviewed publications such as Irish Birds, The Irish Naturalists Journal, The Proceedings of the Royal Irish Academy, Ringing and Migration and In Practice. Chris has also been a named author on additional papers published in journals such as Ibis. Chris has over 10 years' experience as a professional ecologist.

Education
Dip. Field Ecology (2002-2003) National University of Ireland, Cork
Higher National Diploma Engineering (1991 – 1995) Waterford Institute of Technology

Professional Accreditation
Associate Member of the Chartered Institute of Ecology and Environmental Management (ACIEEM)

Sarah Ingham

Sarah is currently a full-time in-house Project Ecologist with INIS managing large teams of bird, mammal and habitat surveyors on a number of national ecological projects, in addition to analysing all data gathered by these teams. Since joining INIS, Sarah has led and managed a broad range of multi-faceted high profile wind farm projects. A large part of Sarah's current role at INIS also involves the output of expert advice and recommendations with regards Appropriate Assessments and Environmental Impact Assessments of large scale infrastructural energy developments throughout Ireland. Her day-to-day work regularly includes designing detailed mitigation measures based on constraints at proposed wind farms and other developments, as well as undertaking desk-top research into other matters relating to birds and ecological conservation in Ireland. Sarah has over 7 years' experience as a professional ecologist.

Education

BSc. (Hons) Zoology and Animal Behaviour (2004 – 2007) Anglia Ruskin University, Cambridge
MSc. Biodiversity and Conservation (2008 – 2009) Trinity College Dublin

Professional Accreditation

Associate Member of the Chartered Institute of Ecology and Environmental Management (MCIEEM)

Peter O'Connor

Peter holds a Masters Degree in GIS and Remote Sensing. He has experience in using MaxEnt and LiDAR to map the habitat suitability and distribution of woodland birds. The results of this study were presented at the Remote Sensing and Photogrammetry Society conference in Aberystwyth. Working as a GIS Specialist in Belize he was involved in a project mapping the Marine Habitats of Port Honduras Marine Reserve. He also ran workshops for the local rangers teaching them the basics in GIS.

John Deasy

In his current role at INIS, John provides project management, data management, data analysis, report writing and GIS support for a number of ongoing projects. In addition, he undertakes a range of field surveys including bird surveys (vantage point and walked transect surveys) as well as bat surveys, habitat surveys, invasive species surveys and marsh fritillary larval web surveys. As part of the Ecology team at Inis, John also contributes to the production of Appropriate Assessments and Environmental Impact Assessments of large scale infrastructural developments throughout Ireland, including wind farm developments and associated infrastructure. John has 4 years of experience as a professional ecologist and over 10 years of experience in the environmental sector.

Education

BSc. Environmental and Earth Systems Science (2002-2006) National University of Ireland, Cork
MSc. Applied Marine Science (2006 – 2007) University of Plymouth
MSc. Ecological Assessment (2013 – 2014) National University of Ireland, Cork

CHAPTER 9 LAND

The Landuse aspect of Population and Human Health has been written by Andy Dunne of Environmental Agricultural Engineering Consultancy.

Andy Dunne holds a Bachelor's Degree in Agricultural Science taken in 1986 and a Master's Degree in Science (Agriculture) awarded in 1993. He is currently completing a PhD at University College Dublin. He has worked as an agricultural consultant since 1994. He is a director of Environmental Agricultural Engineering Consultancy Ltd, a firm of agricultural and engineering consultants based in Co. Laois. For more than 20 years Andy has been involved in a great variety of land use and agricultural development activity and he is familiar with national and EU regulation and policy in the area.

CHAPTER 10 SOILS

See Water

CHAPTER 11 WATER

The report on Soils and Water has been written by David Broderick (BSc, H. Dip Env Eng, MSc): Hydrogeologist and Michael Gill (B.A., B.A.I., M.Sc., Dip. Geol, MIEI): Environmental Engineer of Hydro-Environmental Services (HES) which was established in 2005 as a hydrological, hydrogeological and environmental practice, specialising in peatland and upland hydrology in Ireland and Northern Ireland.

CHAPTER 12 AIR – INCLUDING AIR QUALITY, NOISE AND EMF

AIR QUALITY

The report on the Air Quality aspect of the Environmental Factor, Air, was written by Ciara Nolan of AWN Consulting Ltd. Ciara Nolan holds a BSc (Hons) in Energy Systems Engineering and Master in Applied Environmental Science, of AWN Consulting Ltd. She is an Associate Member of the Institute of Air Quality Management and specialises in the fields of ambient and indoor air quality monitoring and EIA.

AWN Consulting is a multidisciplinary environmental consultancy specialising in Acoustics, Air Quality, Climate, Waste, Water and Soil Quality, Flora and Fauna and Seveso II Major Accident Hazard Land Use Assessments. AWN Consulting has its Head Office in Dublin.

AIRBOURNE NOISE AND VIBRATION

The report on the Noise & Vibration aspect of the Environmental Factor, Air, was written by Peter Barry (BAgr Sc, MSc), environmental scientist and environmental impact assessment practitioner of Malachy Walsh & Partners Ltd.

Peter has 15 years' experience across a variety of environmental topics and has particular expertise in the measurement, assessment, prediction and control of environmental noise and is a member of the Institute of Acoustics and the Institute of Environmental Management and Assessment. Peter has contributed to and authored numerous noise and vibration impact assessments for inclusion in Environmental Impact Statements for a variety of developments, including wind farms, substations and grid connections.

ELECTROMAGNETIC FIELDS (EMF)

The report on the Electromagnetic Radiation aspect of the Environmental Factor, Air, was written by John McAuley, Lewis Brien and Nigel Duignan of Compliance Engineering Ireland Ltd.

John McAuley– CEO (CEI) – MSc (Hons) in Engineering

John the senior consultant on this work has undertaken similar national and International projects for many clients, including the 400kV North South Interconnector, East West Interconnector, many windfarm, solar and compressed air projects, and assisted Eirgrid with EMF evidence-based studies.

John McAuley up until 2016 held the chairmanship of the Electrotechnical Council of Ireland (ETCI) EMF committee and attended European Committee for Electrotechnical Standarization (CENELEC) meetings as the Irish delegate. CENELEC, in conjunction with the International Electrotechnical Commission (IEC), has developed a large number of standards in support of the EU Public EMF Recommendation (1999/519/EC) and the EU EMF Directive (2004/40/EC) for occupational applications.

Lewis Brien–Engineer - B(Hons) in Electronics

Lewis is experienced in carrying out site surveys and measurements on power lines, power stations and substations. He has performed surveys, modelling and reporting of major and minor infrastructure projects including the East West Interconnector and almost 2000 EMF measurements of power lines in Ireland.

Nigel Duignan–Engineer - MSc (Hons) in Electronics

Nigel is experienced in carrying out site surveys and measurements on power lines, trains and substations. He has performed surveys and prepared EIS chapters for several major infrastructural projects including the soon to be completed Luas Cross City line.

Compliance Engineering Ireland (CEI)

CEI has carried out over 500 radiofrequency site surveys throughout Ireland and worldwide. CEI are recognised by Comreg as one of the foremost independent authorities on the radio frequency spectrum in Ireland and are in regular contact on Electromagnetic Compatibility issues. CEI won the current Comreg tender to measure 120 mobile telephone base stations for non-ionising radiation (NIR). CEI are also the main supplier to the Irish mobile phone industry of independent NIR surveys.

CHAPTER 13 CLIMATE

The report on the Environmental Factor, Climate, has been written by Ciara Nolan of AWN Consulting Ltd. Full profile at Chapter 12 Air: Air Quality above.

CHAPTER 14 MATERIAL ASSETS - BUILT SERVICES

WATER SUPPLY

The report on the Water Supply aspect of the Environmental Factor, Material Assets was written by David Broderick of HES. Full profile above at Chapter 11: Water.

ELECTRICITY NETWORK

The report on the Electricity Network aspect of the Environmental Factor, Material Assets was written by Ruairi Geary, Chartered Engineer. Ruairi is a design team lead within TLI Group Limited. He has over 10 years' experience in a wide range of Electrical/Mechanical engineering projects, specialising in the area of distribution and transmission network Design, and in particular working on the ESB system. Ruairi provides advice to both private sector and public sector clients on all aspects of the electricity system.

TLI Group is a utility infrastructure consultancy and construction company, operating extensively within the utilities sector both in Ireland and internationally. Designing and building overhead power lines and underground cables with associated structures are the company's core expertise.
TLI Group has operated extensively with ESB Networks (ESBN) as well as with a large portfolio of clients, in the upgrading, refurbishment and renewal of the all-island electricity network across Ireland.

Ruairi Geary along with other electrical and civil engineers in TLI was also part of the Project Design Team, and was involved in the design of the Mountphilips Substation and Mountphilips to Upperchurch 110kV Underground Cables i.e UWF Grid Connection Element of the Whole UWF Project.

COMMUNICATIONS NETWORK

The report on the Communications Network aspect of the Environmental Factor, Material Assets, was written by Kevin Hayes of Ai Bridges Ltd.

Kevin Hayes

Kevin Hayes is the Engineering Director of Ai Bridges and is both a Master of Electronic Engineering and a Software Design Engineer with in excess of 15 years of experience in telecommunications network design, analysis and troubleshooting of radio frequency issues and development of telecommunication projects. Kevin is currently involved in researching software interference prediction models for air traffic control systems.

Ai Bridges

Ai Bridges is a leading supplier of software prediction modelling solutions and software services for the telecommunications industry and also provide comprehensive turnkey solutions and have extensive experience and knowledge of network design, implementation and deployment of telecommunications software solutions. The organisation have designed and commissioned telecommunications projects for clients throughout Ireland and abroad and have worked successfully with leading vendors to bring telecommunications software solutions to market for the renewable energy sector.

Ai Bridges have been involved in the wind and renewable energy sectors from the outset and have a team of qualified and trained personnel within the Organisation. Ai Bridges has supplied telecommunications solutions to wind farms throughout the Republic and Northern Ireland, Scotland and UK. They have undertaken environmental impact study reports on behalf of wind farm operators on the potential impact on telecommunications networks and television transmission networks of proposed wind farm developments. AI Bridges has also have developed a 3D software prediction model that can predict the impact of a wind farm development on television transmission and aviation communications networks.

Services provided by Ai Bridges include; Electromagnet Interference (EMI) Impact studies, TV interference Remediation, Aviation & Radar Studies, Hot Zone Studies and also expert witness reporting for planning and post-planning application requirements.

CHAPTER 15 ROADS & TRAFFIC

The Roads & Traffic report was written by Mr. Eoin Reynolds of NRB Consulting Engineers. Eoin is a Chartered Engineer and is a Director of NRB Consulting Engineers Limited. He has over 26 years' experience in a wide range of civil engineering projects, although specialising in the area of Traffic & Transportation and Roads Design, and in particular in assessing the infrastructure needs of development. Eoin provides advice to both private sector and public sector clients on all aspects of roads, traffic and transportation and mobility management. He has given expert evidence at planning appeals, oral hearings and public enquiries. He was previously Director with Waterman Boreham Transport Planning, and prior to that he was Manager of the Belfast Office of JMP Consultants Ltd. NRB Consulting Engineers are specialist in roads and transportation.

CHAPTER 16 CULTURAL HERITAGE

The report on the Environmental Factor, Cultural Heritage, was written by Barry Fitzgibbon and Cóilín O'Drisceoil of Kilkenny Archaeology Ltd. The report authors are members of the Irish Archaeological Institute, the professional body of archaeologists in Ireland. The authors are also qualified as licence-eligible archaeologists under the criteria set out by the National Monuments Service and the National Museum of Ireland.

Kilkenny Archaeology Ltd. has been trading since 1998 and specializes in evaluating the impact of large-scale development on Cultural Heritage sites in the receiving environment. The company have been involved in the production of more than 50 Environmental Impact Statements for large-scale developments, including approximately 20 individual windfarm applications.

CHAPTER 17 LANDSCAPE

The report on the Environmental Factor, Landscape, was written by Richard Barker of Macro Works Ltd. Richard is Principal Landscape Architect at Macro Works Ltd. He holds Masters degree in Landscape Architecture and is a corporate member of the Irish Landscape Institute. Relevant experience includes the landscape and visual impact assessment of more than 90 wind energy development proposals including 5 no. Strategic Infrastructure Development (SID) projects and the Consented Upperchurch Windfarm. Experience also extends to numerous linear infrastructure projects including road schemes, electricity transmission lines (overhead and underground) as well as water and sewage pipelines.

Appendix to Chapter 2: The EIAR Process Including Scoping

Appendix 2.3: Scoping of Other Projects or Activities

The data and descriptions in this appendix have informed Chapter 3: Scoping & Consultation of the EIA Report. The information presented in this Appendix 3.1 is outlined below and the relevant element(s) of the Whole UWF Project are also identified.

Appendix 2.3 Section	Section Heading	Relevant EIAR
A2.3.1	Research Results of Other Projects or Activities in the Area	UWF Grid Connection UWF Related Works UWF Replacement Forestry
A.2.3.2	Cumulative Scoping of Other Projects or Activities (in order of Environmental Factors evaluated in the EIAR Main Report)	
A.2.3.3	List of Other Projects or Activities Scoped-Out from the EIAR	
A.2.3.4	List of Other Projects or Activities Scoped-In for further evaluation in the EIAR	

A2.3.1 Research Results of Other Projects or Activities in the Area

A 15km area around the footprint of the various Elements of the Whole UWF Project was drawn, and research of other large projects within this area was carried out by Construction Information Services (CIS), one of Ireland's leading research companies. To cover all projects which may have received planning and an additional extension of duration and which could be constructed at the same time as the Whole UWF Project, the search covered the period from January 2011. In addition to this, the EIAR Teams knowledge of the area added existing projects, such as existing windfarms to the list. Activities in the area surrounding the works were also considered. The list of 32 projects and 3 activities below, are the relevant projects and activities which have potential to cause cumulative effects, These projects are then scoped in Section A3.4.2 below.

Other Project or Activity Map ID	Name	Industry	Details	Location	Status	Planning Authority	Planning Ref
1	Killonan to Nenagh 110kV Overhead Line	Utilities	Existing 110kV overhead line between Killonan 110kV Station near Limerick City and the 110kV/38kV substation station on the outskirts of Nenagh town. The 110kV overhead lines are located to the west of the UWF Grid Connection 110kV UGC in Mountphilips townland. The new Mountphilips Substation associated with the UWF Grid Connection will connect to this line via the new End Masts.	Between Killonan Station and Nenagh Substation	Existing	Limerick Tipperary	Existing
2	Shannonbridge to Killonan 220kV Overhead Line	Utilities	Existing 220kV overhead line between Shannonbridge 220kV Station and Killonan 110kV Station near Limerick City. The 220kV overhead lines pass over the route of the UWF Grid Connection 110kV UGC in Coole townland.	Between Shannonbridge Station and Killonan Station	Existing	Offaly Tipperary Limerick	Existing
3	Bunkimalta Windfarm	Energy	16 wind turbines, each having a rated electrical output of approximately 2,500 - 3,000 kilowatts, access tracks, a fenced Electrical Transformer Station comprising a single-storey Control Building and Substation, an effluent treatment system, three anemometer masts, repository areas, borrow pits and all associated site works, above and below ground. modifications to the existing entrance from the L-2163 to the Keeper Hill Coillte Forest. installation of approximately 22.25km of 38kV underground cable (UGC) between Bunkimalta Wind Farm and Nenagh 110kV substation, to be installed primarily	Bunkimalta, Keeper Hill, Co. Tipperary, Co. Tipperary	Consented	Tipperary	13510035 16600433 16600432

REFERENCE DOCUMENTS

Other Project or Activity Map ID	Name	Industry	Details	Location	Status	Planning Authority	Planning Ref
			in public roads. Bunkimalta Windfarm is located c.3.5km to the north of the UWF Grid Connection, and c.11km to the northwest of the UWF Related Works, and c.12.5km to the northwest of the UWF Replacement Forestry.				
4	Castlewaller Windfarm	Energy	16 turbines (each with a maximum hub height of 100m, maximum rotor diameter of 90m, and with a total tip height of 145m), one permanent meteorological mast, 2 borrow pits, a sub-station including a control building, new internal access roads, upgrading of existing internal access roads, expansion of drainage system, turbine hardstands, wastewater holding tank, underground cables and ancillary works. The UWF Grid Connection 110kV UGC route passes through the footprint of the consented windfarm.	Castlewaller, Newport, Co. Tipperary	Consented	Tipperary	16600472, 11510251.
5	Milestone Windfarm	Energy	Milestone Windfarm is a 6-turbine windfarm located adjacent to the southwest of the consented Upperchurch Windfarm at Knockcurraghbola Commons, Knockcurraghbola Crownlands, Graniera, Shevry, Inchivara and Knockduff. When constructed, Milestone Windfarm will comprise of 6 No. wind turbines (each with a maximum tip height of 126m) along with new access tracks, and electrical substation, a borrow pit and associated works. The grid connection associated with the Milestone Windfarm is towards the south at ESBN Cauteen Station, to be cabled along the public road network. An Environmental Impact Statement accompanied the planning applications for Milestone Windfarm – Ref: 12510385 & 1410 & 16600701. 110kV UGC and Internal Windfarm Cabling pass through a landholding associated with Milestone Windfarm, which is located on lands adjacent to Upperchurch Windfarm.	Knockcurraghbola Commons, Knockcurraghbola Crownlands, Graniera and Shevry, Co. Tipperary & Knockduff & Inchivara, Milestone, Co. Tipperary	currently under construction with construction works expected to be completed before the commencement of the Whole UWF Project	Tipperary	12510385, 1410 16600701
6	Cappawhite Windfarm	Energy	18 wind turbines access tracks, fenced electrical transformer station comprising a single-storey control building and substation, anemometer masts, borrow pits and all associated site works, above and below ground. Each wind turbine will have an overall maximum dimension of 140 metres, comprising a tower 90-100 metres high, with a diameter of about 4 metres at the base, to	Bahagha Curreheen Foilaclug Foildarg Inchinsquillib Kilmore & Oldcastle,	Existing	Tipperary	13210 116

REFERENCE DOCUMENTS

Other Project or Activity Map ID	Name	Industry	Details	Location	Status	Planning Authority	Planning Ref
			which three blades of 40-50 metres length will be attached. The Cappawhite Windfarm is c.8.5km to the southwest of the Upperchurch Windfarm.	Cappaghwhite, Co. Tipperary			
7	Garracummer Windfarm	Energy	13 no. 2 MW wind turbines with steel towers and composite fibre rotor blades of hub height up to 67 metres, a rotor diameter of up to 80 metres and base to blade-tip height of up to 107 metres, also including wind turbines transformers, turbine hardstands, new access roads, strengthening and widening of existing forestry access roads; drainage; a substation control building with fenced compound for electrical equipment; underground electrical cables linking the turbines with the substation compound; underground communication cables, and all associated site works. Garracummer Windfarm is located c.4km to the southwest of the Upperchurch Windfarm	Curraghmarky, Birchgrove, Moanvaun, Garracummer, Cummer More, Cummer Beg	Existing	Tipperary	041259 041034 041178
8	Glencarbry Windfarm	Energy	12 no. wind turbines, overall height of up to 126.6 meters, electrical control building, access roads and ancillary site works, c.5km south of the Upperchurch Windfarm	Glenough Upper, Lackenacreena/Foilmac duff, Glenpaudeen/Glencarbry, Glenough Lower/Turraheen Lower, Rossmore, Glenpaudeen/Glencarbry, Holyford, Co. Tipperary	Existing	Tipperary	07255 1180 1324 13135 13205
9	Glenough Windfarm		14 no. wind turbines up to 80m. hub height and up to 45m. blade length, access roads, control building, c.4.5km to the south of Upperchurch Windfarm	Glenough Upper/Glenough , Lower/Turraheen Upper, Turraheen Lower, Co Tipperary	Existing	Tipperary	041195 08136 08701 10595
10	Hollyford Windfarm	Energy	Development of site consisting of 3 wind turbine generators, 80m in hub height, c.4.5km to the south of Upperchurch Windfarm	Glenough Upper TD, Hollyford, Co. Tipperary	Existing	Tipperary	05287 12400

REFERENCE DOCUMENTS

Other Project or Activity Map ID	Name	Industry	Details	Location	Status	Planning Authority	Planning Ref
11	Knockastanna Windfarm	Energy	Installation and construction of a wind farm including 4 no. turbines, sub-station, access road, temporary monitoring mast and permanent monitoring mast	Curraghfoil, Doon, Co Limerick	Existing	Limerick	011385
12	Gortnahalla Turbine	Energy	Single wind generator with a maximum output set at 500kw, hub height 65m	Gortnahalla, Upperchurch, Co. Tipperary	Built or Expired	Tipperary	12510368
13	Killuragh Digester Plant	Energy	construction of a digester plant, associated ABP building and associated site works to process farm slurry and other organic material to provide renewable energy and fertilizer	Killuragh, Pallasgreen, Co Limerick	Consented	Limerick	111066
14	Rear Cross Quarry	Quarry	1.extraction and processing of rock and ancillary operations within an existing quarry. the application provides for all ancillary operations including access road, stocking areas, quarry sump, oil interceptor/silt trap, soil/overburden storage areas and screening berms and site restoration activities/works including a total extraction area of 3.9ha (existing & proposed), stocking and ancillary areas. the quarry was originally granted planning consent under 03/51/0121. the quarry area will be restored to diverse ecological habitats. 2. the provision and erection of prefabricated modular type office/control cabin (16.2m2), amenity facilities, 3 steel container stores (34.3m2), block construction store (11.5m2), chemical toilet (2m2), weighbridge (54m2) and wheelwash (46m2). 3. all on a total site area of 8.5ha. activities to be carried out include the extraction of aggregates within an existing quarry footprint using blasting and hydraulic excavators. processing of the extracted material will be carried out using mobile plant and involves screening and crushing prior to stockpiling for sale off site. restoration/rehabilitation of the entire site will take place following the completion of extraction. permission is sought for a duration of 20 years for extraction, processing and restoration with an additional 2 years for final restoration/aftercare.	Shanballyedmond Rearcross, Co. Tipperary, Co. Tipperary	Existing	Tipperary	11510323

REFERENCE DOCUMENTS

Other Project or Activity Map ID	Name	Industry	Details	Location	Status	Planning Authority	Planning Ref
15	Foilnaman Mast	Utilities	An existing communications mast comprising a 30m steel lattice mast structure at Knockmaroe townland, in the vicinity of the UWF Related Works/Upperchurch Windfarm site.	Knockmaroe	Existing	Tipperary	10510462
16	Cummermore Communication Pole	Utilities	An existing communications structure comprising a 20m support pole, c.2km to the southwest of the Upperchurch Windfarm, and within 4km of the UWF Related Works (Telecom Relay Pole). This existing pole carries radio aerials and a communications dish, together with associated equipment, cabling, gantry pole, GPS timing antenna, cabinet and fencing. Planning Ref: 14600313	Cummermore	Existing	Tipperary	14600313
17	Ballinahinch Mast	Utilities	24 metre high telecommunications support structure, 3 no. telecommunications antennae, 2 no. link dishes, 1 no. rfe cabinet and 2 no. associated operator cabinets, all located within a 2.4 metre high palisade fenced compound with landscaping, turning circle and a 204m long access track and all associated site works	Ballinahinch House, Ballinahinch, Birdhill, Co. Tipperary, Co. Tipperary	Existing	Tipperary	11510423
18	Knockmeale Mast	Utilities	30m monopole, with 3 no. antennas, 2 no. radio link dishes, associated equipment and cabinets which forms part of the 3g communications network	Knockmeale, Killoscully, Co. Tipperary, Co. Tipperary	Existing	Tipperary	11510111
19	Newport Regional Water Supply	Utilities	Upgrade works on the existing local network – completed.	Newross, Newport	Upgrade works complete	Tipperary	n/a
20	Thurles Regional Water Treatment Works	Utilities	The construction of a water treatment plant and outfall to the River Suir. The water treatment plant will consist of a water treatment and administration building, sludge dewatering building, ESB sub-station, generator & oil tank enclosure, raw water balancing tank, clear water tanks, sludge balancing tank, sludge thickening and sludge holding tank, washwater tank, sludge skip and emergency sludge storage area, chemical storage tanks, washwater storage tank and all associated site development and site excavation works above and below ground	Bohernacrusha, Killeenyarda, Holycross, Co. Tipperary	Consented	Tipperary	16600877

REFERENCE DOCUMENTS

Other Project or Activity Map ID	Name	Industry	Details	Location	Status	Planning Authority	Planning Ref
21	Waste Management Facility, Thurles	Utilities	1) Construction of a new waste management facility building (c. 12 m height, c. 971 m2 gross floor area) 2) Construction of a new on-site waste water treatment plant (packaged secondary system plus packaged tertiary system) & associated pipework to cater for the existing & proposed developments 3) Associated & ancillary works will include new surface water collection system with rainwater harvesting, attenuation measures, de-commissioning of existing septic tank & percolation area, vehicle parking, staff parking, fuelling facilities, noise attenuation barriers, security & stock proof fencing & gates, kerbing, internal footpaths, road side footpaths & street lighting, structural fill & paving, slabs, alterations to site entrance, and landscaping 4) Retention of partial change of use of pre-existing authorised building office & office w.c. (c. 35 m2) to shared use as office & office w.c. between the pre-existing & proposed developments, and retention of change of use of pre-existing authorised slab for use as a slab in the proposed development (c. 261 m2) 5) Retention of the current layout and uses of conveyance plant including intake enclosure & ramps which will all be enclosed by the new facility building 6) Retention of inert fill to low lying areas of site (c. 532 m3). The retention fill area will be finished to profiles with soft landscaping including trees, shrubbery, & grasses, and will be used to enclose a new attenuation structure and as part of a landscaped site buffer / floodplain 7) Retention of associated & ancillary works and current uses including weighbridge, wheelwash, relocated hydrocarbon interceptor, silt trap, & pipework, and slabs (c. 593 m2) The facility will recover inert waste arising from construction & demolition activity including concrete, bricks, tiles, or other such similar material. The facility will recover, store, & transfer dry recyclables and will receive, store, & transfer waste (other than hazardous waste) for onward disposal. The new facility building will enclose the retained conveyance plant and other industrial equipment and will include a vehicle refuelling area. The conveyance plant will be used to convey waste from collection vehicles to larger transport vehicles. A waste facility permit would be required in relation to the development	Monakeeba, Mill Road, Thurles	Consented	Tipperary	15601055

REFERENCE DOCUMENTS

Other Project or Activity Map ID	Name	Industry	Details	Location	Status	Planning Authority	Planning Ref
22	Dew Valley Foods Plant	Manu-factoring	construction of a 8,234 m2 extension to the existing food manufacturing facility to include processing, cold storage, packing & intake/dispatch areas, ancillary plant, maintenance & switch rooms, a staff amenity area, external steel stairs, a transformer compound, pipe bridges, external plant & associated access ladders & platforms, the realignment & expansion of the site boundary to include new boundary walls & fencing, an additional car parking area, and additional site entrance/exit & set down area, new signage, the provision of staff entrance turnstiles, a 208m2 extension to the existing secondary waste water treatment building, the construction of 2no. 1,200m3 water tanks, construction of a new 128m2 process water treatment building, relocation of existing fuel tank & bund wall enclosure, a new treated effluent discharge pipe, the boring of 4 wells, the installation of 2 infiltration tanks, additional site lighting, the relocation of existing demountable workshop & stores, the demolition of an existing pump house, water tank, sheds & ancillary structures to facilitate the works, the re-use of excavated material for landscaping, site development and improvement purposes, the construction of an internal access road, the construction of a bicycle shelter, the installation of a new steam boiler and associated flue gas stack and all ancillary site works/services.	The Commons, Holycross Road, Thurles, Co Tipperary	Consented	Tipperary	16600222
23	Industrial / warehouse Units, Thurles	Industrial	1 No. Light Industrial/Warehousing building (gross floor area 2360.6sq.m.). The development consists of (1) 1 No. Building of total floor area 2360.6sq.m. subdivided into Units. (2) Roundabout and Access Road from Nenagh Road (R498) complete with necessary improvement works and road markings. (3) Car parking and loading areas. (4) Landscaping. (5) Site development works to facilitate the site. (6) Foul water pumping station and all associated works	Bawntameena, Nenagh Road, Thurles, Co. Tipperary	Consented	Tipperary	16600037
24	Newport Distributor Road	Civil	Distributor Road between R503 and local road (Murroe Road) in Newport Village and associated site works including footpaths, lighting, cycletracks, drainage, etc	Tullow, Newport, Co. Tipperary	Consented	Tipperary	07511157, 13510103

REFERENCE DOCUMENTS

Other Project or Activity Map ID	Name	Industry	Details	Location	Status	Planning Authority	Planning Ref
25	Housing Development Doon	Re-sidential	Construction of 25 no. houses consisting of 5 no. 4 bed detached dwellings, 20 no. 3 bed semi-detached dwellings, a bored well, entrance and roads together with associated site works and services	Bottle Hill, Doon, Co Limerick	Consented	Limerick	16530
26	Housing Developments, Annacotty	Re-sidential	Construction of 48 dwellings at Annacotty & construction of 240 dwellings in three areas/lots at Walkers Road	Annacotty, Co Limerick	Consented	Limerick	137026 137094
27	Sports Club Works – Sean Treacy GAA	Sport	astroturf playing area with associated fencing and floodlighting and 2.4m high palisade	Kilcommon, Co Tipperary	Consented	Tipperary	17600278
28	Newport Rugby Club	Sport	Under construction - playing pitches, training pitches, dressing rooms, carpark	Newross, Newport	Under construction	Tipperary	17600016
29	Agriculture - Milking Parlour	Agri-culture	(1) a dairy cubicle house complete with under-ground slatted tanks, (2) a walled silage base, (3) a general agricultural shed, (4) an extension to existing calf house incorporating the existing farm yard manure slab, the demolition of existing animal house and all associated site works.	Portnard, Cappamore, Co. Limerick	Consented	Limerick	15255
30	Agriculture – Milking Parlour	Agri-culture	(1) milking parlour and dairy, (2) unroofed easy-feed layout for dairy cows, (3) geomembrane lined slurry lagoon and all ancillary works	Bunkey, Lisnagry,, Co Limerick	Consented	Limerick	15194
31	Agriculture – Turkey Tunnel & Pig Unit	Agri-culture	a loose turkey poly tunnel, open feeding yard, slatted tank in existing house now used for pigs, change of use from hay barn/loose shed to pig shed/milling shed grain store	Gortussa, Dundrum, Co. Tipperary	Consented	Tipperary	14600343
32	Agricultural sheds and stores	Agri-culture	1) to construct a slatted cubicle dairy building complete with underground slatted tank, (2) to erect a circular slurry storage tower, (3) to construct 2 x walled silage stores with associated concrete area for the storage of round bales, (4) to construct 5 x individual feed store buildings, (5) to construct farm yard manure storage building, (6) to construct fodder storage buildings	Killuragh, Pallasgreen, Co. Limerick	Consented	Limerick	17133
33	Forestry	Activity	Commercial conifer forestry plantations throughout the Slievefelim to Silvermine Mountains upland area	n/a	Ongoing	n/a	n/a

REFERENCE DOCUMENTS

Other Project or Activity Map ID	Name	Industry	Details	Location	Status	Planning Authority	Planning Ref
34	Agriculture	Activity	Dry stock farming, mainly cattle, along with some dairy farming, throughout the Slievefelim to Silvermine Mountains upland area.	n/a	Ongoing	n/a	n/a
35	Turf-Cutting	Activity	Turf cutting in Bleanbeg Bog	n/a	Ongoing	n/a	n/a

REFERENCE DOCUMENTS

A2.3.2 Scoping of Other Projects or Activities in the Area

A-2.3 .2.1 Introduction

In this Section A3.4.2 scoping of the Whole UWF Project together with Other Projects or Activities is presented. The scoping was carried out by the authors of the EIAR Main Report topic chapters 6 to 17.

A-2.3 .2.2 Order of Presentation

The scoping in this Appendix is presented by Environmental Factor topic, in the same order as in the EIAR Main Report.

A-2.3 .2.3 Scoping Process

For each Environmental Factor topic, the scoping of Other Projects or Activities followed the following presentation format:

1. A summary, taken from the EIAR Main Report, of the sensitive aspects, impacts and relevant life-cycle stages which evaluated for likely effects, before the cumulative scoping exercise.

2. The geographical boundaries of the Cumulative Evaluation Study Area are defined for each sensitive aspect,

3. The Other Projects or Activities listed in Section A3.4.1 Research Results of Other Projects or Activities in the Area above, with potential to cause cumulative effects and which are located within the Cumulative Evaluation Study Area were identified,

4. The relevant time-frame study area is defined. This is the stage of the Elements of the Whole UWF Project during which impacts to the sensitive aspects of the Environment are likely to occur, ie. (construction, operation, decommissioning stages),

5. The Other Projects or Activities which are located within the geographical boundary (see point 2 above) are then scoped for potential to cause cumulative effects during the time-frame boundary (see point 3 above),

6. The Other Projects or Activities which are within both the geographical and the time-frame boundaries are then scoped, using a conceptual site model exercise, for potential to cause measurable cumulative effects with the Whole UWF Project.

7. As a result of the Cumulative Conceptual Site Model exercise, each Other Project or Activity is either *scoped-in* for evaluation in the topic chapters in Volume C2 EIAR Main Report, or *scoped-out* with justification for same.

A-2.3 .2.4 Basic Assumptions

The EIAR Team scoping starts with certain **basic assumptions** for the Whole UWF Project and the Other Projects or Activities:

For the Whole UWF Project:

- The residual effect of the Whole UWF Project, or where relevant – a particular Element or part of an Element of the Whole UWF Project, is used. The residual effects are presented in the Impact Evaluation Tables in Volume C2: EIAR Main Report Chapters 6 to 17,

- Any **matters already scoped out** in the Environmental Factor topic chapters (Vol C2 EIAR Main Report), are not included in the Cumulative Conceptual Site Model, as it was considered that there is no potential for cumulative effects with Other Projects or Activities, where there were no measurable effects from the Whole UWF Project in the first instance.

For Other Projects

- the residual effect of the Other Project which assumes that these projects will be constructed, operated and decommissioned according to their planning conditions, is used,

For Activities

- The Activity as it is normally carried out.

A-2.3 .2.5 Other Projects or Activities brought forward for further evaluation in the EIAR

Only the Other Projects or Activities scoped in for further evaluation in the sections hereunder are included in the Environmental Factor topic chapters which make up Chapters 6 to 17 of the EIAR Main Report.

A list and matrix of these Other Projects or Activities is included in Section A2.3.4, at the end of this Appendix.

A-2.3 .2.6 Scoping of Other Projects or Activities for POPULATION

Table 1: Summary of the Sensitive Aspects and Impacts taken from the EIAR Main Report chapter

Sensitive Aspect Evaluated in the EIAR Main Report	Likely Impacts to POPULATION Sensitive Aspect, as per Main EIAR Report	Relevant Whole UWF Project life-cycle stage (time-frame boundary)
Local Economy	Gross Value Added to Businesses and Employment Opportunities	Construction

Table 2: Defining the geographical boundaries of the Cumulative Evaluation Study Area

Sensitive Aspect	Geographical Boundary of the Cumulative Study Area	Justification for Study Area Extent
Local Economy	UWF Grid Connection Study Area along with the additional Electoral Divisions (EDs) of Glenstal, Doon West, Cappamore and Bilboa in County Limerick and Glengar, Curraheen, Cappagh, Donohill, Clonoulty West, Clogher, Moyaliff, Greenhall/Lackagh and Kilmore in County Tipperary in addition to the whole UWF project study area.	Location of all windfarms in the Slievefelim to Silvermines uplands area.

9 No Other Projects or Activities are located within the geographical boundary, as per Table 3.

Table 3: Other Projects or Activities located within the geographical boundary

Sensitive Aspect	Other Projects or Activities	Location of Other Projects or Activities within the Cumulative Geographical Boundary
Local Economy	Project No. 4: Castlewaller Windfarm	Nearest distance to Whole UWF Project 94m (P)
	Project No. 5: Milestone Windfarm	Nearest distance to Whole UWF Project 580m (E – under construction)
	Project No. 3: Bunkimalta Windfarm	Nearest distance to Whole UWF Project 2.6km (P)
	Project No. 7: Garracummer Windfarm	Nearest distance to Whole UWF Project 2.3km (E)
	Project No. 6: Cappawhite Windfarm	Nearest distance to Whole UWF Project 7km (E)
	Project No. 11: Hollyford Windfarm	Nearest distance to Whole UWF Project 3.9km (E)
	Project No. 9: Glenough Windfarm	Nearest distance to Whole UWF Project 2.8km (E)
	Project No. 10: Hollyford Windfarm	Nearest distance to Whole UWF Project 3.5km (E)
	Project No. 8: Glencarbry Windfarm	Nearest distance to Whole UWF Project 4.1km (E)

Note: (P) – Permitted Windfarm. (E) – Existing Windfarm.

As per Table 4, the **time-frame boundary is the construction stage**.

Table 4: Other Projects or Activities within the time-frame boundary

Other Project or Activity	**Is the Other Project or Activity within the Time Frame Boundary? – YES/NO** YES - Within the Timeframe Boundary – brought forward to the Cumulative Conceptual Site Model, *or* NO - Not within the time-frame boundary – scoped out
Project No. 4: Castlewaller Windfarm	NO – Windfarm will not be built during the same period as the Whole UWF Project
Project No. 5: Milestone Windfarm	NO – Windfarm will not be built during the same period as the Whole UWF Project, as it is currently under construction, and is expected to be operational by the time of construction for the Whole UWF Project
Project No. 3: Bunkimalta Windfarm	YES - Windfarm could potentially be constructed at the same time as the Whole UWF Project.
Project No. 7: Garracummer Windfarm	NO – these are existing windfarms, therefore no potential for cumulative construction stage effects.
Project No. 6: Cappawhite Windfarm	
Project No. 11: Hollyford Windfarm	
Project No. 9: Glenough Windfarm	
Project No. 10: Hollyford Windfarm	
Project No. 8: Glencarbry Windfarm	

1 No. Other Project – Bunkimalta Windfarm, is located within both the geographical and time-frame boundaries of the Cumulative Evaluation Study Area, and scoped using a conceptual site model exercise.

Table 5: POPULATION Cumulative Conceptual Site Model

Source(s) of Population Impacts	**Pathway(s)**	**Receptor(s)**	**Whole UWF Project Impacts**	**Project No. 3: Bunkimalta Windfarm**
Local Economy				
Construction contracts, purchasing of material and services, landowner payments	Financial Transactions	Local Economy	Gross Value Added to Businesses & Employment Opportunities	Scoped in – potential for measurable cumulative effects

Table 6: Summary of Other Projects or Activities Scoped In for Cumulative Evaluation in the Main Report

Sensitive Aspect	**Other Project or Activity (scoped in for the evaluation of cumulative impacts in VolC2: EIAR Main Report – Ch.6 Population)**
Local Economy	Project No.3: Bunkimalta Windfarm

A-2.3 .2.7 Scoping of Other Projects or Activities for HUMAN HEALTH

The Human Health appraisal, in the EIAR Main Report, draws from and builds upon the wider EIA technical disciplines, most notably Chapter 6: Population, Chapter 11: Water (in particular Surface Water and Groundwater Abstractions), Chapter 12: Air (Air Quality, Noise, Vibration, and Electromagnetic Radiation) and Chapter 15 Roads.

Table 7: Summary of the Sensitive Aspects and Impacts taken from the EIAR Main Report chapter

Sensitive Aspect Evaluated in the Main EIAR Report	Likely Impacts to Sensitive Aspect, as per Main EIAR Report
Local Residents & Community	Increased Employment (due to indirect Population Effect of Gross Value Added to Businesses and Employment Opportunities)
Kilcommon National School	No impacts are likely to occur
Transient People	No impacts are likely to occur

1 No. project – Bunkimalta Windfarm was included in the cumulative evaluation in Chapter 6: Population, and **is therefore scoped in for further evaluation of cumulative effects in the Human Health chapter**.

Similar to the Scoping of Other Projects or Activities for Population, above, the Other Projects or Activities are scoped out, as they occur outside of the time-frame boundary for effects to the local economy - and therefore also occur outside of the time-frame boundary for health effects to Local Residents and Community.

Table 8: Summary of Other Projects or Activities Scoped In for Cumulative Evaluation in the Main Report

Sensitive Aspect	Other Project or Activity (scoped in for the evaluation of cumulative impacts in VolC2: EIAR Main Report – Ch.7 Human Health)
Local Residents and Community	Project No.3: Bunkimalta Windfarm
Kilcommon National School	*No Other Projects or Activities scoped in for evaluation*
Transient People	*No Other Projects or Activities scoped in for evaluation*

A-2.3 .2.8 Scoping of Other Projects or Activities for BIODIVERSITY

Table 9: Summary of the Sensitive Aspects and Impacts taken from the EIAR Main Report chapter

Sensitive Aspect Evaluated in the Main EIAR Report	Likely Impacts to Sensitive Aspect, as per Main EIAR Report	Relevant Whole UWF Project life-cycle stage (time-frame boundary)
European Sites	*Please refer to the Natura Impact Statement which accompanies the planning application as Vol. E*	
National Sites	No impacts are likely to occur	N/A
Aquatic Species & Habitats	Decrease in instream aquatic habitat quality Riparian habitat degradation Disturbance or displacement Changes to flow regime Spread of aquatic invasive species	Construction
Terrestrial Habitats	Reduction in Terrestrial Habitats Hedgerow Severance Loss of High Nature Value Trees	Construction
Hen Harrier	Reduction in or loss of Suitable Foraging Habitat	Construction & Operation
General Bird Species	Golden Plover: Habitat Loss Golden Plover: Disturbance /Displacement Meadow Pipit: Habitat Loss General Birds: Habitat Enhancement	Construction
Bats	Destruction or disturbance of bat roosts in trees Severance of commuting routes or feeding areas Disturbance or Displacement due to Lighting	Construction
Non Volant Mammals	Badger: Habitat Loss Badger: Disturbance /Displacement Otter: Disturbance /Displacement Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Habitat Loss Irish Hare, Pine Marten, Red Squirrel and Fallow Deer: Disturbance/Displacement	Construction
Amphibians & Reptiles	No impacts are likely to occur	N/A
Marsh Fritillary (Butterfly)	Habitat Loss	Construction

Table 10: Defining the geographical boundaries of the Biodiversity Cumulative Evaluation Study Area

Sensitive Aspect	Geographical Boundary of the Study Area	Justification for study area extent
Aquatic Species & Habitats	The regional Mulkear River catchment and the regional Clodiagh River catchment	The Mulkear River and Clodiagh River are the two regional catchments in which the Whole UWF Project is located. The Mulkear River catchment drains to the Lower River Shannon SAC. The Clodiagh River catchment drains to the Lower River Suir SAC. Extending the scoping area beyond the Mulkear River and Clodiagh River catchments would mean that the whole of the River Shannon catchment and the whole of the River Suir catchment would be included and therefore at this vast scale, the Whole UWF Project would likely have an unmeasurable effect in relation to cumulative impacts.
Terrestrial Habitats	100m	Professional Judgement/twice the Best Practice recommendation.
Hen Harrier	SPA plus 5km /The Whole UWF Project plus 2km	Research on the spatial ecology of Hen Harriers has shown that foraging females spend most of their time within 1km of the nest, while males hunt mostly within 2km of the nest (Arroyo *et al.,* 2009, Irwin *et al.,* 2012, Arroyo *et al.,* 2014). Therefore, landscape and habitat changes within 1km of the nest may impact on both male and female foraging, while changes up to 2km from the nest are more likely to affect males only (Arroyo *et al.,* 2014). SNH (2014) also recommend a 2km buffer out with a proposal site within which data should be collected. A 5km buffer of the SPA in conjunction with a 2km buffer of the Development will ensure all likely effects are evaluated in the context of the Species and the SPA.
General Bird Species	1km	General birds, due to their naturally smaller home ranges are unlikely to be cumulatively affected outside this distance.
Bats	300m	Professional Judgement and as per Best Practice: Bat Surveys for Professional Ecologists: Good Practice Guidelines, Collins, (2016), and The Conservation of Bats in Bridges Project – A Report on the survey and conservation of bat roosts in bridges in Cumbria, Billington and Norman (1997).
Non-Volant Mammals-Badger	2km	Average territory size is 3.5km^2. Average 1-2km per night travelled in published literature.
Non-Volant Mammals-Otter	7km	Territory size of Otter averages at most 13.6km equivalent to a 7km buffer.
Non-Volant Mammals- Other Species	100m	Professional Judgement/twice the Best Practice recommendation.
Marsh Fritillary	2km	The distance of 2km has been previously considered as a standardised 'functional landscape' i.e. the area within which most dispersal, new colonisation and regular exchange of genetic material will occur (Fowles & Smith 2006).

18 Other Projects or Activities are located within the geographical boundary, as per Table 11.

Table 11: Other Projects or Activities located within the geographical boundary

Other Project or Activity	Aquatic Habitats & Species	Terrestrial Habitats	Hen Harrier	General Bird Species	Bats	Non-Volant Mammals	Marsh Fritillary
Project No.3: Bunkimalta Windfarm, Co. Tipperary	√		√	√			
Project No.4: Castlewaller Windfarm, Co. Tipperary	√	√	√	√	√	√	
Project No.12: Gortnahalla Turbine	√						
Project No.13: Killuragh Digester Plant							
Project No.20: Thurles Regional Water Treatment Works	√					√ Otter	
Project No.21: Waste Management Facility, Thurles							
Project No. 22: Dew Valley Foods Plant							
Project No.23: Industrial / warehouse Units, Thurles	√						
Project No.24: Newport Distributor Road	√						
Project No. 25: Housing Development Doon							
Project No.26: Housing Developments, Annacotty							
Project No.29: Agriculture - Milking Parlour							
Project No.30: Agriculture - Milking Parlour	√						
Project No.31: Agriculture – Pig Unit	√						
Project No.32: Agricultural Sheds & Stores							
Project (Activity) 33: Forestry operations	√	√	√	√		√ Badger Otter Other	√
Project (Activity) 34: General Agricultural operations	√	√	√	√		√ Badger Otter Other	√
Project (Activity) 35: Turf-Cutting		√	√	√		√ Other	√

As per Table 12, the timeframe boundary is the construction and operational stages for Hen Harrier, and the construction stage only for the remaining sensitive aspects.

Table 12: Other Projects or Activities within the time-frame boundary

Sensitive Aspect Evaluated in the EIAR Main Report	**Likely Impacts to Sensitive Aspect, as per Main EIAR Report**	**Is the Other Project or Activity within the Time Frame Boundary? – YES/NO** YES - Within the Timeframe Boundary – brought forward to the Cumulative CSM, *or* NO - Not within the time-frame boundary – scoped out
Aquatic Species & Habitats	Project No.3: Bunkimalta Windfarm, (including the windfarms Hen Harrier Management Plan)	YES
	Project No.4: Castlewaller Windfarm (including the windfarms Hen Harrier Management Plan)	NO: Outside the Timeframe Boundary – the UWF Grid Connection will be constructed before the Castlewaller Windfarm
	Project No.12: Gortnahalla Turbine	YES
	Project No.20: Thurles Regional Water Treatment Works	YES
	Project No.23: Industrial / warehouse Units, Thurles	YES
	Project No.24: Newport Distributor Road	YES
	Project No.30: Agriculture - Milking Parlour	YES
	Project No.31: Agriculture – Pig Unit	YES
	Project (Activity) 33: Forestry operations	YES
	Project (Activity) 34: Agriculture	YES
Terrestrial Habitats	Project No.4: Castlewaller Windfarm (including the windfarms Hen Harrier Management Plan)	NO: Outside the Timeframe Boundary – the UWF Grid Connection will be constructed before the Castlewaller Windfarm
	Project (Activity) 33: Forestry operations	YES
	Project (Activity) 34: Agriculture	YES
	Project (Activity) 35: Turf-cutting	YES
Hen Harrier	Project No.3: Bunkimalta Windfarm, (including the windfarms Hen Harrier Management Plan)	YES
	Project No.4: Castlewaller Windfarm (including the windfarms Hen Harrier Management Plan)	YES
	Project (Activity) 33: Forestry operations	YES
	Project (Activity) 34: Agriculture	YES
	Project (Activity) 35: Turf-cutting	YES
General Bird Species	Project No.3: Bunkimalta Windfarm, (including the windfarms Hen Harrier Management Plan)	YES (in relation to Meadow Pipit and General Birds)
	Project No.4 Castlewaller Windfarm (including the windfarms Hen Harrier Management Plan)	YES

Sensitive Aspect Evaluated in the EIAR Main Report	**Likely Impacts to Sensitive Aspect, as per Main EIAR Report**	**Is the Other Project or Activity within the Time Frame Boundary? – YES/NO** YES - Within the Timeframe Boundary – brought forward to the Cumulative CSM, *or* NO - Not within the time-frame boundary – scoped out
	Project (Activity) 33: Forestry operations	YES
	Project (Activity) 34: Agriculture	YES
	Project (Activity) 35: Turf-cutting	YES
Bats	Project No.4: Castlewaller Windfarm (including the windfarms Hen Harrier Management Plan)	YES
Non Volant Mammals	Project No.4 Castlewaller Windfarm (including the windfarms Hen Harrier Management Plan)	YES - in relation to Badger, Otter, Other Mammals (Irish Hare, Pine Martin, Red Squirrel and Fallow Deer)
	Project No.20 Thurles Regional Water Treatment Works	YES - in relation to Otter,
	Project (Activity) 33: Forestry	YES - in relation to Badger, Otter, Other Mammals (Irish Hare, Pine Martin, Red Squirrel and Fallow Deer)
	Project (Activity) 34: Agriculture	YES - in relation to Badger, Otter, Other Mammals (Irish Hare, Pine Martin, Red Squirrel and Fallow Deer)
	Project (Activity) 35: Turf-cutting	YES - in relation to Other Mammals (Irish Hare, Pine Martin, Red Squirrel and Fallow Deer)
Marsh Fritillary (Butterfly)	Project (Activity) 33: Forestry operations	YES
	Project (Activity) 34: Agriculture	YES
	Project (Activity) 35: Turf-cutting	YES

18 Other Projects or Activities are located within both the geographical and time-frame boundaries of the Cumulative Evaluation Study Area for at least one Sensitive Aspect, and therefore scoped using a conceptual site model exercise, see Tables 13 to 22.

Table 13: Conceptual Site Model for Cumulative Impacts – Aquatic Species and Habitats (1 of 2)

Source(s) of Biodiversity Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Project No.3 Bunkimalta Windfarm	Project No.24 Newport Distributor Rd	Project No.30: Agriculture - Milking Parlour	Project No.31: Agriculture – Pig Unit
				Scoping for likely cumulative effects			
Aquatic Species and Habitats							
Instream works; Movement of soils and machinery; Excavation works; Forestry felling; Hydrocarbons; Cement based compounds; Reinstatement	Soils; Surface water, Runoff and surface water, Flowpaths	Aquatic Species and Habitats	Decrease in instream habitat quality	Yes, scoped in for sedimentation sources, Scoped out for fuel/oil and cement based compound sources as it is assumed that best practice oil and fuel measures and best practice cement control measures, as stated in the Bunkimalta WF EIS, will be implemented and therefore no measurable effects on downstream water quality is likely.	Yes, scoped in for sedimentation sources, Scoped out for fuel/oil and cement based compound sources, due to the small volumes present on-site, and the large downstream distance from the Whole UWF Project (5km), cumulative effects are likely to be less than perceptible.	No, scoped out Due to the small scale nature of the site, and the large downstream distance from the Whole UWF Project (8km), cumulative effects are likely to be less than perceptible	No, scoped out Due to the small scale nature of the site, and the large downstream distance from the Whole UWF Project (20km), cumulative effects are likely to be less than perceptible
Sediment; Instream works; Machinery movement	Surface water; Land cover	Aquatic Species and Habitats	Changes to flow regime	Scoped Out – no potential for cumulative effects, negligible changes to flow regime due to the design of the UWF Grid Connection and the provision of reinstatement works.	Scoped Out – no potential for cumulative effects, negligible changes to flow regime due to the design of the UWF Grid Connection and the provision of reinstatement works.	Scoped Out – no potential for cumulative effects, negligible changes to flow regime due to the design of the Whole UWF Project and the provision of reinstatement works.	Scoped Out – no potential for cumulative effects, negligible changes to flow regime due to the design of the Whole UWF Project and the provision of reinstatement works.
Instream works; Operating machinery; Excavation works; Noise	Surface water; Direct contact; Ground and	Aquatic Species and Habitats	Disturbance or Displacement of Aquatic Species	Scoped Out - due to the separation distance from the Whole UWF Project, project design measures and the limited zone of effect (spatial and	Scoped Out - due to the large downstream distance from the Whole UWF Project (5km), project design measures and the limited zone of	Scoped Out - due to the large downstream distance from the Whole UWF Project (8km), project design measures and the limited zone of effect	Scoped Out - due to the large downstream distance from the Whole UWF Project (20km), project design measures and the limited zone of effect (spatial and

REFERENCE DOCUMENTS

Source(s) of Biodiversity Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Project No.3 Bunkimalta Windfarm	Project No.24 Newport Distributor Rd	Project No.30: Agriculture - Milking Parlour	Project No.31: Agriculture – Pig Unit
				Scoping for likely cumulative effects			
and human disturbance; Drilling; Reinstatement	air vibrations			temporal), cumulative effects are likely to be less than perceptible.	effect (spatial and temporal) cumulative effects are likely to be less than perceptible.	(spatial and temporal) cumulative effects are likely to be less than perceptible.	temporal) cumulative effects are likely to be less than perceptible.
Movement of soils and machinery; Excavation works; Forestry felling; Reinstatement	Soils; Direct contact	Aquatic Species and Habitats	Riparian Habitat Degradation	Scoped out – no potential for cumulative effects, due to project design measures , the limited zone of effect (spatial and temporal) and the separation distance from the Whole UWF Project,	Scoped out – no potential for cumulative effects, due to project design measures , the limited zone of effect (spatial and temporal) and no instream works required for the distributor road.	Scoped out – potential for cumulative effects, due to project design measures, the limited zone of effect (spatial and temporal) and no instream works required for the agricultural development.	Scoped out – no potential for cumulative effects, due to project design measures , the limited zone of effect (spatial and temporal) and no instream works required for the agricultural development,
Instream works; Excavation works	Surface water; Movement of soils and machinery	Aquatic Species and Habitats	Spread of aquatic invasive species	Scoped out – no potential for cumulative effects due to the implementation of the Invasive Species Management Plan, and the implementation of Biosecurity as Best practice Measures (BPM's).	Scoped out – no potential for cumulative effects due to the implementation of the Invasive Species Management Plan and the implementation of Biosecurity as Best practice Measures (BPM's).	Scoped out – no potential for cumulative effects due to the implementation of the Invasive Species Management Plan and the implementation of Biosecurity as Best practice Measures (BPM's).	Scoped out – no potential for cumulative effects due to the implementation of the Invasive Species Management Plan and the implementation of Biosecurity as Best practice Measures (BPM's).

REFERENCE DOCUMENTS

Table 14: Conceptual Site Model for Cumulative Impacts – Aquatic Species and Habitats (2 of 2)

Source(s) of Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects			
				Project No.12: Gortnahalla Turbine	Project No.23: Industrial / warehouse Units, Thurles	Project No.20: Thurles Regional Water Treatment Works	Project 33 & 34: General forestry and Agricultural
Aquatic Species and Habitats							
Instream works; Movement of soils and machinery; Excavation works; Forestry felling; Hydrocarbons; Cement based compounds; Reinstatement	Soils; Surface water, Runoff and surface water, Flowpaths	Aquatic Species and Habitats	Decrease in instream habitat quality	No, scoped out Due to the small-scale nature of the site, the small volumes likely to present on-site and the large downstream distance from the Whole UWF Project (10km), cumulative effects are likely to be less than perceptible	No, scoped out Due to the small-scale nature of the site, the small volumes likely to present on-site and the large downstream distance to where cumulative effects can occur(20km), effects are likely to be less than perceptible	No, scoped out Due to the small-scale nature of the site, the small volumes likely to present on-site and the large downstream distance to where cumulative effects can occur(20km), effects are likely to be less than perceptible	No, scoped out Effects are likely to be of a scale of less than measureable
Sediment; Instream works; Machinery movement	Surface water; Land cover	Aquatic Species and Habitats	Changes to flow regime	Scoped Out – no potential for cumulative effects, negligible changes to flow regime due to the design of the Whole UWF Project and the provision of reinstatement works.	Scoped Out – no potential for cumulative effects, negligible changes to flow regime due to the design of the Whole UWF Project and the provision of reinstatement works.	Scoped Out – no potential for cumulative effects, negligible changes to flow regime due to the design of the Whole UWF Project and the provision of reinstatement works.	Scoped Out – no potential for cumulative effects, negligible changes to flow regime due to the design of the Whole UWF Project and the provision of reinstatement works.
Instream works; Operating machinery; Excavation works; Noise and human disturbance; Drilling; Reinstatement	Surface water; Direct contact; Ground and air vibrations	Aquatic Species and Habitats	Disturbance or Displacement of Aquatic Species	Scoped out – no potential for cumulative effects, due to project design measures, the limited zone of effect (spatial and temporal), and the separation distance from the Whole UWF Project,	Scoped out – no potential for cumulative effects, due to project design measures, the limited zone of effect (spatial and temporal), and the separation distance from the Whole UWF Project,	Scoped out – no potential for cumulative effects, due to project design measures, the limited zone of effect (spatial and temporal), and the separation distance from the Whole UWF Project,	Scoped out – no potential for cumulative effects, due to project design measures, the limited zone of effect (spatial and temporal), and the separation

REFERENCE DOCUMENTS

Source(s) of Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects			
				Project No.12: Gortnahalla Turbine	Project No.23: Industrial / warehouse Units, Thurles	Project No.20: Thurles Regional Water Treatment Works	Project 33 & 34: General forestry and Agricultural
							distance from the Whole UWF Project,
Movement of soils and machinery; Excavation works; Forestry felling; Reinstatement	Soils; Direct contact	Aquatic Species and Habitats	Riparian Habitat Degradation	Scoped out – no potential for cumulative effects, due to due to project design measures , the limited zone of effect (spatial and temporal) and the separation distance from the Whole UWF Project,	Scoped out – no potential for cumulative effects, due to due to project design measures , the limited zone of effect (spatial and temporal) and the separation distance from the Whole UWF Project,	Scoped out – no potential for cumulative effects, due to due to project design measures , the limited zone of effect (spatial and temporal) and the separation distance from the Whole UWF Project,	No, scoped out Effects are likely to be of a scale of less than measureable due to project design measures , and therefore the limited zone of effect (spatial and temporal).
Instream works; Excavation works	Surface water; Movement of soils and machinery	Aquatic Species and Habitats	Spread of aquatic invasive species	Scoped out – no potential for cumulative effects due to the implementation of the Invasive Species Management Plan and the implementation of Biosecurity as Best practice Measures (BPM's).	Scoped out – no potential for cumulative effects due to the implementation of the Invasive Species Management Plan and the implementation of Biosecurity as Best practice Measures (BPM's).	Scoped out – no potential for cumulative effects due to the implementation of the Invasive Species Management Plan and the implementation of Biosecurity as Best practice Measures (BPM's).	Scoped out – no potential for cumulative effects due to the implementation of the Invasive Species Management Plan and the implementation of Biosecurity as Best practice Measures (BPM's).

REFERENCE DOCUMENTS

Table 15: Conceptual Site Model for Cumulative Impacts - Terrestrial Habitats

Source(s) of Biodiversity Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects
				Projects (Activities) 33 to 35 Forestry/Agriculture/Turf-cutting
Terrestrial Habitats				
Excavation Works	Land Cover	Habitats	Reduction in Habitats	Scoped Out: Effects are likely to be of a scale of less than measurable within the Geographical Study Area.
Excavation Works	Land Cover	Habitats	Hedgerow Severance	Scoped Out: Effects are likely to be of a scale of less than measurable within the Geographical Study Area.
Excavation Works	Land Cover	Habitats	Loss of High Nature Value Trees	Scoped Out; removal of individual HNV trees to the point of measurable effect is not reasonably foreseeable for these activities within the Geographical Study Area.

REFERENCE DOCUMENTS

Table 16: Conceptual Site Model for Cumulative Impacts for Hen Harrier

Source(s) of Biodiversity Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects		
				Project No.4: Castlewaller Wind Farm	Project No.3: Bunkimalta Windfarm	Projects (Activities) 33 to 35 Forestry/Agriculture/Turf-cutting
Hen Harrier						
Provision of windfarm access roads, turbine hardstanding areas and substation compounds; Land cover change from Agricultural Practices such as drainage, Direct habitat loss through peat extraction of intact bog, and habitat loss through forest maturation	Land Cover	Hen Harrier	Reduction in or Loss of Suitable Foraging Habitat	Yes –Scoped In	Yes-Scoped In	Yes- Scoped In

REFERENCE DOCUMENTS

Table 17: Conceptual Site Model for Cumulative Impacts- General Bird Species

Source(s) of Biodiversity Impacts	Pathway (s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects		
				Project No.4: Castlewaller Wind Farm	Project No.3: Bunkimalta Windfarm	Projects (Activities) 33 to 35 Forestry/Agriculture/Turf-cutting
Golden Plover						
Construction Works; Excavation; Movement of Soils and Machinery	Land Take	Golden Plover	Habitat Loss	Scoped Out; No suitable wintering habitat, birds were only recorded flying over the site. Outside the Timeframe Boundary – the Grid Connection will be constructed before the Castlewaller Windfarm.	Scoped Out; No Golden Plover Recorded in Baseline Studies to inform EIS.	Forestry Scoped Out as habitat is unsuitable for Golden Plover. Agriculture Scoped out as land use change or management is unlikely to result in measurable effects. Turf-cutting Scoped Out as activities are unlikely to overlap wintering period/ Golden Plover will utilise cutover bog.
During Construction Noise and Visual Intrusion	Air	Golden Plover	Disturbance to/Displacement of Wintering Golden Plover (Construction and Operation)	No, Scoped out – Outside the Timeframe Boundary – the Grid Connection will be constructed before the Castlewaller Windfarm.; Operational disturbance is scoped out as no measurable disturbance is expected from the operational UGC.	Scoped Out; No Golden Plover Recorded in Baseline Studies to inform EIS.	Scoped Out; No measurable effects likely or reasonably foreseeable.
Meadow Pipit						
Construction Works; Excavation; Movement of Soils and Machinery	Land Take	Meadow Pipit	Habitat Loss	Scoped Out; No Meadow Pipit recorded in Wind Farm EIS. Outside the Timeframe Boundary – the Grid Connection will be constructed before the Castlewaller Windfarm.	Scoped In	Scoped Out; No measurable effects likely or reasonably foreseeable.
General Birds						
Reinstatement, Replanting, enhancement planting	Landuse change	General Birds	Effects from Habitat Enhancement	No, Scoped out – Outside the Timeframe Boundary – the Grid Connection will be constructed before the Castlewaller Windfarm.	Scoped In	Scoped Out; No measurable effects likely or reasonably foreseeable.

REFERENCE DOCUMENTS

Table 18: Conceptual Site Model for Cumulative Impacts- Bats

Source(s) of Biodiversity Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects Project No.4: Castlewaller Wind Farm
Bats				
Tree felling	Landcover	Bats	Destruction/ disturbance of bat roosts in trees	No, Scoped out – Outside the Timeframe Boundary – the Grid Connection will be constructed before the Castlewaller Windfarm. Residual effects will be imperceptible therefore no measurable cumulative effects are likely.
Site Clearance	Land Cover	Bats	Severance of commuting routes or feeding areas	No – Scoped Out. This was not identified as a potential impact in the EIS.
Artificial Lighting	Visibility	Bats	Disturbance or displacement due to lighting	No – Scoped Out: It is stated in the EIS that "*the wind farm will not be lit at night, with the exception of aviation warning lights*".

Table 19: Conceptual Site Model for Cumulative Impacts- Non-Volant Mammals (Badger)

Source(s) of Biodiversity Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects	
				Project No.4: Castlewaller Wind Farm	Projects (Activities) 33, 34: Forestry/Agriculture
Badger					
Excavations, construction of new access roads, compounds and hardstanding areas	Land Cover	Badger	Habitat Loss	No, Scoped out – Outside the Timeframe Boundary – the Grid Connection will be constructed before the Castlewaller Windfarm.	Scoped Out; No measurable effects likely or reasonably foreseeable.
During Construction	Air	Badger	Disturbance to/ or Displacement of Badgers	No, Scoped out – Outside the Timeframe Boundary – the Grid Connection will be constructed before the Castlewaller Windfarm.	Scoped out: No measurable effects

REFERENCE DOCUMENTS

Source(s) of Biodiversity Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects	
				Project No.4: Castlewaller Wind Farm	Projects (Activities) 33, 34: Forestry/Agriculture
Noise and Visual Intrusion				During Operation disturbance is scoped out as no measurable in combination effects are reasonably foreseeable.	

Table 20: Conceptual Site Model for Cumulative Impacts- Non-Volant Mammals (Otter)

Source(s) of Biodiversity Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects			
				Project No.24: Newport Distributor Road	Project No.4: Castlewaller Windfarm	Project No.20: Thurles Regional Water Treatment Works	Projects (Activities) 33, 34: Forestry/Agriculture
Otter							
During Construction Noise and Visual Intrusion	Air and visibility	Otter	Disturbance to/ or Displacement of Otter	Scoped Out; No measurable effects reasonably foreseeable.	Scoped Out; None Recorded in Baseline Studies to inform EIS. Outside the Timeframe Boundary – the Grid Connection will be constructed before the Castlewaller Windfarm.	Scoped Out: No Otter were recorded in the Clodiagh River catchment portions of the UWWP. The nearest UWWP elements are HA activities which will not disturb Otter; distance from remaining construction works such as watercourse crossings to source disturbance at TRWTW also reduces potential for in combination effects.	Scoped Out; No measurable effects reasonably foreseeable.

REFERENCE DOCUMENTS

Table 21: Conceptual Site Model for Cumulative Impacts- Non-Volant Mammals (Irish Hare, Pine Marten, Red Squirrel and Fallow Deer)

Source(s) of Biodiversity Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects	
				Project No.4: Castlewaller Windfarm	Projects (Activities) 33 to 35 Forestry/Agriculture/Turf-cutting
Irish Hare, Pine Marten, Red Squirrel and Fallow Deer					
Groundworks and vegetation clearance, new access roads and hardstanding areas	Land Cover	Irish Hare, Pine Marten, Red Squirrel and Fallow Deer	Habitat Loss	Scoped Out: Irish Hare Habitat not directly affected; No Red Squirrel recorded; No measurable effects on Pine Marten or Fallow Deer habitats due to extensive suitable habitat in the area. Outside the Timeframe Boundary – the Grid Connection will be constructed before the Castlewaller Windfarm.	Scoped Out; No measurable effects reasonably foreseeable.
During Construction Noise and Visual Intrusion	Air and visibility	Irish Hare, Pine Marten, Red Squirrel and Fallow Deer	Disturbance/Displacement	Scoped Out: Irish Hare Habitat not directly affected; No Red Squirrel recorded; No measurable effects on Pine Marten or Fallow Deer habitats due to extensive suitable habitat in the area and movement of animals away from operating machinery. Outside the Timeframe Boundary – the Grid Connection will be constructed before the Castlewaller Windfarm.	Scoped Out; No measurable effects reasonably foreseeable.

Table 22: Conceptual Site Model for Cumulative Impacts- Invertebrates- Marsh Fritillary

Source(s) of Biodiversity Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects Projects (Activities) 33 to 35: Forestry/Agriculture/Turf-cutting
Marsh Fritillary				
Excavation Works	Land cover	Marsh Fritillary	Habitat Loss	Scoped In

REFERENCE DOCUMENTS

Table 23: Summary of Other Projects or Activities Scoped In for Cumulative Evaluation in the EIAR Main Report Biodiversity Chapter

Sensitive Aspect	**Other Project or Activity (scoped in for the evaluation of cumulative impacts in VolC2: EIAR Main Report – Ch.8 Biodiversity**
European Sites	*Please Refer to Natura Impact Statement in Volume E*
National Sites	*No Other Projects or Activities scoped in for evaluation*
Aquatic Habitats & Species	• Project No.3: Bunkimalta Windfarm • Project No.24: Newport Distributor Road
Terrestrial Habitats	*No Other Projects or Activities scoped in for evaluation*
Hen Harrier	• Project No.3: Bunkimalta Windfarm • Project No.4: Castlewaller Windfarm • Project No.33 to 35 (Activities): Forestry/Agriculture/Turf-cutting
General Bird Species	• Project No.3: Bunkimalta Windfarm
Bats	*No Other Projects or Activities scoped in for evaluation*
Non Volant Mammals	*No Other Projects or Activities scoped in for evaluation*
Amphibians & Reptiles	*No Other Projects or Activities scoped in for evaluation*
Marsh Fritillary	• Project No.33 to 35 (Activities): Forestry/Agriculture/Turf-cutting

A-2.3 .2.9 Scoping of Other Projects or Activities for LAND

Table 24: Summary of the Sensitive Aspects and Impacts from the EIAR Main Report chapter

Sensitive Aspect Evaluated in the Main EIAR Report	Likely Impacts to Sensitive Aspect, as per Main EIAR Report	Relevant Whole UWF Project life-cycle stage (time-frame boundary)
Agricultural Land	Loss of Use and Connectivity of Landholdings	Construction
Forestry Land	Loss of Use and Connectivity of Landholdings	Construction

Table 25: Defining the geographical boundaries of the Land Cumulative Evaluation Study Area

Sensitive Aspect	Geographical Boundary of the Study Area for Land	Justification for Study Area Extent for Land
Agricultural Lands	Whole UWF Project Geographical Study Area	Cumulative impacts to Agricultural Lands and Forestry Lands is limited to landholdings which could be affected by both the Whole UWF Project and by Other Project or Activity. Wider Area: Although there are notable wind energy developments in the Slievefelim to Silvermine Upland Area, the land take from these windfarms collectively represents less than 0.1% of the land within the upland area, therefore no measurable impacts are likely to agricultural or forestry lands in the wider area and for this reason, the boundary of the geographical study area does not extend to the wider upland area.
Forestry Lands		

2 No. Other Projects are located within the geographical boundary, see Table 26:

Table 26: Projects located within the Cumulative Evaluation Study Area

Sensitive Aspect	Other Projects or Activities	Location of Other Projects or Activities within the Cumulative Geographical Boundary
Agricultural Lands	Project No. 5: Milestone Windfarm	Part of the landholding associated with Milestone Windfarm lies within one of the landholdings associated with the 110kV UGC element of the Grid Connection in Knockcurraghbola Commons and Knockcurraghbola Crownlands townlands.
Forestry Lands	Project No. 4: Castlewaller Windfarm	Part of the landholding associated with Castlewaller Windfarm occurs within one of the landholdings associated with the 110kV UGC element of the Grid Connection, in Castlewaller townland.

As per Table 27, the time-frame boundary is the construction stage.

Table 27: Other Projects or Activities within Timeframe Boundaries

Sensitive Aspect	**Other Project or Activity**	**Is the Other Project or Activity within the Time Frame Boundary? – YES/NO** YES - Within the Timeframe Boundary – brought forward to the Cumulative Conceptual Site Model, *or* NO - Not within the time-frame boundary – scoped out
Agricultural Lands	Project No. 5: Milestone Windfarm	**NO:** Milestone Windfarm will have completed its construction before the start of the Whole UWF Project construction stage. Therefore will be no potential for cumulative effects.
Forestry Lands	Project No. 4: Castlewaller Windfarm	**NO:** The entire lifecycle of Castlewaller Windfarm (i.e. construction, operation and decommissioning) will likely occur after the Whole UWF Project is constructed. Therefore will be no potential for cumulative effects

Neither the Milestone Windfarm nor the Castlewaller Windfarm are located within both the geographical and time-frame boundaries of the Cumulative Evaluation Study Area.

Therefore NO Other Projects or Activities are scoped in for further evaluation in the topic chapter Land.

Table 28: Summary of Other Projects or Activities Scoped In for Cumulative Evaluation in the Main Report

Sensitive Aspect	**Other Project or Activity (scoped in for the evaluation of cumulative impacts in VolC2: EIAR Main Report – Ch.9 Land)**
Agricultural Lands	*No Other Projects or Activities scoped in for evaluation*
Forestry Lands	*No Other Projects or Activities scoped in for evaluation*

A-2.3 .2.10 Scoping of Other Projects or Activities for SOILS

Table 29: Summary of the Sensitive Aspects and Impacts taken from the EIAR Main Report chapter

Sensitive Aspect Evaluated in the Main EIAR Report	Likely Impacts to Sensitive Aspect, as per Main EIAR Report	Relevant Whole UWF Project life-cycle stage (time-frame boundary)
Local Soils, Subsoils & Bedrock	Excavation & Relocation of soils, subsoil and bedrock Soil & Subsoil Compaction Soil & Subsoil Erosion Contamination from Oil, Fuels & Chemicals Contamination from Cement Based Compounds	Construction
Lower River Shannon SAC	Excavation & Relocation of soils, subsoil and bedrock Contamination from Oil, Fuels & Chemicals Contamination from Cement Based Compounds	Construction
Bleanbeg Bog NHA	Excavation & Relocation of soils, subsoil and bedrock Contamination from Oil, Fuels & Chemicals Contamination from Cement Based Compounds	Construction

Table 30: Defining the geographical boundaries of the SOILS Cumulative Evaluation Study Area

Sensitive Aspect	Geographical Boundary of the Study Area	Justification for study area extent
Local Soils, Subsoil and Bedrock	Other Projects or Activities within 100m of the UWF Whole Project works areas	Only direct effects on soils and geology are anticipated, however a conservative scoping in distance of 100m from the Whole UWF Study Area is area is undertaken to assess cumulative effects locally. A 100m buffer would cover adjacent lands and hence is very conservative.
Lower River Shannon SAC	Boundary of the UWF Grid Connection/Other Elements of the Whole UWF Project Study Areas where they overlap the SAC boundary.	Only direct effects on soils and geology are anticipated and therefore for cumulative effects to occur a direct impact on the SAC from other projects or activities will have to occur.
Bleanbeg Bog NHA	Entire Boundary of Bleanbeg Bog NHA	Only direct effects on soils and geology are anticipated and therefore for cumulative effects to occur a direct impact on the NHA from other projects or activities will have to occur.

4 Other Projects or Activities are located within the geographical boundary, see Table 31

Table 31: Other Projects or Activities located within the geographical boundary

Sensitive Aspect	Other Projects or Activities	Location of Other Projects or Activities within the Cumulative Geographical Boundary
Local Soils, Subsoil and Bedrock	Project No. 4: Castlewaller Windfarm	Part of the landholding associated with the permitted Castlewaller Windfarm occurs within one of the landholdings associated with the 110kV UGC element of the Grid Connection, in Castlewaller townland. Approximately 1.5km of the 110kV UGC route exists within the Castlewaller Windfarm site. There are proposed windfarm works within the 100m scoping distance of the 110kV UGC works area in Castlewaller.
	Project No. 5: Milestone Windfarm*	Outside the Geographical Boundary: Part of the landholding associated with Milestone Windfarm lies within one of the landholdings associated with the 110kV UGC element of the UWF Grid Connection in Knockcurraghbola Commons and Knockcurraghbola Crownlands townlands. However, there is no proposed

Sensitive Aspect	Other Projects or Activities	Location of Other Projects or Activities within the Cumulative Geographical Boundary
		construction work within the 100m scoping distance of the 110kV UGC route and therefore no cumulative effects on soils and geology are anticipated.
	Project No. 33: Forestry (Activity)	Agriculture and forestry are the predominant landuses in the area of the Whole Windfarm
	Project No. 34: Agriculture (Activity)	
Lower River Shannon SAC	Project No. 34: Agriculture (Activity)	The proposed route of the 110kV UGC at the Mulkear River crossing is also used as an agricultural access track. The land at the Bilboa River crossing is used for low intensity agriculture.
Bleanbeg Bog NHA	Project No. 35: Turf-cutting (Activity)	Turf cutting occurs within the boundary of the NHA.
	Project No. 4: Castlewaller Windfarm*	Outside the Geographical Boundary: Castlewaller Windfarm is located approximately 300m to the south of the NHA. There is no proposed windfarm works within the NHA and therefore no cumulative effects on soils and geology are anticipated.

** included for clarity, due to the close proximity of these projects to the Whole UWF Project works*

Timeframe boundaries are not relevant for soils and geology impacts as cumulative effects on soils and geology are not time dependant as impacts usually are permanent (i.e. excavation and relocation of soil/subsoil, including peat and bedrock). To account for more minor temporary effects (i.e. from cement compounds for example) the timeframe boundary from construction stage onwards is used.

Table 32: Other Projects or Activities within the time-frame boundary

Other Project or Activity	Is the Other Project or Activity within the Time Frame Boundary? – YES/NO YES - Within the Timeframe Boundary – brought forward to the Cumulative Conceptual Site Model, *or* NO - Not within the time-frame boundary – scoped out
Project No.4: Castlewaller Windfarm	YES
Project No.33: Forestry (activity)	
Project No.34: Agriculture (activity)	
Project No.35: Turf Cutting (activity)	

4 Other Projects or Activities are located within both the geographical and time-frame boundaries of the Cumulative Evaluation Study Area for at least one Sensitive Aspect, and therefore scoped using a conceptual site model exercise, see Table 33.

Table 33: Soils Conceptual Site Model - Local Soils, Subsoil and Bedrock

Source(s) of Soil Impacts	Pathway(s)	Receptor	Whole UWF Project Impacts	Scoping for Cumulative Effects		
				Project No.4: Castlewaller Windfarm	Project No. 33: Forestry and Project No. 34: Agriculture (Activities)	Project (Activity) 35: Turf-Cutting
Local Soils, Subsoil and Bedrock						
Groundworks, earthworks, extraction from borrow pits	Excavation, drilling, movement and mounding of overburden	Local Soils, Subsoil and Bedrock	Excavation & Relocation of soil, subsoil and bedrock	Yes, scoped in	No, scoped out Cumulative effects are likely to be less than imperceptible given that the loss of soil and subsoil due to forestry or agricultural practices is likely to be unmeasurable over the geographical scale of the Project.	No, scoped out Cumulative effects are likely to be less than imperceptible given the small scale of the turbary cutting, the very low peat excavations volumes at the Whole UWF Project along with the large geographical scale of the Project.
Construction traffic movement, temporary infra-structure and temporary storage of overburden	Physical Com-pression	Local Soils, Subsoil and Bedrock	Soil and subsoil compaction	No, scoped out Due to small combined footprint of the 110kV UGC and the Castlewaller WF (within 100m scoping distance of the UGC), the cumulative compaction effects of both projects is likely to have a less than perceptible effects on local soils and subsoil. Also the proposed route of the 110kV UGC is mainly along a forestry track at the Castlewaller site which reduced the effect of compact and erosion.	No, scoped out Cumulative effects are likely to be less than imperceptible given that compaction due to forestry or agricultural practices is likely to be unmeasurable over the geographical scale of the Project.	No, scoped out Cumulative effects are likely to be less than imperceptible given the large geographical spread of the the Whole UWF Project.

Source(s) of Soil Impacts	Pathway(s)	Receptor	Whole UWF Project Impacts	Scoping for Cumulative Effects		
				Project No.4: Castlewaller Windfarm	Project No. 33: Forestry and Project No. 34: Agriculture (Activities)	Project (Activity) 35: Turf-Cutting
Groundworks and storage of overburden	Excavations, tracking of construction traffic and wind and rain action	Local Soils, Subsoil and Bedrock	Soil and subsoil erosion	No, scoped out Due to small combined footprint of the 110kV UGC and the Castlewaller WF (within 100m scoping distance of the UGC), the cumulative erosion effects of both projects is likely to have a less than perceptible on local soils and subsoil.	No, scoped out Cumulative effects are likely to be less than imperceptible given that erosion due to forestry or agricultural practices is likely to be unmeasurable over the geographical scale of the Project.	No, scoped out Cumulative effects are likely to be less than imperceptible given the large geographical spread of the Whole UWF Project.
Oils, Fuels and Chemicals.	Soil, subsoil and bedrock pore space	Local Soils, Subsoil and Bedrock	Contamination from Oil, Fuels & Chemicals	No, scoped out The combined volumes present on-site will be very small and cumulative effects are likely to be less than perceptible.	No, scoped out The potential volumes leaked/spilled during day to day activities (if any) are likely to unmeasurable over the geographical scale of the Project.	No, scoped out as the source is unlikely to be present in any significant volumes.
Cement Based compounds	Soil, subsoil and bedrock pore space	Local Soils, Subsoil and Bedrock	Contamination from Cement Based Compounds	No, scoped out The combined volumes present are will be very small and cumulative effects are likely to be less than perceptible.	No, scoped out as the source is unlikely to be present in any significant volume.	No, scoped out as the source is unlikely to be present.

Table 34: Soils Conceptual Site Model - Lower River Shannon SAC

Source(s) of Soil Impacts	Pathway(s)	Receptor	Whole UWF Project Impacts	Scoping for Cumulative Effects
				Project No. 34: Agriculture (Activities)
Lower River Shannon SAC				
Groundworks, relocation and storage of overburden	Excavation, movement and mounding of overburden	Soil, subsoil and bedrock	Excavation & Relocation of soils, subsoil and bedrock (UWF Grid Connection only)	No, Scoped out – Cumulative effects are likely to be less than imperceptible given that the loss of soil and subsoil due to agricultural practices is likely to be unmeasurable.

Source(s) of Soil Impacts	Pathway(s)	Receptor	Whole UWF Project Impacts	Scoping for Cumulative Effects
				Project No. 34: Agriculture (Activities)
Oils, fuels and chemicals.	Soil, subsoil and bedrock pore space	Soil, subsoil and bedrock	Contamination from Oil, Fuels & Chemicals (UWF Grid Connection only)	No, Scoped out – The potential volumes leaked/spilled during day to day activities (if any) are likely to unmeasurable at the works location within the SAC
Cement based compounds.	Soil, subsoil and bedrock pore space	Soil, subsoil and bedrock	Contamination from Cement Based Compounds (UWF Grid Connection only)	No, Scoped out – Farming activities are not expected to have cement based compounds at the proposed works location

Table 35: Soils Conceptual Site Model – Bleanbeg Bog NHA

Source(s) of Soil Impacts	Pathway(s)	Receptor	Whole UWF Project Impacts	Scoping for Cumulative Effects
				Project (Activity) 35: Turf-Cutting
Bleanbeg Bog NHA				
Groundworks and relocation of soil, subsoil and bedrock	Excavations and storage of material	Soil, subsoil and bedrock	Excavation & Relocation of soils, subsoil and bedrock (UWF Grid Connection only)	Scoped In
Contamination of soil, subsoil and bedrock from leakages and spillage of oils, fuels, chemicals.	Soil, subsoil and bedrock pore space	Soil, subsoil and bedrock	Contamination from Oil, Fuels & Chemicals (UWF Grid Connection only)	No, scoped out as the source is unlikely to be present in any significant volumes.
Contamination of soil, subsoil and bedrock from cement based compounds.	Soil, subsoil and bedrock pore space	Soil, subsoil and bedrock	Contamination from Cement Based Compounds (UWF Grid Connection only)	No, Scoped out, source not likely to be present.

Table 36: Summary of Other Projects or Activities Scoped In for Cumulative Evaluation in the Main Report

Sensitive Aspect	Other Project or Activity (scoped in for the evaluation of cumulative impacts in VolC2: EIAR Main Report – Ch.10 SOILS)
Local Soils, Subsoil and Bedrock	Project No.4: Castlewaller Windfarm
Lower River Shannon SAC	*No Other Projects or Activities scoped in for evaluation*
Bleanbeg Bog NHA	Project No.35 (Activity): Turf Cutting

A-2.3 .2.11 Scoping of Other Projects or Activities for WATER

Table 37: Summary of the Sensitive Aspects and Impacts taken from the EIAR Main Report chapter

Sensitive Aspect Evaluated in the Main EIAR Report	Likely Impacts to Sensitive Aspect, as per Main EIAR Report	Relevant Whole UWF Project life-cycle stage (time-frame boundary)
Local Surface Water Bodies	Morphological impacts to watercourses due to in-stream works Surface water quality impacts during conifer plantation tree felling Surface water quality impacts due to earthworks Water quality impacts from dewatering of excavations Surface Water Quality Impacts due to Watercourse Crossing Works Surface Water Quality Impacts during Directional Drilling Works Surface Water Impacts due to Contamination by fuels, oils, chemicals Water Quality Impacts from Cement Based Compounds Increased flood risk Surface Water Quality Impacts due to Runoff from Permanent Hardstanding Surfaces	Construction Construction Construction Construction Construction Construction Construction Construction Operation Operation
Local Groundwater Bodies	Ground Water Impacts due to Contamination by Fuels, Oils and Chemicals Ground Impacts from Cement Based Compounds Groundwater level (quantity) impacts from dewatering of excavations	Construction
Local Wells & Springs	No impacts are likely to occur	N/A
Lower River Shannon SAC	Surface water quality impacts due to tree felling Surface water quality impacts due to earthworks Water quality impacts from dewatering of excavations Surface Water Quality Impacts due to Watercourse Crossing Works Surface Water Quality Impacts during Directional Drilling Works Surface Water Impacts due to Contamination by fuels, oils, chemicals Water Quality Impacts from Cement Based Compounds	Construction
Lower River Suir SAC	Surface water quality impacts due to tree felling Surface water quality impacts due to earthworks Surface Water Quality Impacts due to Watercourse Crossing Works Surface Water Impacts due to Contamination by fuels, oils, chemicals Water Quality Impacts from Cement Based Compounds	Construction
Bleanbeg Bog NHA	No impacts are likely to occur	N/A
Local Water Dependent Habitats	Drainage of Marsh Fritillary habitat	Construction/Operation

Table 38: Defining the geographical boundaries of the WATER Cumulative Evaluation Study Area

Receptor	Geographical Boundary of the Study Area	Justification for Study Area Extent
Local Surface Water Bodies	As defined by local surface water catchments. The cumulative assessment was completed on a Local Surface Water Body scale	Only other developments within the same local surface water body as the subject development or the other elements of the Whole UWF Project can contribute to cumulative impacts within the surface water body. The local surface water bodies included are: Newport River (Mulkear), Small River, Clare River (Annagh), Bilboa River and the Clodiagh River).
Local Groundwater Bodies	With 300m of the construction works areas associated with the various elements of the Whole UWF Project	Within the underlying aquifer, groundwater flowpaths are expected to be relatively short, typically from 30-300m before groundwater discharges locally into streams. Therefore, for cumulative effects to occur on groundwater, other developments will have to be within 300m of the Whole UWF Project.
Lower River Shannon SAC	The regional Mulkear River catchment	The Mulkear River is one of the regional catchment in which the Whole UWF Project is located. The Mulkear River catchment drains to the Lower River Shannon SAC. Extending the scoping area beyond the Mulkear River catchment would mean that the whole of the River Shannon catchment would be included and therefore at this vast scale, the Whole UWF Project would likely have an unmeasurable effect in relation to cumulative impacts.
Lower River Suir SAC	The regional Clodiagh River catchment	The Clodiagh River is one of the regional catchments in which the Whole UWF Project is located. The Clodiagh River catchment drains to the Lower River Suir SAC. Extending the scoping area beyond the Clodiagh River catchment would mean that a much larger proportion of the River Suir catchment would be included and therefore at this scale, the Whole UWF Project would likely have an unmeasurable effect in relation to cumulative impacts.
Local Water Dependent Habitats	Within 300m of habitat	300m relates to the groundwater flowpath distance. Therefore, for cumulative effects to occur on local water dependant habitats, other developments will have to be within 300m of the Whole UWF Project.

15 Other Projects or Activities are located within the geographical boundaries, see Table 39.

Table 39: Other Projects or Activities located within the geographical boundary

Sensitive Aspect	Other Projects or Activities	Location of Other Projects or Activities within the Cumulative Geographical Boundary
Local Surface Water Bodies	Project No. 3: Bunkimalta Windfarm	Consented windfarm development, where 5 no. turbines are located within the Clare River catchment and 11 no. turbines are located within the Newport River (Mulkear) catchment.
	Project No. 4: Castlewaller Windfarm	Consented windfarm development, where all 15 no. turbines are located within the Small River catchment.
	Project No. 12: Gortnahalla Wind Turbine	Consented single turbine development within the Clodiagh River catchment.
	Project No.14: Rear Cross Quarry	NO: Although located within the geographical boundary, there is no potential for effects to water quality due to the implementation of best practice water quality control measures as stated in the quarry's EIS which are being implemented and therefore no measureable cumulative effects on downstream water quality is likely.
	Project No. 20: Thurles Regional Water Treatment Works	Consented water treatment works within the the Clodiagh River catchment.
	Project No. 23: Industrial / warehouse Units, Thurles	Consented Industrial / warehouse Units within the Clodiagh River catchment.
	Project No. 24: Newport Distributor Road	Consented public road development at Newport, Co. Tipperary within the Newport River catchment.
	Project No. 30: Agriculture – Milking Parlour	Consented milking parlour development within the Newport River catchment.
	Project No. 31: Agriculture – Turkey Tunnel & Pig Unit	Consented change of use of hay storage to slatted unit for pigs at farm site located within the Multeen River catchment.
	Project No. 33: Forestry (Activities)	Forestry is one of the predominant land uses in the area of the Whole UWF Project.
	Project No. 34: Agriculture (Activities)	Agriculture is one of the predominant land uses in the area of the Whole UWF Project.
Local Ground-water Bodies	**NO**: scoped out, no projects located within the geographical boundary with potential to cause measurable cumulative effects.	
Lower River Shannon SAC	Project No. 4: Castlewaller Windfarm	Consented windfarm development, where all 15 no. turbines are located within the Small River catchment. The windfarm is also located upstream of the Lower River Shannon SAC.
	Project No. 3: Bunkimalta Windfarm	Consented windfarm development, upstream of the Lower River Shannon SAC, where 5 no. turbines are located within the Clare River catchment and 11 no. turbines are located within the Newport River (Mulkear) catchment.

	Project No. 13: Killuragh Digester Plant	Consented development upstream of the Lower River Shannon SAC within the Mulkear River catchment.
	Project No. 24: Newport Distributor Road	Consented public road development at Newport, Co. Tipperary, upstream of the Lower River Shannon SAC, within the Newport River catchment
	Project No. 25: Housing Development Doon	Consented housing development, upstream of the Lower River Shannon SAC, within the Mulkear River catchment.
	Project No. 26: Housing Developments, Annacotty	Consented development, upstream of the Lower River Shannon SAC, within the Mulkear River catchment.
	Project No. 29: Agriculture - Milking Parlour	Consented development, upstream of the Lower River Shannon SAC, within the Mulkear River catchment.
	Project No. 32: Agricultural sheds and stores	Consented farm development, upstream of the Lower River Shannon SAC, within the Mulkear River catchment.
	Project No. 30: Agriculture – Milking Parlour	Consented milking parlour development, upstream of the Lower River Shannon SAC, within the Newport River catchment.
	Project No. 33: Forestry (Activities)	Forestry is one of the predominant land uses in the area of the Whole UWF Project.
	Project No. 34: Agriculture (Activities)	Agriculture is one of the predominant land uses in the area of the Whole UWF Project.
Lower River Suir SAC	Project No. 12: Gortnahalla Wind Turbine	Consented single turbine development, upstream of the Lower River Suir SAC, within the Clodiagh River catchment.
	Project No. 20: Thurles Regional Water Treatment Works	Consented water treatment works, upstream of the Lower River Suir SAC, within the Clodiagh River catchment.
	Project No. 23: Industrial / warehouse Units, Thurles	Consented Industrial / warehouse Units, upstream of the Lower River Suir SAC, within the Clodiagh River catchment.
	Project No. 31: Agriculture – Turkey Tunnel & Pig Unit	Agricultural development at a farm site, upstream of the Lower River Suir SAC, located within the Multeen River catchment.
	Project No. 33: Forestry (Activities)	Forestry is one of the predominant land uses in the area of the Whole UWF Project.
	Project No. 34: Agriculture (Activities)	Agriculture is one of the predominant land uses in the area of the Whole UWF Project.
Local Water Dependent Habitats	**NO**: scoped out, no projects located within the geographical boundary with potential to cause measurable cumulative effects	

As per Table 40, the time-frame boundary is mainly the construction stage, with the operational stage also relevant for some Local Surface Water Body impacts and for Local Water Dependent Habitats..

Table 40: Other Projects or Activities within the time-frame boundary

Sensitive Aspect	**Other Projects or Activities**	**Is the Other Project or Activity within the Time Frame Boundary? – YES/NO** YES - Within the Timeframe Boundary – brought forward to the Cumulative Conceptual Site Model, or NO - Not within the time-frame boundary – scoped out
Local Surface Water Bodies	Project No. 3: Bunkimalta Windfarm	YES
	Project No. 4: Castlewaller Windfarm	NO: Outside the Timeframe Boundary in relation to sedimentation effects – the UWF Grid Connection will be constructed before the Castlewaller Windfarm.
	Project No. 12: Gortnahalla Wind Turbine	YES
	Project No. 20: Thurles Regional Water Treatment Works	YES
	Project No. 23: Industrial / warehouse Units, Thurles	YES
	Project No. 24: Newport Distributor Road	YES
	Project No. 30: Agriculture – Milking Parlour	YES
	Project No. 31: Agriculture – Turkey Tunnel & Pig Unit	YES
	Project No. 33: Forestry (Activities)	YES
	Project No. 34: Agriculture (Activities)	YES
Lower River Shannon SAC	Project No. 3: Bunkimalta Windfarm	YES
	Project No. 4: Castlewaller Windfarm	NO: Outside the Timeframe Boundary in relation to sedimentation effects – the UWF Grid Connection will be constructed before the Castlewaller Windfarm.
	Project No. 13: Killuragh Digester Plant	YES
	Project No. 24: Newport Distributor Road	YES
	Project No. 25: Housing Development Doon	YES
	Project No. 26: Housing Developments, Annacotty	YES
	Project No. 29: Agriculture - Milking Parlour	YES
	Project No. 30: Agriculture – Milking Parlour	YES
	Project No. 32: Agricultural sheds and stores	YES
	Project No. 33: Forestry (Activities)	YES
	Project No. 34: Agriculture (Activities)	YES

REFERENCE DOCUMENTS

Lower River Suir SAC	Project No. 12: Gortnahalla Wind Turbine	YES
	Project No. 20: Thurles Regional Water Treatment Works	YES
	Project No. 23: Industrial / warehouse Units, Thurles	YES
	Project No. 31: Agriculture – Turkey Tunnel & Pig Unit	YES
	Project No. 33: Forestry (Activities)	YES
	Project No. 34: Agriculture (Activities)	YES

14 Other Projects or Activities are located within both the geographical and time-frame boundaries of the Cumulative Evaluation Study Area for at least one Sensitive Aspect, and therefore scoped using a conceptual site model exercise, see Tables 41 to 45.

Table 41: WATER Conceptual Site Model for Cumulative Impacts (Part 1 of 2) – Local Surface Water Bodies

Source(s) of Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects				
				Project No. 3: Bunkimalta Windfarm	**Project No. 12: Gortnahalla Turbine**	**Project No. 20: Thurles Regional Water Treatment Works**	**Project No. 23: Industrial / warehouse Units, Thurles**	**Project No. 24: Newport Distributor Road**
Local Surface Water Bodies								
Surface water quality effects from suspended sediments	Runoff / Surface Water flows	Local Surface Water Bodies	Surface water quality effects from suspended sediments	Yes, scoped in	No, scoped out Due to the small scale nature of the site, and the large downstream distance from the Whole UWF Project (10km), cumulative effects are likely to be less than perceptible.	No, scoped out Due to the small scale nature of the site, and the large downstream distance to where cumulative effects can occur(20km), effects are likely to be less than perceptible.	No, scoped out Due to the small scale nature of the site, and the large downstream distance to where cumulative effects can occur(20km), effects are likely to be less than perceptible.	Yes, scoped in
Oils, fuels and chemicals	Runoff and surface water flowpaths	Local Surface Water Bodies	Surface Water Impacts due to Con-tamination by Fuels, Oils and Chemicals	No, scoped out It is assumed that best practice oil and fuel measures as stated in the Bunkimalta WF EIS will be implemented and therefore no measure effects on downstream water quality is likely.	No, scoped out Due to the small volumes likely to present on-site, and the large downstream distance from the Whole UWF Project (10km), cumulative effects are likely to be less than perceptible.	No, scoped out Due to the small volumes likely to present on-site, and the large downstream distance to where cumulative effects can occur(20km), effects are likely to be less than perceptible.	No, scoped out Due to the small volumes likely to present on-site, and the large downstream distance to where cumulative effects can occur(20km), effects are likely to be less than perceptible.	No, scoped out Due to the small volumes present on-site, and the large downstream distance from the Whole UWF Project (5km), cumulative effects are likely to be less than perceptible.
Cement based compounds	Runoff and surface water flowpaths	Local Surface Water Bodies	Water Quality Impacts from Cement Based Compounds	No, scoped out It is assumed that best practice cement control measures as	No, scoped out Due to the small volumes likely to present on-site, and the	No, scoped out Due to the small volumes likely to present on-site, and	No, scoped out Due to the small volumes likely to present on-site, and	No, scoped out Due to the small volumes present on-site (Newport), and

REFERENCE DOCUMENTS

Source(s) of Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects				
				Project No. 3: Bunkimalta Windfarm	**Project No. 12: Gortnahalla Turbine**	**Project No. 20: Thurles Regional Water Treatment Works**	**Project No. 23: Industrial / warehouse Units, Thurles**	**Project No. 24: Newport Distributor Road**
Local Surface Water Bodies								
				stated in the Bunkimalta WF EIS will be implemented and therefore no measure effects on downstream water quality is likely.	large downstream distance from the Whole UWF Project (10km), cumulative effects are likely to be less than perceptible.	the large downstream distance to where cumulative effects can occur(20km), effects are likely to be less than perceptible.	the large downstream distance to where cumulative effects can occur(20km), effects are likely to be less than perceptible.	the large downstream distance from the Whole UWF Project (5km), cumulative effects are likely to be less than perceptible.
Permanent Access Roads and Hardstanding and new culverts	Runoff and surface water flowpaths	Local Surface Water Bodies	Increase flood risk, Surface Water Quality Impacts due to Runoff from Permanent Hardstanding Surfaces	Scoped out - due to the project design (new culverts sized to coped with a 100yr flood at a minimum, permanent drainage systems for permanent infrastructure) of the Whole UWF Project – no potential for measurable cumulative effects	Scoped out - due to the project design (new culverts sized to coped with a 100yr flood at a minimum, permanent drainage systems for permanent infrastructure) of the Whole UWF Project – no potential for measurable cumulative effects	Scoped out - due to the project design (new culverts sized to coped with a 100yr flood at a minimum, permanent drainage systems for permanent infrastructure) of the Whole UWF Project – no potential for measurable cumulative effects	Scoped out - due to the project design (new culverts sized to coped with a 100yr flood at a minimum, permanent drainage systems for permanent infrastructure) of the Whole UWF Project – no potential for measurable cumulative effects	Scoped out - due to the project design (new culverts sized to coped with a 100yr flood at a minimum, permanent drainage systems for permanent infrastructure) of the Whole UWF Project – no potential for measurable cumulative effects

REFERENCE DOCUMENTS

Table 42: WATER Conceptual Site Model for Cumulative Impacts (Part 2 of 2) – Local Surface Water Bodies

Source(s) of Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects		
				Project 30: Agriculture – Milking Parlour	**Project No. 31: Agriculture – Turkey Tunnel & Pig Unit**	**Project No. 34: Agriculture and Project No. 33: Forestry operation (Activities)**
Local Surface Water Bodies						
Surface water quality effects from suspended sediments	Runoff / Surface Water flows	Local Surface Water Bodies	Surface water quality effects from suspended sediments	No, scoped out Due to the small scale nature of the agricultural site, and the large downstream distance from the Whole UWF Project (8km), cumulative effects are likely to be less than perceptible.	No, scoped out Due to the small scale nature of the agricultural site, and the large downstream distance from the Whole UWF Project (20km), cumulative effects are likely to be less than perceptible.	No, scoped out Effects are likely to be of a scale of less than measureable.
Oils, fuels and chemicals	Runoff and surface water flowpaths	Local Surface Water Bodies	Surface Water Impacts due to Contamination by Fuels, Oils and Chemicals	No, scoped out Due to the small volumes present on-site, and the large downstream distance from the Whole UWF Project (8km), cumulative effects are likely to be less than perceptible.	No, scoped out Due to the small scale nature of the agricultural site, and the large downstream distance from the Whole UWF Project (20km), cumulative effects are likely to be less than perceptible.	No, scoped out Effects are likely to be of a scale of less than measureable.
Cement based compounds	Runoff and surface water flowpaths	Local Surface Water Bodies	Water Quality Impacts from Cement Based Compounds	No, scoped out Due to the small volumes present on-site (Milking Parlour), and the large downstream distance from the Whole UWF Project (8km), cumulative effects are likely to be less than perceptible.	No, scoped out Due to the small scale nature of the agricultural site, and the large downstream distance from the Whole UWF Project (20km), cumulative effects are likely to be less than perceptible.	No, scoped out Effects are likely to be of a scale of less than measureable

REFERENCE DOCUMENTS

Table 43: WATER Conceptual Site Model for Cumulative Impacts (Part 1 of 2) – Lower River Shannon SAC

Source(s) of Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects			
				Project No. 3: Bunkimalta Windfarm	Project No. 13: Killuragh Digester Plant,	Project No. 24: Newport Distributor Road	Project No. 25: Housing Development Doon
Lower River Shannon SAC							
Surface water quality effects from suspended sediments	Surface Water flows	Lower River Shannon SAC	Surface water quality effects from suspended sediments	Yes, scoped in	No, scoped out There will be no significant runoff from site to generate any sort of measureable in-combination effect.	Yes, scoped in	No, scoped out There will be no significant runoff from site to generate any sort of measureable in-combination effect.
Oils, fuels and chemicals	Runoff and surface water flowpaths	Lower River Shannon SAC	Water Impacts from Fuels, Oils and Chemicals	No, scoped out It is assumed that best practice oil and fuel measures as stated in the Bunkimalta WF EIS will be implemented and therefore no measure effects on downstream water quality is likely.	No, scoped out There will be no significant runoff from site to generate any sort of measureable in-combination effect.	No, scoped out Due to the small volumes present on-site, and the large downstream distance from the Whole UWF Project (5km), cumulative effects are likely to be less than perceptible.	No, scoped out There will be no significant runoff from site to generate any sort of measureable in-combination effect.
Cement based compounds	Runoff and surface water flowpaths	Lower River Shannon SAC	Water Quality Impacts from Cement Based Compounds	No, scoped out It is assumed that best practice cement control measures as stated in the Bunkimalta WF EIS will be implemented and therefore no measure effects on downstream water quality is likely.	No, scoped out There will be no significant runoff from site to generate any sort of measureable in-combination effect.	No, scoped out Due to the small volumes present on-site, and the large downstream distance from the Whole UWF Project (5km), cumulative effects are likely to be less than perceptible.	No, scoped out There will be no significant runoff from site to generate any sort of measureable in-combination effect.

REFERENCE DOCUMENTS

Table 44: WATER Conceptual Site Model for Cumulative Impacts (Part 2 of 2) – Lower River Shannon SAC

Source(s) of Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects				
				Project No. 26: Housing Developments, Annacotty	Project No. 29: Agriculture - Milking Parlour	Project 30: Agriculture – Milking Parlour	Project No. 32: Agricultural sheds and stores	Project No. 33: Forestry Project No. 34: Agriculture
Lower River Shannon SAC								
Surface water quality effects from suspended sediments	Surface Water flows	Lower River Shannon SAC	Surface water quality effects from suspended sediments	No, scoped out There will be no significant runoff from site to generate any sort of measureable in-combination effect.	No, scoped out There will be no significant runoff from site to generate any sort of measureable in-combination effect.	No, scoped out Due to the small scale nature of the site, and the large downstream distance from the Whole UWF Project (8km), cumulative effects are likely to be less than perceptible.	No, scoped out There will be no significant runoff from site to generate any sort of measureable in-combination effect.	No, scoped out Effects are likely to be of a scale of less than measureable.
Surface water quality effects from oils, fuels and chemicals	Surface Water flows	Lower River Shannon SAC	Water Impacts from Fuels, Oils and Chemicals	No, scoped out There will be no significant runoff from site to generate any sort of measureable in-combination effect.	No, scoped out There will be no significant runoff from site to generate any sort of measureable in-combination effect.	No, scoped out Due to the small volumes present on-site, and the large downstream distance from the Whole UWF Project (8km), cumulative effects are likely to be less than perceptible.	No, scoped out There will be no significant runoff from site to generate any sort of measureable in-combination effect.	No, scoped out Effects are likely to be of a scale of less than measureable.
Surface water quality effects from cement based compounds	Surface Water flows	Lower River Shannon SAC	Water Quality Impacts from Cement Based Compounds	No, scoped out There will be no significant runoff from site to generate any sort of measureable in-combination effect.	No, scoped out There will be no significant runoff from site to generate any sort of measureable in-combination effect.	No, scoped out Due to the small volumes present on-site, and the large downstream distance from the Whole UWF Project (8km), cumulative effects are likely to be less than perceptible.	No, scoped out There will be no significant runoff from site to generate any sort of measureable in-combination effect.	No, scoped out Effects are likely to be of a scale of less than measureable.

REFERENCE DOCUMENTS

Table 45: WATER Conceptual Site Model for Cumulative Impacts (Part 1 of 1) – Lower River Suir SAC

Source(s) of Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects				
				Project No. 12: Gortnahalla Turbine	**Project No. 20: Thurles Regional Water Treatment Works**	**Project No. 23: Industrial / warehouse Units, Thurles**	**Project No. 31: Agriculture – Turkey Tunnel & Pig Unit**	**Project No. 33: Forestry Project No. 34: Agriculture**
Lower River Suir SAC								
Surface water quality effects from suspended sediments	Surface Water flows	Lower River Suir SAC	Surface water quality effects from suspended sediments	No, scoped out Due to the small scale nature of the site, and the large downstream distance from the Whole UWF Project (10km), cumulative effects are likely to be less than perceptible.	No, scoped out Due to the small scale nature of the site, and the large downstream distance to where cumulative effects can occur(20km), effects are likely to be less than perceptible.	No, scoped out Due to the small scale nature of the site, and the large downstream distance to where cumulative effects can occur(20km), effects are likely to be less than perceptible.	No, scoped out, due to the small scale nature of the site, and the large downstream distance from the Whole UWF Project (20km), cumulative effects are likely to be less than perceptible.	No, scoped out Effects are likely to be of a scale of less than measureable.
Surface water quality effects from oils, fuels and chemicals	Surface Water flows	Lower River Suir SAC	Water Impacts from Fuels, Oils and Chemicals	No, scoped out Due to the small volumes likely to present on-site, and the large downstream distance from the Whole UWF Project (10km), cumulative effects are likely to be less than perceptible.	No, scoped out, due to the small volumes likely to present on-site, and the large downstream distance to where cumulative effects can occur (20km), effects are likely to be less than perceptible.	No, scoped out, due to the small volumes likely to present on-site, and the large downstream distance to where cumulative effects can occur(20km), effects are likely to be less than perceptible.	No, scoped out, due to the small scale nature of the site, and the large downstream distance from the Whole UWF Project (20km), cumulative effects are likely to be less than perceptible.	No, scoped out Effects are likely to be of a scale of less than measureable.
Surface water quality effects from cement based compounds	Surface Water flows	Lower River Suir SAC	Water Quality Impacts from Cement Based Compounds	No, scoped out Due to the small volumes likely to present on-site, and the large downstream distance from the Whole UWF Project (10km), cumulative effects are likely to be less than perceptible.	No, scoped out - Due to the small volumes likely to present on-site, and the large downstream distance to where cumulative effects can occur (20km), effects are likely to be less than perceptible.	No, scoped out, due to the small volumes likely to present on-site, and the large downstream distance to where cumulative effects can occur (20km), effects are likely to be less than perceptible.	No, scoped out, due to the small scale nature of the site, and the large downstream distance from the Whole UWF Project (20km), cumulative effects are likely to be less than perceptible.	No, scoped out Effects are likely to be of a scale of less than measureable.

REFERENCE DOCUMENTS

Table 46: Summary of Other Projects or Activities Scoped In for Cumulative Evaluation in the Main Report

Sensitive Aspect	Other Project or Activity (scoped in for the evaluation of cumulative impacts in VolC2: EIAR Main Report – Ch.11: WATER)
Local Surface Water Bodies	Project No.3: Bunkimalta Windfarm Project No.24: Newport Distributor Road
Local Groundwater Bodies	*No Other Projects or Activities scoped in for evaluation*
Local Wells & Springs	*No Other Projects or Activities scoped in for evaluation*
Lower River Shannon SAC	Project No.3: Bunkimalta Windfarm Project No.24: Newport Distributor Road
Lower River Suir SAC	*No Other Projects or Activities scoped in for evaluation*
Bleanbeg Bog NHA	*No Other Projects or Activities scoped in for evaluation*
Local Water Dependent Habitats	*No Other Projects or Activities scoped in for evaluation*

A-2.3 .2.12 Scoping of Other Projects or Activities for AIR

Table 47: Summary of the Sensitive Aspects and Impacts taken from the EIAR Main Report chapter

Sensitive Aspect Evaluated in the Main EIAR Report	Likely Impacts to Sensitive Aspect, as per Main EIAR Report	Relevant Whole UWF Project life-cycle stage (time-frame boundary)
Local Residents & Community	Decrease in Ambient Air Quality Increase in Ambient Noise Levels (construction) Increase in Ambient Noise Levels (operational stage) Increase in Ambient EMF Levels	Construction & Operational
Transient People	Increase in Ambient EMF Levels	Operational
Electronic Equipment	Increase in Ambient EMF Levels	Operational

Table 48: Defining the geographical boundaries of the AIR Cumulative Evaluation Study Area

Sensitive Aspect	Geographical Boundary of the Study Area	Justification for Study Area Extent
Local Residents & Community	Air Quality, Noise & Vibration: 700m of construction works areas or within 50m of main transport routes used by construction vehicles, and within 500m of operational substations (noise emissions only). EMF: 200m from Mountphilips 110kV Substation, 110kV UGC, Internal Windfarm Cabling, Consented UWF Turbines and Consented UWF Substation.	Local Residents & Community could potential be effected by noise sources or EMF sources from different directions at the same time or from air quality impacts at different times (sequentially) and therefore the distance from the source was doubled from that used for the elements of the Whole UWF Project.
Transient People	200m from the Mountphilips 110kV Substation, 110kV UGC, Internal Windfarm Cabling, Consented Upperchurch Turbines and Consented Upperchurch Substation.	Potential for electronic equipment to be effected by increased levels of EMF coming from different directions and therefore the distance from the source was doubled from that used for direct effects.
Electronic Equipment	200m from the Mountphilips 110kV Substation, 110kV UGC, Internal Windfarm Cabling, Consented Upperchurch Turbines and Consented Upperchurch Substation.	Potential for electronic equipment to be effected by increased levels of EMF coming from different directions and therefore the distance from the source was doubled from that used for direct effects.

4 Other Projects or Activities are located within the geographical boundary, see Table 49

Table 49: Other Projects or Activities located within the geographical boundary

Sensitive Aspect	Other Projects or Activities	Location of Other Projects or Activities within the Cumulative Geographical Boundary
Local Residents & Community	Project No.1: Killonan – Nenagh 110kV OHL	The 110kV OHL is located to the west of the Mountphilips Substation Within the geographical boundary for construction stage dust and noise effects and operational stage noise effects. Outside the geographical boundary for operational EMF effects No potential for cumulative operational stage noise effects.
	Project No. 2: Shannonbridge – Killonan 220 kV OHL	The 110kV UGC will cross under the existing 220 kV OHL to the east of the Mountphilips Substation Within the geographical boundary for construction stage dust and noise effects and operational stage EMF effects. No potential for construction cumulative noise or dust or operational stage cumulative noise effects.
	Project No. 4: Castlewaller Windfarm	Nearest distance to Whole UWF Project 94m (P) Within the geographical boundary for construction stage noise and dust effects. Outside the geographical boundary for operational noise or EMF effects
	Project No. 5: Milestone Windfarm	Nearest distance to Whole UWF Project 580m (under construction) Within the geographical boundary for construction stage dust, noise and vibration effects. Outside the geographical boundary for operational EMF effects. Outside the geographical boundary for operational noise effects from the UWF Related Works or UWF Grid Connection in the Knockmaroe/ Knockcurraghbola area, and in addition with regard to the UWF, this impact pathway is scoped out – as it was already considered acceptable by C.A. Noise related impacts in the geographical boundary in Knockmaroe/Knockcurraghbola only relate to cumulative effects of both the operational Upperchurch Turbines and operational Milestone Turbines. There will be no new sources of noise from the operational UWF Grid Connection or UWF Related Works in this area. The cumulative effects on local amenity has already been assessed in the UWF RFI 2013, and by ABP in 2013 and has been considered acceptable, therefore the evaluation is not repeated again in the 2018 EIARs.
Transient People	Project No.1: Killonan – Nenagh 110kV OHL	The 110kV OHL is located to the west of the Mountphilips Substation Within the geographical boundary for operational stage EMF effects. No potential for cumulative construction stage dust effects or construction/operational stage noise effects.
	Project No. 2: Shannonbridge – Killonan 220 kV OHL	The 110kV UGC will cross under the existing 220 kV OHL to the east of the Mountphilips substation. Within the geographical boundary for operational stage EMF effects. No potential for cumulative construction stage dust effects or construction/operational stage noise effects.
	Project No. 4: Castlewaller Windfarm	Nearest distance to Whole UWF Project 94m (P) Within the geographical boundary for operational stage EMF effects. No potential for cumulative construction stage dust effects or construction/operational stage noise effects.
	Project No. 5: Milestone Windfarm	Nearest distance to Whole UWF Project 580m (E – under construction) Outside the geographical boundary for operational stage EMF effects. No potential for cumulative construction stage dust effects or construction/operational stage noise effects.

Sensitive Aspect	Other Projects or Activities	Location of Other Projects or Activities within the Cumulative Geographical Boundary
Electronic Equipment	Project No.1: Killonan – Nenagh 110kV OHL	The 110kV OHL is located to the west of the Mountphilips Substation Within the geographical boundary for operational stage EMF effects. No potential for cumulative construction stage dust effects or construction/operational stage noise effects.
	Project No. 2: Shannonbridge – Killonan 220 kV OHL	The 110kV UGC will cross under the existing 220 kV OHL to the east of the Mountphilips substation. Within the geographical boundary for operational stage EMF effects. No potential for cumulative construction stage dust effects or construction/operational stage noise effects.
	Project No. 4: Castlewaller Windfarm	Nearest distance to Whole UWF Project 94m (P) Within the geographical boundary for operational stage EMF effects. No potential for cumulative construction stage dust effects or construction/operational stage noise effects.
	Project No. 5: Milestone Windfarm	Nearest distance to Whole UWF Project 580m (E – under construction) Outside the geographical boundary for operational stage EMF effects. No potential for cumulative construction stage dust effects or construction/operational stage noise effects.

Note: (P) – Permitted Windfarm. (E) – Existing Windfarm.

As per Table 50, the time-frame boundary is the construction stage for air quality effects, the construction and operational stage for noise effects and the operational stage for EMF effects.

Table 50: Other Projects or Activities within the time-frame boundary

Sensitive Aspect	Other Projects or Activities	Is the Other Project or Activity within the Time Frame Boundary? – YES/NO YES - Within the Timeframe Boundary – brought forward to the Cumulative Conceptual Site Model, or NO - Not within the time-frame boundary – scoped out
Local Residents & Community	Project No.1: Killonan – Nenagh 110kV OHL	NO: Outside the timeframe boundary for construction stage dust and noise effects - the Killonan – Nenagh 110kV OHL already exists.
	Project No. 2: Shannonbridge – Killonan 220 kV OHL	YES for operational stage EMF effects
	Project No. 4: Castlewaller Windfarm	NO: Outside the timeframe boundary The Castlewaller Windfarm is in the Gate 4 grid connection queue and has not received a grid connection offer. Its connection point is not yet known or predictable. The entire lifecycle of Castlewaller Windfarm (i.e. construction, operation and decommissioning) will likely occur during the operational stage of the 110kV UGC. Therefore there will be no overlap of construction periods.
	Project No. 5: Milestone Windfarm	NO- Outside the timeframe boundary for dust, noise and vibration effects Milestone Windfarm commenced construction in September 2017, and it is expected that construction of this windfarm will be completed before construction of the Whole UWF Project commences. Therefore, as construction of the two projects will not overlap, no cumulative air quality or noise effects will occur.

Sensitive Aspect	**Other Projects or Activities**	**Is the Other Project or Activity within the Time Frame Boundary? – YES/NO** YES - Within the Timeframe Boundary – brought forward to the Cumulative Conceptual Site Model, or NO - Not within the time-frame boundary – scoped out
Transient People	Project No.1: Killonan – Nenagh 110kV OHL	YES for operational stage EMF effects
	Project No. 2: Shannonbridge – Killonan 220 kV OHL	YES for operational stage EMF effects
	Project No. 4: Castlewaller Windfarm	YES for operational stage EMF effects
Electronic Equipment	Project No.1: Killonan – Nenagh 110kV OHL	YES for operational stage EMF effects
	Project No. 2: Shannonbridge – Killonan 220 kV OHL	YES for operational stage EMF effects
	Project No. 4: Castlewaller Windfarm	YES for operational stage EMF effects

3 Other Projects or Activities are located within both the geographical and time-frame boundaries of the Cumulative Evaluation Study Area for at least one Sensitive Aspect, and therefore scoped using a conceptual site model exercise, see Table 51.

Table 51: AIR Cumulative Conceptual Site Model

Source(s) of EMF Impacts	**Pathway(s)**	**Receptor(s)**	**Impact Description**	**Other Projects/Activities**	**Scoped In / Scoped Out**
Local Residents & Community					
Grid Connection – 110kV UGC	Air/Ground	Local Residents & Community	Increase in ambient EMF levels	Project No. 2: Shannonbridge – Killonan 220 kV OHL	Scoped In
Transient People					
Grid Connection – Mountphilips 110kV Substation and 110kV UGC	Air/Ground	Transient People	Increase in ambient EMF levels	Project No.1: Killonan – Nenagh 110kV OHL	Scoped In
				Project No. 2: Shannonbridge – Killonan 220 kV OHL	Scoped In
				Project No. 4: Castlewaller Windfarm	Scoped In
Electronic Equipment					
Grid Connection – Mountphilips 110kV Substation and 110kV UGC	Air/Ground	Electronic Equipment	Increase in ambient EMF levels	Project No.1: Killonan – Nenagh 110kV OHL	Scoped In
				Project No. 2: Shannonbridge – Killonan 220 kV OHL	Scoped In
				Project No. 4: Castlewaller Windfarm	Scoped In

Table 52: Summary of Other Projects or Activities Scoped In for Cumulative Evaluation in the Main Report

Sensitive Aspect	Other Project or Activity (scoped in for the evaluation of cumulative impacts in VolC2: EIAR Main Report – Ch.12 AIR)
Local Residents and Community	Project No. 2: Shannonbridge – Killonan 220 kV OHL
Transient People	Project No.1: Killonan – Nenagh 110kV OHL Project No. 2: Shannonbridge – Killonan 220 kV OHL Project No. 4: Castlewaller Windfarm
Electronic Equipment	Project No.1: Killonan – Nenagh 110kV OHL Project No. 2: Shannonbridge – Killonan 220 kV OHL Project No. 4: Castlewaller Windfarm

A-2.3 .2.13 Scoping of Other Projects or Activities for CLIMATE

Table 53: Summary of the Sensitive Aspects and Impacts taken from the EIAR Main Report chapter

Sensitive Aspect Evaluated in the Main EIAR Report	Likely Impacts to Sensitive Aspect, as per Main EIAR Report	Relevant Whole UWF Project life-cycle stage (time-frame boundary)
Climate	Increase in Renewable Energy	Operational

Table 54: Defining the geographical boundaries of the CLIMATE Cumulative Evaluation Study Area

Sensitive Aspect	Geographical Boundary of the Study Area	Justification for Study Area Extent
Climate	Irish State	Any climatic effects, if significant will have the potential to impact Ireland's commitments and targets under various EU Climate Agreements and other international agreements.

There are 233. No. Other Projects (operational windfarms) within the geographical boundary.

The Operational Stage of the Upperchurch Windfarm is the relevant timeframe boundary

Table 55: Other Projects or Activities within the time-frame boundary

Sensitive Aspect	Is the Other Project or Activity within the Time Frame Boundary? – YES/NO YES - Within the Timeframe Boundary – brought forward to the Cumulative Conceptual Site Model, *or* NO - Not within the time-frame boundary – scoped out
Climate	233 No. operational Windfarms: YES - Any other operational windfarms in the Republic of Ireland will have the potential to have a positive cumulative impact on Climate as a result of the increased availability of renewable energy

Table 56: CLIMATE Conceptual Site Model for Cumulative Impacts

Source(s) of Climate Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	All Irish Windfarms Scoping for likely cumulative effects
Renewable energy generated by wind turbines	Air	Climate	Increase in Renewable Energy	Yes – scoped in

Table 57: Summary of Other Projects or Activities Scoped In for Cumulative Evaluation in the Main Report

Sensitive Aspect	Other Project or Activity (scoped in for the evaluation of cumulative impacts in VolC2: EIAR Main Report – Ch.13: CLIMATE)
Climate	233 No. operational Windfarms

A-2.3 .2.14 Scoping of Other Projects or Activities for MATERIAL ASSETS (Built Services)

Table 58: Summary of the Sensitive Aspects and Impacts taken from the EIAR Main Report chapter

Sensitive Aspect Evaluated in the Main EIAR Report	Likely Impacts to Sensitive Aspect, taken from the Main EIAR Report	Relevant Whole UWF Project life-cycle stage (time-frame boundary)
Local Residents & Community (end users)	No impacts are likely to occur	N/A
Electricity Transmission System	No impacts are likely to occur	N/A

No likely effects or measurable effects from the Elements of the Whole UWF Project, therefore no potential for measurable cumulative effects with Other Projects or Activities.

A-2.3 .2.15 Scoping of Other Projects or Activities for MATERIAL ASSETS (Roads)

Table 59: Summary of the Sensitive Aspects and Impacts taken from the EIAR Main Report chapter

Sensitive Aspect Evaluated in the Main EIAR Report	Likely Impacts to Sensitive Aspect, as per Main EIAR Report	Relevant Whole UWF Project life-cycle stage (time-frame boundary)
Public Roads	Damage to Road Boundaries Damage to Road Pavements	Construction
Road Users	Increased Journey Times	Construction

Table 60: Defining the geographical boundaries of the ROADS Cumulative Evaluation Study Area

Sensitive Aspect	Geographical Boundary of the Study Area	Justification for Study Area Extent
Public Roads	Route of concentrated construction traffic and boundary of works areas on roads and site access points on the public road network and all parts of the public road network subject to road works.	Cumulative effects are only possible on the roads affected by the Whole UWF Project.
Road Users		

5 Other Projects or Activities are located within the geographical boundary, see Table 61.

Table 61: Other Projects or Activities located within the geographical boundary

Sensitive Aspect	Other Projects or Activities	Location of Other Projects or Activities within the Cumulative Geographical Boundary
Public Roads	Project No. 4: Castlewaller Windfarm	L60111-0
	Project No. 5: Milestone Windfarm	L497-0
	Project No. 27: Sports Club Works – Sean Treacy GAA	R503-126
	Project No. 33: Forestry (Activity)	All roads
	Project No. 34: Agriculture (Activity)	All roads
Road Users	Project No. 4: Castlewaller Windfarm	L60111-0
	Project No. 5: Milestone Windfarm	L497-0
	Project No. 27: Sports Club Works – Sean Treacy GAA	R503-126
	Project No. 33: Forestry (Activity)	All roads
	Project No. 34: Agriculture (Activity)	All roads

As per Table 62, the time-frame boundary is the construction stage

Table 62: Other Projects or Activities within the time-frame boundary

Sensitive Aspect	**Other Projects or Activities**	**Is the Other Project or Activity within the Time Frame Boundary? – YES/NO** YES - Within the Timeframe Boundary – brought forward to the Cumulative Conceptual Site Model, or NO - Not within the time-frame boundary – scoped out
Public Roads	Project No. 4: Castlewaller Windfarm	NO: Outside the timeframe boundary - will not be constructed during the construction stage of the UWF Grid Connection
	Project No. 5: Milestone Windfarm	NO: Outside the timeframe boundary - currently under construction, and expected to be completed by mid 2018 – i.e. before the UWF Grid Connection.
	Project No. 27: Sports Club Works – Sean Treacy GAA	YES
Road Users	Project No. 4: Castlewaller Windfarm	NO: Outside the timeframe boundary - will not be constructed during the construction stage of the UWF Grid Connection
	Project No. 5: Milestone Windfarm	NO: Outside the timeframe boundary - currently under construction, and expected to be completed by mid 2018 – i.e. before the UWF Grid Connection.
	Project No. 27: Sports Club Works – Sean Treacy GAA	YES

Table 63: Soils Conceptual Site Model – Public Roads & Road Users

Source(s) of Soil Impacts	**Pathway(s)**	**Receptor**	**Whole UWF Project Impacts**	**Scoping for Cumulative Effects**
				Project No.27: Sports Club Works Sean Treacy GAA
Public Roads				
Trenching works, site access	Boundary	Public Roads	Damage to Road Boundaries	No Scoped Out, no damage foreseeable to road boundaries, no potential for cumulative effects.
Trenching works, site access, construction traffic	Roads	Public Roads	Damage to Road Pavements	No Scoped Out, works will not will generate any noticeable levels of additional traffic – no potential for measurable cumulative effects
Road Users				
Road works, construction traffic	Roads	Road Useres	Increased Journey Times	No Scoped Out, works will not will generate any noticeable levels of additional traffic – no potential for measurable cumulative effects

Table 64: Summary of Other Projects or Activities Scoped In for Cumulative Evaluation in the Main Report

Sensitive Aspect	**Other Project or Activity (scoped in for the evaluation of cumulative impacts in VolC2: EIAR Main Report – Ch.15: MATERIAL ASSETS (ROADS))**
Public Roads	*No Other Projects or Activities scoped in for evaluation*
Road Users	*No Other Projects or Activities scoped in for evaluation*

A-2.3 .2.16 Scoping of Other Projects or Activities for CULTURAL HERITAGE

Table 65: Summary of the Sensitive Aspects and Impacts taken from the EIAR Main Report chapter

Sensitive Aspect Evaluated in the Main EIAR Report	Likely Impacts to Sensitive Aspect, taken from the Main EIAR Report	Relevant Whole UWF Project life-cycle stage (time-frame boundary)
Recorded Legally Protected Sites	Visual Impact	Operational
Other Recorded Sites	No impacts are likely to occur	N/A
Previously Unrecorded Sites	Damage to Townland Boundaries	Construction
Unrecorded Subsurface Sites	Complete or partial destruction	Construction

Table 66: Defining the geographical boundaries of the Cultural Heritage Cumulative Evaluation Study Area

Sensitive Aspect	Geographical Boundary of the Study Area	Justification for Study Area Extent
Recorded Legally Protected Sites	4km from the Mountphilips Substation and from the Telecoms Relay Pole	Because of the relatively low heights of the Mountphilips Substation and the Telecom Relay Pole any visibility beyond 2km would be barely perceptible to none. The 4km distance is used to take account of any structures which may be visible from another location. The remainder of the UWF Grid Connection and UWF Related Works will either be placed below ground level or will comprise stone roads which are a common occurrence in the area and will not cause any visual impacts, and for this reason these parts are not included in the study area. Regarding the consented Upperchurch Windfarm, any measurable cumulative visual impacts beyond the study area for the Telecom Relay Pole will only relate to the presence of cumulative turbines in views containing the Consented UWF Turbines, the cumulative impacts of which have previously been assessed as acceptable by ABP, and for this reason the study area does not extend beyond the 4km for the Telecom Relay Pole.
Previously Unrecorded Sites	Townland boundaries affected by the Whole UWF Project	Cumulative impacts to townland boundaries is limited to those boundaries which could potentially be affected by both the Whole UWF Project and by Other Projects or Activities.
Unrecorded Subsurface Sites	Footprint of the UWF Grid Connection, UWF Related Works and the Upperchurch Windfarm.	Cumulative impacts to Cultural Heritage sites is limited to those sites which could potentially be affected by both the Whole UWF Project and by Other Projects/Activities.

5 Other Projects are located within the geographical boundary, see Table 67.

Table 67: Other Projects or Activities located within the geographical boundary

Sensitive Aspect	Other Projects or Activities	Location of Other Projects or Activities within the Cumulative Geographical Boundary
Recorded Legally Protected Sites	Project No.5: Milestone Windfarm	The Milestone Windfarm turbines are located c.0.5km to the south of the Telecom Relay Pole (UWF Related Works).
	Project No.7: Garracummer Windfarm	The Garracummer Windfarm turbines are located c.4.4km to the southwest of the Telecom Relay Pole (UWF Related Works).
	Project No.15: Foilnaman Mast	This existing mast is located within the development area of the consented Upperchurch Windfarm c.0.2km from the Telecom Relay Pole (UWF Related Works).
	Project No.16: Cummermore Communication Pole	This existing pole is located in the 3.7km from the Telecom Relay Pole (UWF Related Works)
	Project No.17: Ballynahinch Mast	This existing mast is located c. 3.8km north of the Mountphilips Substation (UWF Grid Connection).
Previously Unrecorded Sites	Project No.5: Milestone Windfarm	The UWF Grid Connection and UWF Related Works will require the removal of a 5m section of townland boundary between the townlands of Knockcurraghbola Commons and Knockcurraghbola Crownlands, this boundary extends into the Milestone Windfarm.
Unrecorded Subsurface Sites	**NO:** scoped out, no projects located within the geographical boundary with potential to cause measurable cumulative effects	

As per Table 68, the time-frame boundary is the operational stage for Recorded Legally Protected Sites and the construction stage for Previously Unrecorded Sites.

Table 68: Other Projects or Activities within the time-frame boundary

Sensitive Aspect	Other Projects or Activities	Is the Other Project or Activity within the Time Frame Boundary? – YES/NO YES - Within the Timeframe Boundary – brought forward to the Cumulative Conceptual Site Model, or NO - Not within the time-frame boundary – scoped out
Recorded Legally Protected Sites	Project No.5: Milestone Windfarm	YES
	Project No.7: Garracummer Windfarm	YES
	Project No.15: Foilnaman Mast	YES
	Project No.16: Cummermore Communication Pole	YES
	Project No.17: Ballynahinch Mast	YES
Previously Unrecorded Sites	Project No.5: Milestone Windfarm	YES

REFERENCE DOCUMENTS

All 5 Other Projects are located within both the geographical and time-frame boundaries of the Cumulative Evaluation Study Area, and therefore scoped using a conceptual site model exercise, see Tables 69 to 70.

Table 69: CULTURAL HERITAGE Conceptual Site Model for Cumulative Impacts – Recorded Legally Protected Sites

Source(s) of Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects				
				Project No.5: Milestone Windfarm	Project No.7: Garracummer Windfarm	Project No.15: Foilnaman Mast	Project No.16: Cummermore Communication Pole	Project No.17: Ballynahinch Mast
Recorded Legally Protected Sites								
Above ground structures, features and works	Visibility	Recorded Legally Protected Sites	Visual Impact	Yes – Scoped In	Scoped Out: The Mountphilips Substation will not be inter-visible with Garracummer Windfarm. Cumulative visual effects are limited the Telecom Relay Pole and the Consented Windfarm with the Garracummer Windfarm. It is considered that due to its small scale, that the addition of the Telecoms Relay Pole to the viewsheds from cultural heritage sites will not cause any additional measurable visual effect to that already evaluated (and considered acceptable) for the Consented Windfarm - which included a cumulative evaluation of the visual impact of the Upperchurch Windfarm together with the Garracummer Windfarm	Yes – Scoped In	Yes – Scoped In	Scoped Out – no inter-visibility with the Mountphilips Substation.

Table 70: CULTURAL HERITAGE Conceptual Site Model for Cumulative Impacts – Previously Unrecorded Sites

Source(s) of Impacts	Pathway(s)	Receptor(s)	Whole UWF Project Impacts	Scoping for likely cumulative effects
				Project No.5: Milestone Windfarm
Previously Unrecorded Sites				
Initial groundworks during the construction phase	Mechanical or manual excavation of soil	Previously Unrecorded Sites	Visual Impact	Scoped Out: no potential for cumulative effects to the townland boundary between Knockcurraghbola Commons and Knockcurraghbola Crownlands as the Milestone Windfarm uses an existing gateway/road through the townland boundary.

REFERENCE DOCUMENTS

REFERENCE DOCUMENTS

Table 71: Summary of Other Projects or Activities Scoped In for Cumulative Evaluation in the Main Report

Sensitive Aspect	Other Project or Activity (scoped in for the evaluation of cumulative impacts in VolC2: EIAR Main Report – Ch.16: CULTURAL HERITAGE)
Recorded Legally Protected Sites	Project No.5: Milestone Windfarm Project No.15: Foilnaman Mast Project No.16: Cummermore Communication Pole
Other Recorded Sites	*No Other Projects or Activities scoped in for evaluation*
Previously Unrecorded Sites	*No Other Projects or Activities scoped in for evaluation*
Unrecorded Subsurface Sites	*No Other Projects or Activities scoped in for evaluation*

REFERENCE DOCUMENTS

A-2.3 .2.17 Scoping of Other Projects or Activities for LANDSCAPE

Table 72: Summary of the Sensitive Aspects and Impacts taken from the EIAR Main Report chapter

Sensitive Aspect Evaluated in the Main EIAR Report	Likely Impacts to Sensitive Aspect, taken from the Main EIAR Report	Relevant Whole UWF Project life-cycle stage (time-frame boundary)
Landscape Character	Alteration or division of land cover and vegetation patterns Intensification of activity causing a reduction in rural tranquillity Intensification of built development and reduction in the integrity of rural landscape patterns	Construction Construction Operational
Visual Amenity	Intensification of activity causing visual disharmony, clutter or complexity Intensification of activity causing visual disharmony, clutter or complexity	Construction Operational

Table 73: Defining the geographical boundaries of the Landscape Cumulative Evaluation Study Area

Sensitive Aspect	Geographical Boundary of the Study Area	Justification for Study Area Extent
Landscape Character	Cumulative construction effects: 1km corridor for linear elements including 110kV UGC, Internal Windfarm Cables, and Realigned Windfarm Roads Cumulative operational effects; 4km radius from Mountphilips Substation, Telecoms Relay Pole, UWF Replacement Forestry	Distances outside of which, the Mountphilips Substation, Telecoms Relay Pole, UWF Replacement Forestry could not have a material cumulative effect on prevailing landscape character or visual amenity. Any measurable cumulative landscape character and visual amenity impacts beyond these study areas will only relate to the presence of cumulative turbines in views containing the consented UWF turbines, the cumulative impacts of which have previously been assessed as acceptable by ABP.
Visual Amenity		

All 8 Other Projects or Activities are located within the geographical boundary, see Table 74.

Table 74: Other Projects or Activities located within the geographical boundary

Sensitive Aspect	Other Projects or Activities	Location of Other Projects or Activities within the Cumulative Geographical Boundary
Landscape Character	Project 4: Castlewaller Windfarm	YES – within the geographical boundary (1km boundary) for construction related effects. NO - for operational stage visual effects, no inter-visibility between this windfarm and the Mountphilips Substation or the Telecom Relay Pole or the UWF Replacement Forestry).
	Project No.5: Milestone Windfarm	YES – Within the 1km boundary for construction related effects. YES - Within the geographical boundary (4km boundary) for operational stage visual effects relating to the Telecom Relay Pole and the UWF Replacement Forestry. No inter-visibility with Mountphilips Substation.
	Project No.7: Garracummer Windfarm	The Garracummer Windfarm turbines are located c.4.4km to the southwest of the Telecom Relay Pole (UWF Related Works).

REFERENCE DOCUMENTS

Sensitive Aspect	Other Projects or Activities	Location of Other Projects or Activities within the Cumulative Geographical Boundary
	Project No.15: Foilnaman Mast	This existing mast is located within the development area of the consented Upperchurch Windfarm c.0.2km from the Telecom Relay Pole (UWF Related Works) and within 4km of the UWF Replacement Forestry.
	Project No.16: Cummermore Communication Pole	This existing pole is located in the 3.7km from the Telecom Relay Pole (UWF Related Works).
	Project No.17: Ballynahinch Mast	This existing mast is located c. 3.8km north of the Mountphilips Substation (UWF Grid Connection).
	Project Nos.33, 34 (Activities): Forestry, Agriculture	Predominant landuses in the area.
Visual Amenity	Project 4: Castlewaller Windfarm	YES – within the geographical boundary (1km boundary) for construction related effects. NO - for operational stage visual effects, no inter-visibility between this windfarm and the Mountphilips Substation or the Telecom Relay Pole or the UWF Replacement Forestry).
	Project No.5: Milestone Windfarm	YES – Within the 1km boundary for construction related effects. YES - Within the geographical boundary (4km boundary) for operational stage visual effects relating to the Telecom Relay Pole and the UWF Replacement Forestry. No inter-visibility with Mountphilips Substation.
	Project No.7: Garracummer Windfarm	The Garracummer Windfarm turbines are located c.4.4km to the southwest of the Telecom Relay Pole (UWF Related Works).
	Project No.15: Foilnaman Mast	This existing mast is located within the development area of the consented Upperchurch Windfarm c.0.2km from the Telecom Relay Pole (UWF Related Works) and within 4km of the UWF Replacement Forestry.
	Project No.16: Cummermore Communication Pole	This existing pole is located in the 3.7km from the Telecom Relay Pole (UWF Related Works).
	Project No.17: Ballynahinch Mast	This existing mast is located c. 3.8km north of the Mountphilips Substation (UWF Grid Connection).
	Project Nos.33, 34 (Activities): Forestry, Agriculture	Predominant landuses in the area.

As per Table 75, the time-frame boundary is the construction and operational stages.

Table 75: Other Projects or Activities within the time-frame boundary

Sensitive Aspect	Other Projects or Activities	Is the Other Project or Activity within the Time Frame Boundary? – YES/NO YES - Within the Timeframe Boundary – brought forward to the Cumulative Conceptual Site Model, or NO - Not within the time-frame boundary – scoped out
Landscape Character	Project 4: Castlewaller Windfarm	NO: Outside the timeframe boundary for cumulative construction stage effects – the construction of Castlewaller

Sensitive Aspect	**Other Projects or Activities**	**Is the Other Project or Activity within the Time Frame Boundary? – YES/NO** YES - Within the Timeframe Boundary – brought forward to the Cumulative Conceptual Site Model, or NO - Not within the time-frame boundary – scoped out
		Windfarm will not overlap the construction stage of the UWF Grid Connection.
	Project No.5: Milestone Windfarm	NO: Outside the timeframe boundary for cumulative construction stage effects – will be an existing windfarm by the time of the construction stage of the UWF Grid Connection. YES – re operational stage visibility effects
	Project No.7: Garracummer Windfarm	NO: Outside the timeframe boundary for cumulative construction stage effects – existing windfarm. YES – re operational stage visibility effects
	Project No.15: Foilnaman Mast	NO: Outside the timeframe boundary for cumulative construction stage effects – existing mast. YES – re operational stage visibility effects
	Project No.16: Cummermore Communication Pole	NO: Outside the timeframe boundary for cumulative construction stage effects – existing communication pole. YES – re operational stage visibility effects
	Project No.17: Ballynahinch Mast	NO: Outside the timeframe boundary for cumulative construction stage effects – existing communication pole. YES – re operational stage visibility effects
	Project Nos.33, 34 (Activities): Forestry, Agriculture	YES
Visual Amenity	Project 4: Castlewaller Windfarm	NO: Outside the timeframe boundary for cumulative construction stage effects – the construction of Castlewaller Windfarm will not overlap the construction stage of the UWF Grid Connection.
	Project No.5: Milestone Windfarm	NO: Outside the timeframe boundary for cumulative construction stage effects – will be an existing windfarm by the time of the construction stage of the UWF Grid Connection. YES – re operational stage visibility effects
	Project No.7: Garracummer Windfarm	NO: Outside the timeframe boundary for cumulative construction stage effects – existing windfarm. YES – re operational stage visibility effects
	Project No.15: Foilnaman Mast	NO: Outside the timeframe boundary for cumulative construction stage effects – existing mast. YES – re operational stage visibility effects
	Project No.16: Cummermore Communication Pole	NO: Outside the timeframe boundary for cumulative construction stage effects – existing communication pole. YES – re operational stage visibility effects
	Project No.17: Ballynahinch Mast	NO: Outside the timeframe boundary for cumulative construction stage effects – existing communication pole. YES – re operational stage visibility effects
	Project Nos.33, 34 (Activities): Forestry, Agriculture	YES

REFERENCE DOCUMENTS

All 8 Other Projects or Activities are located within both the geographical and time-frame boundaries of the Cumulative Evaluation Study Area, and therefore scoped using a conceptual site model exercise, see Table 76.

Table 76: LANDSCAPE Conceptual Site Model for Cumulative Impacts

Source(s) of Impacts	Pathway(s)	Receptor	Whole UWF Project Impacts	Scoping for likely cumulative effects					
				Project No.5: Milestone Windfarm	Project No.7: Garracummer Windfarm	Project No.15: Foilnaman Mast	Project No.16: Cummer-more Comm-unication Pole	Project No.17: Ballynahinch Mast	Project No. 33: Forestry Project No. 34: Agriculture
Landscape Character									
Excavation of soil, and vegetation removal or planting	Physical land cover disturbance / change	Landscape Character	Alteration or division of land cover and vegetation patterns	Scoped Out No potential for construction works to coincide-outside the timeframe boundary	Scoped Out - Existing windfarm	Scoped Out - Existing structure	Scoped Out - Existing structure	Scoped Out - Existing structure	Yes – Scoped In
Construction related activities	Visibility	Landscape Character	Intensification of activity causing a reduction in tranquillity		Scoped Out: The Mountphilips Substation will not be inter-visible with Garracummer Windfarm. Cumulative visual effects are limited the Telecom Relay Pole and the Consented Windfarm with the Garracummer Windfarm. It is considered that due to its small scale, that the addition of the Telecoms Relay Pole to the viewsheds from cultural heritage sites will not cause any additional measurable visual effect to that already evaluated (and considered acceptable) for the Consented Windfarm - which included a cumulative evaluation of the visual impact of the Upperchurch Windfarm together with the Garracummer Windfarm			Scoped Out – no inter-visibility with the Mountphilips Substation	Yes – Scoped In
Presence of above ground structures Permanent alterations to landform & vegetation patterns	Visibility	Landscape Character	Intensification of built development and reduction in the integrity of rural landscape patterns	Yes – Scoped In		Yes – Scoped In	Yes – Scoped In		Scoped out - These are the prevailing and characteristic land uses in this area (they are the baseline rather than other sources of impact)

REFERENCE DOCUMENTS

Source(s) of Impacts	Pathway(s)	Receptor	Whole UWF Project Impacts	Scoping for likely cumulative effects					
				Project No.5: Milestone Windfarm	Project No.7: Garracummer Windfarm	Project No.15: Foilnaman Mast	Project No.16: Cummer-more Comm-unication Pole	Project No.17: Ballynahinch Mast	Project No. 33: Forestry Project No. 34: Agriculture
Visual Amenity									
Construction related activities	Visibility	Visual Amenity	Intensification of activity causing visual disharmony, clutter or complexity	Scoped Out No potential for construction works to coincide-outside the timeframe boundary	Scoped Out - Existing windfarm	Scoped Out - Existing structure	Scoped Out - Existing structure	Scoped Out - Existing structure	Yes – Scoped In
Presence of above ground structures and Permanent alterations to landform and vegetation patterns	Visibility	Visual Amenity	Addition of new features or loss of existing features causing visual disharmony, clutter or complexity	Yes – Scoped In	Scoped Out: The Mountphilips Substation will not be inter-visible with Garracummer Windfarm. Cumulative visual effects are limited the Telecom Relay Pole and the Consented Windfarm with the Garracummer Windfarm. It is considered that due to its small scale, that the addition of the Telecoms Relay Pole to the viewsheds from cultural heritage sites will not cause any additional measurable visual effect to that already evaluated (and considered acceptable) for the Consented Windfarm - which included a cumulative evaluation of the visual impact of the Upperchurch Windfarm together with the Garracummer Windfarm	Yes – Scoped In	Yes – Scoped In	Scoped Out – no inter-visibility with the Mountphilips Substation	Scoped out - These are the prevailing and characteristic land uses in this area (they are the baseline rather than other sources of impact)

REFERENCE DOCUMENTS

REFERENCE DOCUMENTS

Table 77: Summary of Other Projects or Activities Scoped In for Cumulative Evaluation in the Main Report

Sensitive Aspect	Other Project or Activity (scoped in for the evaluation of cumulative impacts in VolC2: EIAR Main Report – Ch.17: LANDSCAPE)
Landscape Character	Project No.5: Milestone Windfarm Project No.15: Foilnaman Mast Project No.16: Cummermore Communication Pole Project No.33: Forestry (Activity) Project No.34: Agriculture (Activity)
Visual Amenity	Project No.5: Milestone Windfarm Project No.15: Foilnaman Mast Project No.16: Cummermore Communication Pole Project No.33: Forestry (Activity) Project No.34: Agriculture (Activity)

REFERENCE DOCUMENTS

A2.3.3 List of Projects or Activities Scoped-Out from the EIAR

The following Projects have been scoped out from all Environmental Factor topics:

Other Project or Activity Map ID	Industry	Name
6	Energy	Cappawhite Windfarm
7	Energy	Garracummer Windfarm
8	Energy	Glencarbry Windfarm
9	Energy	Glenough Windfarm
10	Energy	Hollyford Windfarm
11	Energy	Knockastanna Windfarm
12	Energy	Gortnahalla Turbine
13	Energy	Killuragh Digester Plant
14	Quarry	Rear Cross Quarry
17	Utilities	Ballinahinch Mast
18	Utilities	Knockmeale Mast
19	Utilities	Newport Regional Water Supply
20	Utilities	Thurles Regional Water Treatment Works
21	Utilities	Waste Management Facility, Thurles
22	Manufactoring	Dew Valley Foods Plant
23	Industrial	Industrial / warehouse Units, Thurles
25	Residential	Housing Development Doon
26	Residential	Housing Developments, Annacotty
27	Sport	Sports Club Works – Sean Treacy GAA
28	Sport	Newport Rugby Club
29	Agriculture	Agriculture - Milking Parlour
30	Agriculture	Agriculture – Milking Parlour
31	Agriculture	Agriculture - Pig Unit
32	Agriculture	Agricultural sheds and stores

A2.3.4 Projects Scoped-In for further evaluation in the EIAR

Table 78: List of Other Projects or Activities included in the Environmental Factor Cumulative Evaluation

Other Project or Activity *(These projects are identified on Figure CE 3.2: Other Projects or Activities Scoped In for Evaluation in the Environmental Factor Topic Chapters and are identified using a number on the mapping)*	**Population**	**Human Health**	**Biodiversity**	**Land**	**Soils**	**Water**	**Air**	**Climate**	**Built Services**	**Roads & Traffic**	**Cultural Heritage**	**Landscape**
Existing Killonan to Nenagh 110kV Overhead Line (Project 1)							■		-			
Existing Shannonbridge – Killonan 220kV Overhead Line (Project 2)							■					
Consented Bunkimalta Windfarm (Project 3)	■	■	■			■						
Consented Castlewaller Windfarm (Project 4)			■		■		■					
Existing Milestone Windfarm (Project 5) (includes Inchivara Windfarm and currently under construction)											■	■
Operational Windfarms in the Republic of Ireland								■				
Existing Communication Structures - Foilnaman Mast (Project 15) - Cummermore Communications Pole (Project 16)											■	■
Consented Project – Newport Distributor Road, Newport (Project 24)			■			■						
Activity – Forestry (Project 33)			■									■
Activity – Agriculture (Project 34)			■									■
Activity –Turf-cutting (Project 35)			■		■							

Appendix 2.4: Completed EIA Report CHECKLIST

Appendix 2.4 Section	Section Heading	Relevant EIA Report
A2.4.1	SECTION 1: DESCRIPTION OF THE PROJECT	UWF Replacement Forestry
A2.4.2	DESCRIPTION OF ENVIRONMENTAL FACTORS LIKELY TO BE AFFECTED BY THE PROJECT	
A2.4.3	SECTION 3: DESCRIPTION OF THE LIKELY SIGNIFICANT EFFECTS OF THE PROJECT	
A2.4.4	SECTION 4: CONSIDERATION OF ALTERNATIVES	
A2.4.5	SECTION 5 DESCRIPTION OF MITIGATION	
A2.4.6	SECTION 6 DESCRIPTION OF MONITORING MEASURES	
A2.4.7	SECTION 7: QUALITY	

The EIA Report Checklist was used by the EIA Co-ordinator to review the EIA Report during its preparation.

The EIA Report Checklist form was sourced in PART C –EIA REPORT CHECKLIST EC (2017) Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU). At http://ec.europa.eu/environment/eia/pdf/EIA_guidance_EIA_report_final.pdf from Page 92.

The EIA Report Checklist can also be used by the competent authority to carry out an examination of the submitted EIA Report.

The EIA Report Checklist is organised into seven sections covering the information that should be contained in an EIA Report per;

- Description of the Project;
- Description of the environment likely to be affected by the Project (including Baseline);
- Description of the Project's likely significant effects;
- Alternatives;
- Description of Mitigation and Compensation Measures;
- Description of Monitoring Measures;
- Quality (presentation, Non-Technical Summary, and quality of experts).

REFERENCE DOCUMENTS

This appendix comprises the completed review of the final EIA Report for the UWF Replacement Forestry.

A2.4 PART C: EIA REPORT REVIEW CHECKLIST

A2.4.1 SECTION 1: DESCRIPTION OF THE PROJECT

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C. Section S. Figure F. Appendix A.*
The Objectives and Physical Characteristics of the Project					
1.1	Are the Project's objectives and the need for the Project explained?	Y	Y	None	Volume C2: EIAR Main Report C.1 Introduction – S. 1.5.1 C.5 Description of Development - S. 5.2.1
1.2	Is the programme for the Project's implementation described, detailing the estimated length of time (e.g. expected start and finish dates) for construction, operation, and decommissioning? (this should include any phases of different activity within the main phases of the Project, extraction phases for mining operations for example)	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development - S.5.3
1.3	Have all of the Project's main characteristics been described? (for assistance, see the Checklist in Part C of the Scoping Guidance Document in this series)	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development - S.5.2
1.4	Has the location of each Project component been identified, using maps, plans, and diagrams as necessary?	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development - S.5.1 Volume C3: EIAR Figures F.RF 1.1, F.RF 5.1 & F.CE 1.1
1.5	Is the layout of the site (or sites) occupied by the Project described? (including ground levels, buildings, other physical structures, underground works, coastal works, storage facilities, water features, planting, access corridors, boundaries)	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S.5.2 Volume C3: EIAR Figures F.RF 5.2 Layout F.RF 5.3 Entrance
1.6	For linear Projects, have the route corridor, the vertical, and horizontal alignment and any tunnelling and earthworks been described?	N/A			

REFERENCE DOCUMENTS

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C. Section S. Figure F. Appendix A.*
1.7	Have the activities involved in the construction of the Project (including land-use requirements) all been described?	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S.5.3.1, S5.3.1.1 to S5.3.1.4, & 5.4.1.1 (land use)
1.8	Have the activities involved in the Project's operation (including land-use requirements and demolition works) all been described?	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S.5.3.2.1 to S5.3.2.7; & 5.4.1.1 (land use)
1.9	Have the activities involved in decommissioning the Project all been described? (e.g. closure, dismantling, demolition, clearance, site restoration, site re-use, etc.)	N	Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S.5.3.3
1.10	Have any additional services, required for the Project, been described? (e.g. transport access, water, sewerage, waste disposal, electricity, telecoms)	N/A			
1.11	Are any developments likely to occur as a consequence of the Project identified? (e.g. new housing, roads, water or sewerage infrastructure, aggregate extraction)	N/A			
1.12	Have any existing activities that will alter or cease as a consequence of the Project been identified?	N/A			
1.13	Have any other existing or planned developments, with which the Project could have cumulative effects, been identified?	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S.5.6
1.14	Has the 'whole Project' been described, e.g. including all associated/ancillary works?	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S.5.6.1, 5.6.2
1.15	Are any activities described as part of the 'whole Project' excluded from the assessment? Are such exclusions justified? (e.g. associated/ancillary activities can be included either because they fall under the scope of the Directive (Annex I or II) or because they can be considered as an integral part of the main infrastructure works using the 'centre of gravity test'. Guidance on associated and ancillary works has been published by the European Commission in an Interpretation Line available at: http://ec.europa.eu/environment/eia/pdf/Note%20-%20Interpretation%20of%20Directive%2085-337-EEC.pdf)	N			All parts of the 'whole project' are included in the EIA Report.
The Size of the Project					
1.16	Is the area of land occupied by each of the permanent Project components quantified and shown on a scaled map? (including any associated access arrangements, landscaping, and ancillary facilities)	Y	Y	None	Volume B: Planning Drawings Volume C2: EIAR Main Report

REFERENCE DOCUMENTS

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
					C.5 Description of Development – S. 5.4.1.1
1.17	Has the area of land required temporarily for construction been quantified and mapped?	N/A			
1.18	Is the reinstatement and after-use of the land occupied temporarily for the operation of the Project described? (e.g. land used for mining or quarrying)	N/A			
1.19	Has the size of any structures or other works developed as part of the Project been identified? (e.g. the floor area and height of buildings, the size of excavations, the area or height of planting, the height of structures such as embankments, bridges or chimneys, the flow or depth of water)	Y	Y	None	Volume B: Planning Drawings C. 5 Description of Development – S.5.2.3 Volume C3: EIAR Figures Figures RF 5.2
1.20	Has the form and appearance of any structures or other works developed as part of the Project been described? (e.g. the type, finish, and colour of materials, the architectural design of buildings and structures, plant species, ground surfaces, etc.)	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S.5.2.3
1.21	For urban or similar development Projects, have the numbers and other characteristics of new populations or business communities been described?	N			Not an urban development
1.22	For Projects involving the displacement of people or businesses, have the numbers and other characteristics of those displaced been described?	N			No displacement of people or businesses
1.23	For new transport infrastructure or Projects that generate substantial traffic flows, has the type, volume, temporal pattern, and geographical distribution of new traffic generated or diverted as a consequence of the Project been described?	N			No new transport infrastructure and substantial volumes of traffic will not be generated by the project
Production Processes and Resources Used					
1.24	Have all of the processes involved in operating the Project been described? (e.g. manufacturing or engineering processes, primary raw material production, agricultural or forestry production methods, extraction processes)	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S.5.3.2 and S.5.4
1.25	Have the types and quantities of outputs produced by the Project been described? (these could be primary or manufactured products, goods such as power or water or services such as homes, transport, retailing, recreation, education, municipal services (water, waste, etc.)	N			No products associated with the project
1.26	Have the types and quantities of resources, e.g. natural resources (including water, land, soil, and biodiversity), raw materials, and energy needed for construction and operation been discussed?	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S. 5.4

REFERENCE DOCUMENTS

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
1.27	Have the environmental implications of the sourcing of resources, e.g. natural resources (including water, land, soil and biodiversity), raw materials, and energy been discussed?	Y	Y	None	Volume C2: EIAR Main Report C.8: Biodiversity (S.8.2), Ch9: Land (Section 9.2) C.10: Soil (S.10.2), Ch.11: Water (Section 11.2)
1.28	Have efficiency and sustainability in use of resources, e.g. natural resources (including water, land, soil and biodiversity), raw materials, and energy been discussed?	Y	Y	None	Volume C2: EIAR Main Report C.4 Alternatives Considered
1.29	Have any hazardous materials used, stored, handled or produced by the Project been identified and quantified? during construction; during operation; during decommissioning.	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S. 5.4.3
1.30	Has the transportation of resources, including natural resources (including water, land, soil, and biodiversity) and raw materials to the Project site, and the number of traffic movements involved, been discussed? (including road, rail and sea transport) during construction; during operation; during decommissioning.	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S.5.3.1.8, Volume C2: EIAR Main Report C.15 Environmental Factor: Material Assets (Roads)
1.31	Have the Project's environmentally relevant social and socio-economic implications been discussed? Will employment be created or lost as a result of the Project, for instance? during construction; during operation; during decommissioning.	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S.5.3.1.2 and S.5.3.2.2 C.6: Environmental Factor: Population – S.6.2 Local Economy.
1.32	Have the access arrangements and the number of traffic movements involved in bringing workers and visitors to the Project been estimated? during construction; during operation; during decommissioning.	N/A			
1.33	Has the housing and provision of services for any temporary or permanent employees for the Project been discussed? (this is relevant for Projects that require the migration of a substantial, new workforce into the area, either for construction or in the long term)	N/A			

REFERENCE DOCUMENTS

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
Residues and Emissions					
1.34	Have the types and quantities of solid waste generated by the Project been identified? (including the construction or demolition of wastes, surplus spoil, process wastes, by-products, surplus or reject products, hazardous wastes, household or commercial wastes, agricultural or forestry wastes, site clean-up wastes, mining wastes, decommissioning wastes) during construction; during operation; during decommissioning.	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S. 5.4.3
1.35	Have the composition and toxicity, or other hazards from all solid wastes produced by the Project, been discussed?	N			No solid waste will be produced.
1.36	Have the methods for collecting, storing, treating, transporting, and finally disposing of these solid wastes been described?	N/A			
1.37	Have the locations for the final disposal of all solid wastes been discussed, in consideration with the Waste Management Plan(s) concerned?	N/A			
1.38	Have the types and quantities of liquid effluents generated by the Project been identified? (including site drainage and run-off, process wastes, cooling water, treated effluents, sewage) during construction; during operation; during decommissioning.	N/A			
1.39	Have the composition and toxicity or other hazards of all liquid effluents produced by the Project been discussed?	N/A			
1.40	Have the methods for collecting, storing, treating, transporting, and finally disposing of these liquid effluents been described?	N/A			
1.41	Have the locations for the final disposal of all liquid effluents been discussed?	N/A			
1.42	Have the types and quantities of gaseous and particulate emissions generated by the Project identified? (including process emissions, fugitive emissions, emissions from combustion of fossil fuels in stationary and mobile plant, emissions from traffic, dust from materials handling, odours) during construction; during operation;	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S. 5.4.2

REFERENCE DOCUMENTS

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
	during decommissioning.				
1.43	Have the composition and toxicity or other hazards of all of emissions to the air produced by the Project been discussed?	Y	Y	None	Volume C2: EIAR Main Report C.12: Air
1.44	Have the methods for collecting, treating, and finally discharging these emissions to the air described?	N			No toxic emissions to air
1.45	Have the locations for discharge of all emissions to the air been identified and have the characteristics of the discharges been identified? (e.g. height of stack, velocity and temperature of release)	N			No toxic emissions to air
1.46	Have the methods for capturing, treating, and storing these emissions been described?	N			No toxic emissions to air
1.47	Have the locations for the storage of all emissions identified and the characteristics of the storage unit been identified? (e.g. type of storage unit, storing capacity, methods used)	N			No storage required
1.48	Has the potential for resource recovery from wastes and residues been discussed? (including re-use, recycling or energy recovery from solid waste and liquid effluents)	N			
1.49	Have any sources of noise, heat, light or electromagnetic radiation from the Project been identified and quantified? (including equipment, processes, construction works, traffic, lighting, etc.)	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S. 5.4.2 Ch.12: Air
1.50	Have the methods for estimating the quantities and composition of all residues and the emissions identified and any difficulties discussed?	Y	Y	None	Volume C2: EIAR Main Report Ch.12: Air – S.12.1.8
1.51	Have the uncertainty attached to estimates of residues and emissions been discussed?	Y	Y	None	Volume C2: EIAR Main Report Ch.12: Air – S.12.1.7
Risks of Accidents and Hazards					
1.52	Have any of the risks associated with the Project been discussed? - risks from handling of hazardous materials; - risks from spills fire, explosion; - risks of traffic accidents; - risks from breakdown or failure of processes or facilities; - risks from exposure of the Project to natural disasters (earthquake, flood, landslide etc.).	 Y Y N N Y	 Y Y Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S. 5.5
1.53	Have the measures to prevent and respond to accidents and abnormal events been described? (preventive measures, training, contingency plans, emergency plans, early-warning systems, etc.)	N/A			

REFERENCE DOCUMENTS

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
1.54	Is there a plan in place detailing the preparedness for an emergency (e.g. suggested as part of the EIA Report's Mitigation Measures)?	N/A			
1.55	Is this plan in line with other EU legislation requirements, in particular Article 12 of the Seveso Directive (Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances) which refers to emergency plans?	N/A			
Other Questions on Description of the Project					

REFERENCE DOCUMENTS

A2.4.2 SECTION 2: DESCRIPTION OF ENVIRONMENTAL FACTORS LIKELY TO BE AFFECTED BY THE PROJECT

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
Baseline: Aspects of the Environment					
2.1	Have the existing land uses on the land to be occupied by the Project and the surrounding area described and are any people living on or using the land been identified? (including residential, commercial, industrial, agricultural, recreational, and amenity land uses and any buildings, structures or other property)	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development -S.5.4.1.1 C.9 Land – S.9.1
2.2	Have the topography, geology and soils of the land to be occupied by the Project and the surrounding area been described?	Y	Y	None	Volume C2: EIAR Main Report C.10 Soils – S. 10.1, S.10.2
2.3	Have any significant features of the topography or geology of the area been described and are the conditions and use of soils been described? (including soil quality stability and erosion, agricultural use and agricultural land quality)	Y	Y	None	Volume C2: EIAR Main Report C.9 Land – S.9.1.3, 9.1.4, S.9.2 C.10 Soils – S.10.1.3, 10.1.4, Sensitive Aspect Evaluation Sections from S.10.2
2.4	Has the biodiversity of the land/sea to be affected by the Project and the surrounding area been described and illustrated on appropriate maps?	Y	Y	None	Volume C2: EIAR Main Report C.8 Biodiversity – S.8.1.3, 8.1.4, Sensitive Aspect Evaluation Sections from S.8.2 Volume C3: EIAR Figures Figures for Chapter 8 – F.RF 8.1 to RF 8.11
2.5	Have the species (including their populations and habitats), and the habitat types that may be affected by the Project been described? Particular attention should be paid to any species and habitats protected under the Habitats and Birds Directives (Directives 92/43/EEC and 2009/147/EC).	Y	Y	None	Volume C2: EIAR Main Report C.8 Biodiversity – S.8.1.3, 8.1.4, Sensitive Aspect Evaluation Sections from S.8.2 Volume C3: EIAR Figures Figures for Chapter 8 – F.RF 8.2 to RF 8.3
2.6	Have the Natura 2000 sites that may be affected by the Project been described?	Y	Y	None	Volume C2: EIAR Main Report Volume E: Natura Impact Statement

REFERENCE DOCUMENTS

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
2.7	Has the water environment of the area been described? (including reference to any River Basin Management Plans/Programme of Measures under the WFD, running and static surface waters, groundwaters, estuaries, coastal waters and the sea and including run off and drainage). N.B. not relevant if water environment will not be affected by the Project	Y	Y	None	Volume C2: EIAR Main Report C.11 Water – S.11.1.3, 11.1.4, Sensitive Aspect Evaluation Sections from S.11.2 Volume C3: EIAR Figures Figures for Chapter 11 – F.RF 11.2 to F. RF 11.8
2.8	Have the hydrology, water quality, and use of any water resources that may be affected by the Project been described? (including any River Basin Management Plans/Programme of Measures under the WFD, use for water supply, fisheries, angling, bathing, amenity, navigation, effluent disposal)	Y	Y	None	Above
2.9	Have local climatic and meteorological conditions in the area been described? (N.B. not relevant if the atmospheric environment will not be affected by the Project)	N			Local atmospheric environment not effected. Effects on Climate nationally is evaluated in Chapter 13: Climate.
2.10	Has existing air quality in the area been described, including, where relevant, limit values set out by Directives 2008/50/EC and 2004/107/EC as well as relevant Programmes adopted under this legislation? (N.B. not relevant if the ambient air will not be affected by the Project)	Y	Y	None	Volume C2: EIAR Main Report C.12 Air – S. 12.1.3, 12.1.4, Sensitive Aspect Evaluation Sections from S.12.2
2.11	Has the existing noise climate been described, including, where relevant, reference to noise maps and actions plans set out by the Environmental Noise Directive (2002/49/EU)? (N.B. not relevant if acoustic environment will not be affected by the Project)	Y	Y	None	Volume C2: EIAR Main Report C.12 Air – S. 12.1.3, 12.1.4, Sensitive Aspect Evaluation Sections from S.12.2
2.12	Has the existing situation regarding light, heat, and electromagnetic radiation been described? (N.B. not relevant if these characteristics of the environment will not be affected by the Project)	N/A			
2.13	Have any material assets in the area that may be affected by the Project been described? (including buildings, other structures, mineral resources, water resources)	Y	Y	None	Volume C2: EIAR Main Report C.14 Built Services – S. 14.1.3, 14.1.4, Sensitive Aspect Evaluation Sections from S.14.2 C.15 Roads – S.15.1.3, 15.1.4, Sensitive Aspect Evaluation Sections from 15.2 C.16 Cultural Heritage – S.16.1.3, 16.1.4, Sensitive Aspect Evaluation Sections from S.16.2

REFERENCE DOCUMENTS

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
					Volume C3: EIAR Figures Figures for Chapter 14; Chapter 15 and Chapter 16
2.14	Have any locations or features of archaeological, historic, architectural or other community or cultural importance in the area that may be affected by the Project been described, including any designated or protected sites?	Y	Y	None	Volume C2: EIAR Main Report C.16 Cultural Heritage – S.16.1.3, 16.1.4, Sensitive Aspect Evaluation Sections from S.16.2 Volume C3: EIAR Figures Figures for Chapter 16: F.16.2 to 16.5
2.15	Has the landscape or townscape of the area that may be affected by the Project been described, including any designated or protected landscapes and any important views or viewpoints?	Y	Y	None	Volume C2: EIAR Main Report C.17 Landscape – S.17.1.3, 17.1.4, Sensitive Aspect Evaluation Sections from S.17.2 Volume C3: EIAR Figures Figure RF17.2 to RF 17.3
2.16	Have the demographic, social and socioeconomic conditions (e.g. employment) in the area been described?	Y	Y	None	Volume C2: EIAR Main Report C.6 Population – S.6.1.3, 6.1.4, Sensitive Aspect Evaluation Sections from S.6.2 Volume C4: EIAR Appendices – App 6.1
2.17	Have any future changes in any of the above aspects of the environment that may occur in the absence of the Project, been described? (the so-called Dynamic Baseline)	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters - C.6 to 17 S. X.2 Sensitive Aspect Evaluation Sections
Data Collection and Methods					
2.18	Has the study area been defined widely enough to include all of the areas likely to be significantly affected by the Project?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters - C.6 to 17 Sensitive Aspect Evaluation Sections from S.6.2 Volume C3: EIAR Figures Figures illustrating the Study Areas where relevant

REFERENCE DOCUMENTS

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
2.19	Have all relevant national and local authorities been contacted to collect information on the Baseline environment?	Y	Y	None	Volume C2: EIAR Main Report C.3 Consultation Scoping Volume C4: EIAR Appendix – App 3.1
2.20	Have all the sources of data and information from existing databases, free services, and other relevant environmental assessments been investigated?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters - C.6 to 17 S. X.1.7 – Sources of Baseline Information
2.21	Have sources of data and information on the Existing environment been adequately referenced?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters - C.6 to 17 S. X.1.7 – Sources of Baseline Information Reference list at the end of each Topic Chapter
2.22	Is justification provided about which particular existing datasets was (were) were relied upon, as opposed to others?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters - C.6 to 17 S.X.1.7.1 – Certainty and Sufficiency of Information Provided
2.23	Where data collection has been undertaken to characterise the Baseline environment, have the methods used, any difficulties encountered, and any uncertainties been the data described?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters - C.6 to 17 S.X.1.7.1 – Certainty and Sufficiency of Information Provided S.X.1.8 Methodology for Evaluating Effects
2.2	Were the methods used appropriate for the purpose?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters - C.6 to 17 S.X.1.7.1 – Certainty and Sufficiency of Information Provided S.X.1.8 Methodology for Evaluating Effects
2.25	Have the methods used to predict the impact of the Project on climate changes been described? (if relevant)	Y	Y	None	Volume C2: EIAR Main Report C.13 Climate – S.13.1.8
2.26	Have the methods used to predict climate change's impact on the Project been described?	N			No effects to the project expected.
2.27	Is the uncertainty attached to the climate change evolution predictions discussed? (if relevant)	N			No effects to the project expected.

REFERENCE DOCUMENTS

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
2.28	Did you consider life cycle assessment of the Project to describe the Project's impact on climate change? (if relevant)	Y	Y	None	Volume C2: EIAR Main Report C.13 Climate – S.13.1.7
2.29	Have any important gaps in the data on the existing environment/ evolution prediction been identified (e.g. climate change), and the means used to deal with these gaps during the assessment, been explained?	N			No important gaps in data
2.30	Where data collection would be required to adequately characterise the Baseline environment, but they have not been practicable for any reason, are the reasons explained and have proposals been set out for the surveys to be undertaken at a later stage?	N			All data collected to enable adequate characterisation of the baseline environment
Other Questions on the Description of the Environment					

REFERENCE DOCUMENTS

A2.4.3 SECTION 3: DESCRIPTION OF THE LIKELY SIGNIFICANT EFFECTS OF THE PROJECT

No.	Review Question	Relevant?	Adequately Addressed	What further information is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C. Section S. Figure F. Appendix A.*
Scoping of Effects					
3.1	Has the process by which the scope of the information for the EIA Report defined been described? (for assistance, see the Scoping Guidance Document in this series)	Y	Y	None	Volume C2: EIAR Main Report C.2 The EIA Report Process - S.2.3: Scoping for Content and Extent of the EIA Report
3.2	Is it evident that a systematic approach to Scoping has been adopted?	Y	Y	None	Volume C2: EIAR Main Report C.2 The EIA Report Process - S.2.3: Scoping for Content and Extent of the EIA Report Environmental Topic Chapters - C.6 to 17 S.X.1.3 Sensitive Aspects Included, X.1.4: Sensitive Aspects Excluded (and rationale)
3.3	Was consultation carried out during Scoping?	Y	Y	None	Volume C2: EIAR Main Report C.2 The EIA Report Process - S.2.3: Scoping for Content and Extent of the EIA Report C3: Consultation Scoping Volume C4: EIAR Appendix - A.3.1, A 3.2 and A3.3
3.4	Have the comments and views of consultees been presented?	Y	Y	None	Volume C2: EIAR Main Report C.3 Consultation Scoping – S.3.1, 3.2, 3.3 Volume C4: EIAR Appendix - A.3.1 and A 3.2
Prediction of Direct Effects					
3.5	Have the direct, primary effects on land uses, people, and property been described and, where appropriate, quantified?	Y	Y	None	Volume C2: EIAR Main Report Sensitive Aspect Evaluation Sections from S.X.2 C.6 Population – from S6.2 C.7 Human Health – from S7.2 C.9 Land – from S9.2 C.12 Air – from S12.2 C.14 Built Services – from S14.2

REFERENCE DOCUMENTS

No.	Review Question	Relevant?	Adequately Addressed	What further information is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
					C.15 Roads – from S15.2
3.6	Have the direct, primary effects on geological features and characteristics of soils been described and, where appropriate, quantified?	Y	Y	None	Volume C2: EIAR Main Report C.10 Soils – Sensitive Aspect Evaluation Sections from S.10.2
3.7	Have the direct, primary effects on biodiversity been described and, where appropriate, quantified? (if relevant, are references made to Natura 2000 sites? (Directive 2009/147/EC and Directive 92/43/EEC))	Y	Y	None	Volume C2: EIAR Main Report C.8 Biodiversity – Sensitive Aspect Evaluation Sections from S. 8.2 and Vol.E Natura Impact Statement
3.8	Have the direct, primary effects on the hydrology and water quality of water features been described and, where appropriate, quantified?	Y	Y	None	Volume C2: EIAR Main Report C.11 Water – Sensitive Aspect Evaluation Sections from S. 11.2
3.9	Have the direct, primary effects on uses of the water environment been described and, where appropriate, quantified? (if relevant, are references made for River Basin Management Plans/Programmes of Measures under the WFD (2000/60/EC))	Y	Y	None	Volume C2: EIAR Main Report C.8 Biodiversity – Sensitive Aspect Evaluation Sections from S. 8.2 C.11 Water – Sensitive Aspect Evaluation Sections from S. 11.2
3.10	Have the direct, primary effects on air quality been described and, where appropriate, quantified? (if relevant, are references made to Air Quality Plans under Directives 2008/50/EC and 2004/107/EC))	Y	Y	None	Volume C2: EIAR Main Report C.12 Air – Sensitive Aspect Evaluation Sections from S.12.2 Volume C4: EIAR Appendices – A12.1
3.11	Have the direct, primary effects on climate change been described and, where appropriate, quantified?	Y	Y	None	Volume C2: EIAR Main Report C.13 Climate – Sensitive Aspect Evaluation Sections from S.13.2
3.12	Have the direct, primary effects on the acoustic environment (noise or vibration) been described and, where appropriate, quantified? (if relevant, are references made to Action Plans/Programme under the Environmental Noise Directive (2002/49/EU))	N/A			
3.13	Have the direct, primary effects on heat, light or electromagnetic radiation been described and, where appropriate, quantified?	N/A			

No.	Review Question	Relevant?	Adequately Addressed	What further information is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
3.14	Have the direct, primary effects on material assets and depletion of natural resources (e.g. fossil fuels, minerals) been described?	Y	Y	None	Volume C2: EIAR Main Report C.8 Biodiversity C.9 Land C.10 Soils C.14 Material Assets - Built Services C.15 Material Assets - Roads Sensitive Aspect Evaluation Section from S.X.2
3.15	Have the direct, primary effects on locations or features of cultural importance been described?	Y	Y	None	Volume C2: EIAR Main Report C.16 Cultural Heritage – Sensitive Aspect Evaluation Sections from S.16.2
3.16	Have the direct, primary effects on the quality of the landscape and on views and viewpoints been described and, where appropriate, illustrated?	Y	Y	None	Volume C2: EIAR Main Report C.17 Landscape – Sensitive Aspect Evaluation Sections from S.17.2
3.17	Have the direct, primary effects on environmentally relevant demography, social, and socio-economic condition in the area been described and, where appropriate, quantified?	Y	Y	None	Volume C2: EIAR Main Report C.6 Population – Sensitive Aspect Evaluation Sections from S.6.2
3.18	Have the secondary effects on any of the environment's aspects, above, caused by primary effects on other aspects been described and, where appropriate, quantified? (e.g. effects on biodiversity, including species and habitats protected under Directives 92/43/EEC and 2009/147/EC caused by soil, air or water pollution or noise; effects on uses of water caused by changes in hydrology or water quality; effects on archaeological remains caused by desiccation of soils)	Y	Y	None	Volume C2: EIAR Main Report C.18: Interaction of the Environmental Factors
3.19	Have the temporary, short term effects caused only during construction or during time limited phases of Project operation or decommissioning been described? (e.g. emissions produced during the construction)	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters C6 to C17 Sensitive Aspect Evaluation Sections from S.X.2
3.20	Have the permanent effects on the environment caused by construction, operation or decommissioning of the Project been described?	Y	Y	None	Volume C2: EIAR Main Report Sensitive Aspect Evaluation Sections from S.X.2
3.21	Have the long-term effects on the environment, caused over the lifetime of Project operations or caused by build-up of pollutants, in the environment been described?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters C6 to C17

No.	Review Question	Relevant?	Adequately Addressed	What further information is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
					Sensitive Aspect Evaluation Sections from S.X.2
3.22	Have the effects that could result from accidents, abnormal events or exposure of the Project to natural or man-made disasters been described and, where appropriate, quantified?	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development S.5.5
3.23	Have the effects on the environment, caused by activities ancillary to the main Project, been described? (ancillary activities are part of the Project but usually take place at a distance from the main Project location e.g. construction of access routes and infrastructure, traffic movements, sourcing of aggregates or other raw materials, generation and supply of power, disposal of effluents or wastes). For further guidance and explanation concerning ancillary works assessment see http://ec.europa.eu/environment/eia/pdf/Note%20-%20Interpretation%20of%20Directive%2085-337-EEC.pdf	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters C6 to C17 Sensitive Aspect Evaluation Sections from S.X.2 (cumulative evaluation section of the impact tables)
Impact Assessment Methods					
3.24	Have the indirect effects on the environment caused by consequential development been described? (consequential development is other Projects, not part of the main Project, stimulated to take place by implementation of the Project e.g. to provide new goods or services needed for the Project, to house new populations or businesses stimulated by the Project)	N			No consequential or secondary developments are known at present.
3.25	Have the cumulative effects on the environment of the Project, together with other existing or planned developments in the locality, been described? (different future scenarios including a worst-case scenario should be described, as well as the effects on both climate change and biodiversity). For further guidance on the assessment of cumulative impacts see *http://europa.eu. environment/eia/eia-support* *http://ec.europa.eu/environment/archives/eia/eia-studiesand-reports/pdf/guidel.pdf).*	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters C6 to C17 Sensitive Aspect Evaluation Sections from S.X.2 (cumulative evaluation section of the impact tables)
3.26	Have the transboundary effects on the environment of the Project, either during construction or operation, been described?	N			No transboundary effects
3.27	Have the geographic extent, duration, frequency, reversibility, and probability of occurrence of each effect been identified as being appropriate?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters C6 to C17 Sensitive Aspect Evaluation Sections from S.X.2 (cumulative evaluation section of the impact tables)

No.	Review Question	Relevant?	Adequately Addressed	What further information is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
Prediction of Effects on Human Health and Sustainable Development issues					
3.28	Have the primary and secondary effects on human health and welfare described and, where appropriate, been quantified? (e.g. health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups).	Y	Y	None	Volume C2: EIAR Main Report C.7 Human Health – Sensitive Aspect Evaluation Sections from S.7.2
3.29	Have the impacts on issues such as biodiversity, marine environment, global climate change, use of natural resources and disaster risk been discussed, where appropriate?	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development – S.5.5 Ch.8: Biodiversity Ch.10: Soils Ch.13: Climate
Evaluation of the Significance of Effects					
3.30	Is the significance or importance of each predicted effect clearly explained with reference to legal or policy requirements, other standards, and the number, importance, and sensitivity of people, resources or other receptors affected?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters C6 to C17 Sensitive Aspect Evaluation Sections from S.X.2 (cumulative evaluation section of the impact tables)
3.31	Where effects are evaluated against legal standards or requirements, have the appropriate local, national or international standards been used and has relevant guidance followed?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters - C.6 to 17 S.X.1.8 – Methodology for Evaluating Effects
3.32	Have the positive effects on the environment been described, as well as the negative effects?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters C6 to C17 Sensitive Aspect Evaluation Sections from S.X.2 (cumulative evaluation section of the impact tables) C.6 Population C.7 Human Health C.8 Biodiversity

REFERENCE DOCUMENTS

No.	Review Question	Relevant?	Adequately Addressed	What further information is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
					C.13 Climate
Impact Assessment Methods					
3.33	Have the methods used to predict the effects described, and the reasons for their choice, any difficulties encountered, and uncertainties in the results been discussed?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters - C.6 to 17 S.X.1.7.1 – Certainty and Sufficiency of Information Provided S.X.1.8 – Methodology for Evaluating Effects
3.34	Where there is uncertainty about the precise details of the Project, and its impact on the environment/climate change, have worst-case predictions been described?	N			No uncertainty about the precise details of the project
3.35	Where there have been difficulties in compiling the data needed to predict/evaluate effects, have these difficulties been acknowledged and their implications for the results been discussed?	N			No difficulties in compiling data
3.36	Has the basis for evaluating the significance or importance of impacts been described clearly?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters - C.6 to 17 S.X.1.8 – Methodology for Evaluating Effects Sensitive Aspect Evaluation Sections from S.X.2 (cumulative evaluation section of the impact tables)
3.37	Have the impacts been described on the basis that all Mitigation Measures proposed have been implemented i.e. have the residual impacts been described?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters C6 to C17 Sensitive Aspect Evaluation Sections from S.X.2 (cumulative evaluation section of the impact tables) S.X.X.5 Mitigation Measures for Impacts, S.X.X.6 Evaluation of Residual Impacts
3.38	Is the level of treatment of each effect appropriate to its importance for the Development Consent decision? Does the discussion focus on the key issues and avoid irrelevant or unnecessary information?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters - C.6 to 17 (S.X.1.3 Sensitive Aspects Included, X.1.4: Sensitive Aspects Excluded (and rationale)

REFERENCE DOCUMENTS

No.	Review Question	Relevant?	Adequately Addressed	What further information is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
					Use of Appendices – See Volume C4: EIAR Appendices
3.39	Is appropriate emphasis given to the most severe, adverse effects of the Project with lesser emphasis given to less significant effects?	Y	Y	None	
Other Questions relevant to Description of Effects					
	Have, with a view to avoiding duplication of assessments, the available results of other relevant assessments under Union or national legislation, in preparing the environmental impact assessment report been taken into account? If so, how was this done?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters - C.6 to 17 Section X.1.7 Sources of baseline Information, includes the 2013/2014 EIA and AA reporting for the Consented Upperchurch Windfarm. C8 Biodiversity refers to the Natura Impact Statement in Volume E.

REFERENCE DOCUMENTS

A2.4.4 SECTION 4: CONSIDERATION OF ALTERNATIVES

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
4.1	Have the different Alternatives suggested during Scoping been considered and assessed, and if not has justification been provided?	Y	Y	None	Volume C2: EIAR Main Report C.4 Alternatives Considered
4.2	Have the Developer and practitioners, who are preparing the EIA Report, identified and assessed additional Alternatives (to the ones suggested during Scoping)?	Y	Y	None	Volume C2: EIAR Main Report C.4 Alternatives Considered
4.3	Have the process by which the Project was developed been described and are the Alternatives to the design of the Project considered during this process been described? (for assistance, see also the guidance on types of Alternatives which may be relevant in the Scoping Guidance Document)	Y	Y	None	Volume C2: EIAR Main Report C.4 Alternatives Considered - S.4.2
4.4	Have the Alternatives to the design considered during this process been described? (for assistance, see also the guidance on types of alternatives which may be relevant in the Scoping Guidance Document in this series)	Y	Y	None	Volume C2: EIAR Main Report C.4 Alternatives Considered S.4.2
4.5	Have the Alternatives to technology been considered during this process? (for assistance, see also the guidance on types of Alternatives which may be relevant in the Scoping Guidance Document in this series)	N/A			
4.6	Have the Alternatives to the location considered during this process been described? (for assistance, see also the guidance on types of alternatives which may be relevant in the Scoping Guidance Document in this series)	Y	Y	None	Volume C2: EIAR Main Report C.4 Alternatives Considered S.4.1
4.7	Have the Alternatives to the size considered during this process been described (for assistance, see also the guidance on types of alternatives which may be relevant in the Scoping Guidance Document in this series)	N/A			
4.8	Have the Alternatives to the scale considered during this process been described? (for assistance, see also the guidance on types of alternatives which may be relevant in the Scoping Guidance Document in this series)	N/A			
4.9	Has the Baseline situation in the 'do-nothing' scenario been described?	Y	Y	None	Volume C2: EIAR Main Report C.4 Alternatives Considered S.4.5 – 'Do Nothing' Alternative

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
4.10	Are the Alternatives realistic and genuine Alternatives to the Project? (i.e. feasible Project options that meet the objectives)	Y	Y	None	Only reasonable and genuine alternatives described in Ch.4 Alternatives Considered
4.11	Have the main reasons for choosing the proposed Project been provided, including an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects?	Y	Y	None	Volume C2: EIAR Main Report C.4 Alternatives Considered S. 4.2 to 4.4
4.12	Are the main environmental effects of the Alternatives compared to those of the proposed Project?	Y	Y	None	Volume C2: EIAR Main Report C.4 Alternatives Considered S. 4.2 to 4.4
4.13	Are Mitigation Measures considered in the assessment of Alternatives? (more on mitigation in section 5 below)	Y	Y	None	Volume C2: EIAR Main Report C.4 Alternatives Considered S. 4.4 Alternative Processes
Other Questions on Consideration of Alternatives					

REFERENCE DOCUMENTS

A2.4.5 SECTION 5 DESCRIPTION OF MITIGATION

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
5.1	Where there are significant adverse effects on any aspect of the environment, has the potential for the mitigation of these effects been discussed?	Y	Y	None	Volume C2: EIAR Main Report C.4 Alternatives Considered S. 4.2 to 4.4 C.5 Description of Development, S.5.2.4 Environmental Protection Measures designed into the UWF Replacement Forestry
5.2	Have the measures that the Developer has proposed to implement, in order to mitigate effects, been clearly described and is their effect on the magnitude and significance of impacts clearly explained?	Y	Y	None	Volume C2: EIAR Main Report C.4 Alternatives Considered S. 4.2 to 4.4 C.5 Description of Development S.5.2.4 Environmental Protection Measures designed into the UWF Replacement Forestry
5.3	Have any proposed mitigation strategy's negative effects been described?	N/A			
5.4	If the effect of Mitigation Measures on the magnitude and significance of impacts is uncertain, has this been explained?	N/A			No uncertainties regarding mitigation measures
5.5	Is it clear if the Developer has made a binding commitment to implement the mitigation proposed or acknowledged that the Mitigation Measures are just suggestions or recommendations?	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development S.5.2.4 Environmental Protection Measures (PD) designed into the UWF Replacement Forestry (PD 01 to PD15) Volume B: Planning Drawings – Environmental Protection Measures (where relevant) shown on the Drawings
5.6	Do the Mitigation Measures cover both the construction and operational phases of the Project?	Y	Y	None	Volume C2: EIAR Main Report C.5 Description of Development S.5.2.4 Environmental Protection Measures designed

REFERENCE DOCUMENTS

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
					into the UWF Replacement Forestry (PD 01 to PD15) (only construction stages required)
5.7	Have the Developer's reasons for choosing the proposed mitigation been explained?	Y	Y	None	Volume C2: EIAR Main Report C.4 Alternatives Considered – S.4.2 to 4.4
5.8	Have the responsibilities for the implementation of mitigation including roles, responsibilities, and resources been clearly defined?	Y	Y	None	Chapter 19: Monitoring Arrangements
5.9	Where the mitigation of significant adverse effects is not practicable, or where the Developer has chosen not to propose any mitigation, have the reasons for this been clearly explained?	N			No other potential or likely significant effects.
5.10	Is it evident that the practitioners developing the EIA Report and the Developer have considered the full range of possible approaches to mitigation, including measures to avoid, prevent or reduce and, where possible, offset impacts by alternative strategies or locations, changes to the Project design and layout, changes to methods and processes, 'end of pipe' treatment, changes to implementation plans and management practices, measures to repair or remedy impacts and measures to compensate impacts?	Y	Y	None	Volume C2: EIAR Main Report C.4 Alternatives Considered S. 4.2 to 4.4 C.5 Description of Development S.5.2.4 Environmental Protection Measures designed into the UWF Replacement Forestry. Environmental Topic Chapters - C.6 to 17 (S.X.X.3. Project Design Measures for 'Topic' cumulative information)
Other Questions on Mitigation					

REFERENCE DOCUMENTS

A2.4.6 SECTION 6 DESCRIPTION OF MONITORING MEASURES

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
6.1	Where adverse effects on any aspect of the environment are expected, has the potential for the monitoring of these effects been discussed?	Y	Y	None	Volume C2: EIAR Main Report C19: Monitoring Arrangements
6.2	Are the measures, which the Developer proposes implementing to monitor effects, clearly described and has their objective been clearly explained?	Y	Y	None	Volume C2: EIAR Main Report C19: Monitoring Arrangements
6.3	Is it clear whether the Developer has made a binding commitment to implement the proposed monitoring programme or that the Monitoring Measures are just suggestions or recommendations?	Y	Y	None	Volume C2: EIAR Main Report C19: Monitoring Arrangements
6.4	Have the Developer's reasons for choosing the monitoring programme proposed been explained?	Y	Y	None	Volume C2: EIAR Main Report C19: Monitoring Arrangements
6.5	Have the responsibilities for the implementation of monitoring, including roles, responsibilities, and resources been clearly defined?	Y	Y	None	Volume C2: EIAR Main Report C19: Monitoring Arrangements
6.6	Where monitoring of adverse effects is not practicable, or the Developer has chosen not to propose any Monitoring Measures, have the reasons for this been clearly explained?	N			Any adverse effects are monitored
6.7	Is it evident that the practitioners developing the EIA Report and the Developer have considered the full range of possible approaches to monitoring, including Monitoring Measures covering all existing environmental legal requirements, Monitoring Measures stemming from other legislation to avoid duplication, monitoring of Mitigation Measures (ensuring expected significant effects are mitigated as planned), Monitoring Measures capable of identifying important unforeseen effects?	Y	Y	None	Volume C2: EIAR Main Report C19: Monitoring Arrangements
6.8	Have arrangements been proposed to monitor and manage residual impacts?	Y	Y	None	Volume C2: EIAR Main Report C19: Monitoring Arrangements
Other Questions on Monitoring Measures					

REFERENCE DOCUMENTS

A2.4.7 SECTION 7: QUALITY

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
Quality of presentation					
7.1	Is the EIA Report available in one or more clearly defined documents?	Y	Y	None	Volume C2: EIAR Main Report C.1 Introduction S.1.4 – Table 1-1 Volume C1: EIAR Non-Technical Summary Volume C2: EIAR Main Report Volume C3: EIAR Figures Volume C4: EIAR Appendices Also available on www.upperchurchwindfarmgridconnection.ie
7.2	Is the document(s) logically organised and clearly structured, so that the reader can locate information easily?	Y	Y	None	Volume C2: EIAR Main Report C.2 The EIAR Process including Scoping – S.2.5 Presentation of the EIAR Report
7.3	Is there a table of contents at the beginning of the document(s)?	Y	Y	None	Beginning of each volume, and at the beginning of each Chapters
7.4	Is there a clear description of the process that has been followed?	Y	Y	None	Volume C2: EIAR Main Report C.2 The EIAR Process including Scoping S.2.1 to S.2.5
7.5	Is the presentation comprehensive but concise, avoiding irrelevant data and information?	Y	Y	None	Volume C2: EIAR Main Report C.2 The EIAR Process including Scoping – S.2.3 Scoping for Content and Extent. Use of Volume C4: EIAR Appendices
7.6	Does the presentation make effective use of tables, figures, maps, photographs, and other graphics?	Y	Y	None	Volume C3: EIAR Figures
7.7	Does the presentation make effective use of annexes or appendices to present detailed data that is not essential to understanding the main text?	Y	Y	None	Volume C4: EIAR Appendices
7.8	Are all analyses and conclusions adequately supported with data and evidence?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters C.6 to C.17 Sensitive Aspect Evaluation Sections from S.X.2

REFERENCE DOCUMENTS

No.	Review Question	Relevant?	Adequately Addressed	What further info is needed?	Relevant part of the EIA Report *Abbreviations: Chapter C.* *Section S.* *Figure F.* *Appendix A.*
7.9	Have all sources of data been properly referenced?	Y	Y	None	Volume C2: EIAR Main Report Environmental Topic Chapters C.6 to C.17 – S.X.1.7, List of References at the end of Topic Chapter. All cross referencing in red text
7.10	Has terminology been used consistently throughout the document(s)?	Y	Y	None	Yes, project naming and impact description uses consistent terms throughout the EIAR. Volume C2: EIAR Main Report C.2 The EIAR Process including Scoping – S.2.4: Descriptive Terminology Used in this EIA Report
7.11	Does it read as a single document, with cross referencing between sections used to help the reader navigate through the document(s)?	Y	Y	None	Checked in final review All cross referencing in red text All Topic chapters presented using the same structure and format. Colour codes used to distinguish sensitive receptors Side Tabs used to aid navigation through the document.
7.12	Is the presentation demonstrably fair and, as far as possible, impartial and objective?	Y	Y	None	Use of independent competent experts to evaluate all effects on the environment. Volume C2: EIAR Main Report C.2 The EIAR Process including Scoping – S.2.2.3 The Project Design Team and S.2.2.4: The EIA Report Team

Non-Technical Summary					
7.13	Does the EIA Report include a Non-Technical Summary?	Y	Y	None	Volume C1: EIAR Non-Technical Summary
7.14	Does the Summary provide a concise but comprehensive description of the Project, its environment, the effects of the Project on the environment, the proposed Mitigation Measures, and proposed monitoring arrangements?	Y	Y	None	Yes, concise but comprehensibly covers project, environment, effects, mitigation measures and monitoring arrangements.
7.15	Does the Summary highlight any significant uncertainties about the Project and its environmental effects?	N			No significant uncertainties
7.16	Does the Summary explain the Development Consent process for the Project and the EIA's role in this process?	Y	Y	None	Volume C1: EIAR Non-Technical Summary S.1.6 The proposed development as part of the Whole Upperchurch Windfarm Project S.2.1 Why is this EIA Report required
7.17	Does the Summary provide an overview of the approach to the assessment?	Y	Y	None	Volume C1: EIAR Non-Technical Summary C2 The EIA Report Process
7.18	Has the Summary been written in nontechnical language, avoiding technical terms, detailed data, and scientific discussion?	Y	Y	None	Yes, non-technical language and approach used throughout.
7.19	Would it be comprehensible to a lay-member of the public?	Y	Y	None	Yes, main objective of the Non-Technical Summary
Expertise					
7.20	Is the competency of experts, who are responsible for the preparation of the EIA Report, indicated or otherwise explained in the EIA Report?	Y	Y	None	Volume C2: EIAR Main Report C.2 The EIAR Process including Scoping – S.2.2.3 The Project Design Team and S.2.2.4: The EIA Report Team
7.21	Has the Developer complied with national or local legal requirements and practices for the selection of experts responsible for the preparation of the EIA Report?	Y	Y	None	Guidance on selection of experts from: ○ EC (2017) Guidance on the preparation of the Environmental Impact Assessment Report S.2.2 The competence of Expertise and Quality Control ○ Guidelines on the information to be contained in environmental impact assessment reports (EPA Draft August 2017) S.2.5 Competency of Experts
Other Questions on Quality of Presentation					
	Are Non-Technical Summary figures and mapping included with the text or form a separate volume, similar to V2 EIAR Main Report?				Non-Technical Summary figures are presented with the NTS.

REFERENCE DOCUMENTS

Appendix 3.1: Consultations with Statutory Bodies & Other Parties

Appendix 3.1 Document	Order of Documents	Relevant EIA Report
A3.1.1	Consultation Response from Kilkenny County Council	UWF Grid Connection UWF Related Works UWF Replacement Forestry

Comhairle Chontae Chill Chainnigh | Kilkenny County Council
Halla an Chontae, Sráid Eoin, Cill Chainnigh, R95 A39T. | County Hall, John Street, Kilkenny, R95 A39T.
Fónamh don Phobal - Caomhnú don Oidhreacht | Serving People – Preserving Heritage

5th July, 2017

Our Ref.IR 467

Julie Brett,
Ecopower Developments,
Zetec House,
Purcellsinch
IDA Business Park,
Kilkenny

Re.: Response to Scoping Document submitted on 6th June 2017 as part of pre-planning consultation process for Upperchurch Windfarm (UWF) Related Works

A Chara,

I refer to your correspondence of 6th June 2017 in regard to the above and wish to comment as follows:-

The applicant shall formally consult inter-alia the following bodies:

- National Parks and Wildlife Service of the Department of the Environment
- National Monuments Section of the Department of the Environment
- Inland Fisheries Ireland
- An Taisce

Kilkenny County Council's comments relate only to the development works located within the County Kilkenny administrative boundary; it is considered that as the substantive area of works are not located within County Kilkenny, that this Planning Authority is not deemed as the appropriate body to the overall and cumulative impacts of the complete development.

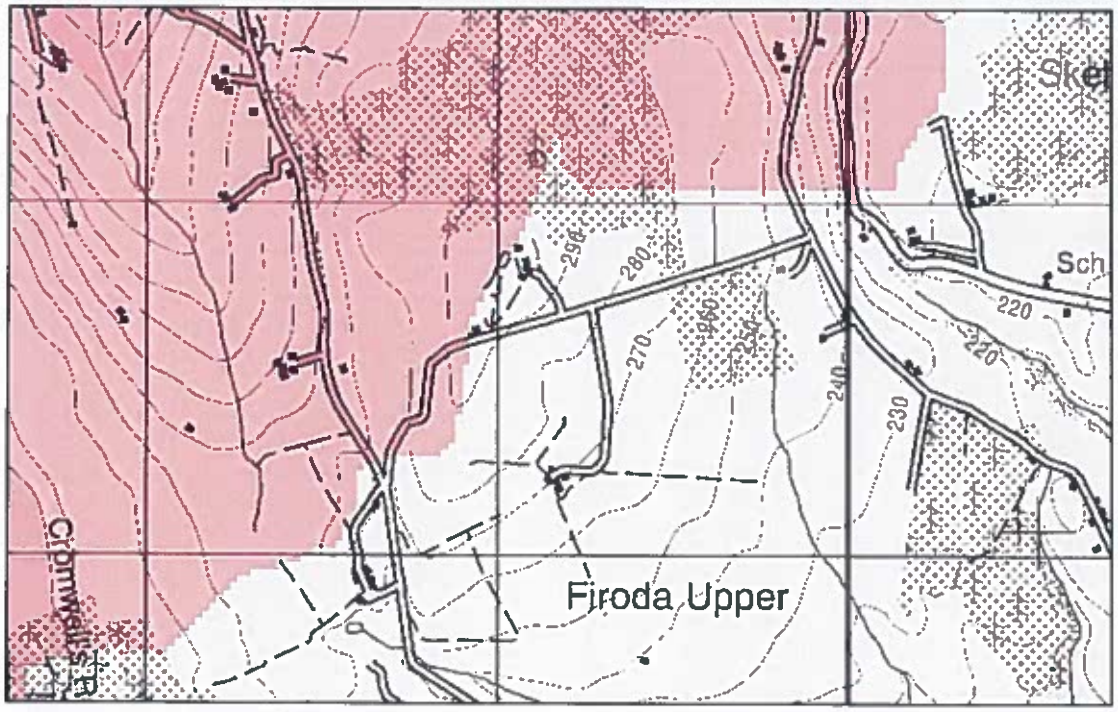
The Environment Section has advised as follows:

It would appear that the only aspect of the proposed development which would be likely to have any significant impact within Kilkenny County Council's functional area is the afforestation of lands at Firoda Wood, Firoda Upper. The woods would appear to be located within the protected catchment of the River Nore Freshwater Pearl Mussel – see sketch overleaf highlighting the extent of the catchment at the area of interest.

Freshwater Pearl Mussels are very sensitive to water pollution and in particular silt or sediment in the waters. This will need to be addressed as part of the Environmental Impact Assessment. It would appear that the location of the afforestation (being a compensatory measure for felling elsewhere) is somewhat discretionary. The assessment should in the

first instance consider alternative locations. Where other locations are not feasible, the assessment will need to assess the proposal in line with the Forestry Service document *Forestry and Freshwater Pearl Mussel Requirements – Site Assessment and Mitigation Measures.*

Apart from the above, the Environmental Impact Assessment should obviously comply with all statutory requirements under Environmental Impact Assessment legislation as well as having full regard to the EPA's general guidance on preparing Environmental Impact Statements.



Extent of River Nore Pearl Mussle Area Highlighted in Red

Additional Considerations:
The entrance to the lands at Firoda would need to be assessed fully as an entrance to serve a forestry land use, including adequate sightlines and would require planning permission.

Archaeology
It appears that there are two recorded monuments within the area proposed for planting:

- KK005-007 Enclosure
- KK005-006 Enclosure

Legislation:
Circular Letter PL 1/2017, dated 15th May 2017 *Implementation of Directive 2014/52/EU in the effects of certain public and private projects on the environment (EIA Directive) – Advice on Administrative Provisions in Advance of Transposition* requires that:
Where the screening for EIA has commenced prior to 16 May 2017 and is carried out in accordance with Directive 2011/92/EU, but the application for planning permission or other

development consent and accompanying EIS, where EIA is determined to be required, is submitted on or after 16 May 2017, the application will fall to be dealt with in accordance with Directive 2014/52/EU.

Therefore the applicant is advised to fully comply with the requirements of Directive 2014/52/EU on the effects of certain public and private projects on the Environment (EIA Directive) and any resulting amendments to the Planning and Development Act 2000 as amended and the Planning and Development Regulations 2001-2015 to provide for the transposition of the Directive into the Irish planning code. The applicants should also comply with any the requirements of the 'Guidelines for Planning Authorities and An Bord Pleanala on carrying out Environmental Impact Assessment' and any updates subsequent to the above Directive.

Is mise le meas,

Annette Fitzpatrick,
Administrative Officer,
Planning.

Appendix to Chapter 4: Consideration of Alternatives

No Appendices for Chapter 4

Appendix 5.1: Best Practice Measures

The data and descriptions in this appendix have informed Chapter 5: Description of Development (UWF Replacement Forestry) of the EIA Report. The information presented in this Appendix 5.1 is outlined below and the relevant element(s) of the Whole UWF Project are also identified.

Appendix Heading	Relevant Individual Project Element
Best Practice Measures	UWF Replacement Forestry

UWF REPLACEMENT FORESTRY

Appendix 5.1
Best Practice Measures

ECOPOWER

February 2018

Table 1: List of Best Practice Measures for the UWF Replacement Forestry

BPM No.	BPM Title
RF-BPM-01	Monitoring of non-native invasive plant species
RF-BPM-02	Management of general non-native invasive species
RF-BPM-03	Best practice methods to ensure the protection of Viviparous lizard (*Lacerta (Zootoca) vivipara*

RF-BPM-01 **Best Practice Measure**	
Title:	**Monitoring of non-native invasive plant species**
RF-BPM-01	**Monitoring of non-native invasive plant species.**
Environmental Commitment	
Monitoring of non-native invasive plant species.	
Work Sections/Locations	
Afforestation lands	
Responsibility of	**Role/Duty**
Project Ecologist	• Implementation of surveying • Must be aware of the best practice guidance listed in References below.
Avoid adverse effects of the introduction and spread of non-native invasive species	
• Monitoring in the form of confirmatory surveys will be carried out by the Project Ecologist to identify any infestations within or close to the afforestation lands. • Surveying will be carried out annually and this survey information will be used to inform any maintenance activities. Surveys will focus always on the works area plus 7m. Surveying of municipal areas – i.e. public road haulage routes, will not be included in surveys. • The results of this will be made available to the Promoter, and any bodies as agreed at the consenting stage. • The measures included in the Invasive Species Management Plan will be implemented.	
References	
• National Roads Authority (2010). Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority, Dublin. • Appendix 5.2: Invasive Species Management Plan.	

RF-BPM-02 **Best Practice Measure**

Title:	**Management of general non-native invasive species**

Environmental Commitment

To avoid the introduction, establishment and spread of non-native species to the afforestation lands during the planting and growth stages.

Work Sections/Locations

All sections

Responsibility of	**Role/Duty**
Construction Manager	• Requiring supply companies to clean delivery vehicles before entering the site to gain access to works area • Obtaining and keeping a record of delivery companies cleaning of vehicles
Project Ecologist	• Carrying out spot checks on flagmen during cleaning of delivery/site vehicles. • Must be aware of the best practice guidance listed in References below.

Inspection and Cleaning of Delivery Vehicles

- Prior to arrival on site, the planting contractor's vehicles and equipment will be thoroughly cleaned and then dried using high-pressure steam cleaning, with water > 65 degrees C, in addition to the removal of all vegetative material. Items difficult to soak/spray will be wiped down with a suitable disinfectant (e.g. Virkon Aquatic).
- Evidence that all machinery has been cleaned will be required to be on file for review by the statutory authorities. Given that Crayfish Plague has affected rivers in the area recently (2017) the level of evidence required of the Contractor will be actual registration plates of vehicles onsite and a register of when, how and where each of these were cleaned before they arrived on site.
- The planting personnel will be responsible for inspecting and cleaning site/delivery vehicles both entering and exiting the site, and will receive training from the Project Ecologist in the correct techniques.
- The planting crew will be equipped with a 'disinfection box'. This will contain Virkon Aquatic or another proprietary disinfectant, a spraying mechanism, cloths or sponges, a scrubbing brush and protective gloves. Protective gloves will be worn when using any disinfectant solution.
- Visual inspections will be carried out on all machinery and equipment for evidence of attached plant or animal material, or adherent mud or debris. Any attached or adherent material will be removed before entering or leaving the site of operation, securely stored away from traffic for removal to the waste storage area in the Temporary Compound at the end of the work day.
- No removed material or run-off will be allowed to enter a water body of any sort.
- Following cleaning, all equipment and vehicles will be visually inspected to ensure that all adherent material and debris has been removed manually.
- Records of supplies and cleaning of site/delivery vehicles will be kept by Project Ecologist.
- Spot checks on the adequacy of cleaning will be carried out by the Project Ecologist.

Measures at or in watercourses

- Residual water in any containers/vessels used in works near watercourses will be flushed with disinfectant (Virkon Aquatic) onto grass. A drying period of at least 24 hours will be adhered to.
- Any observations of mass mortality of Crayfish will be reported to the relevant authorities within 1 hour of evidence being found.

Measures for white toothed shrew

• Consignments of organic materials, such as hedging material, will be inspected for presence of Greater White-toothed Shrew.
References
• http://www.fisheriesireland.ie/Research/invasive-species.html • http://www.nonnativespecies.org/checkcleandry/

RF-BPM-03 **Best Practice Measure**	
Title:	**Best practice methods to ensure the protection of Viviparous lizard (*Lacerta (Zootoca) vivipara*)**
Environmental Commitment	
To avoid effects on Viviparous lizard (*Lacerta (Zootoca) vivipara*) during the planting works.	
Work Sections/Locations	
All sections	
Responsibility of	**Role/Duty**
Project Ecologist	• Monitor the planting works to ensure that mitigation measures are strictly adhered to. • Must be aware of the best practice guidance listed in References below.

To avoid effects on Viviparous lizard.

- As Viviparous lizards are widespread in Ireland and can be found in a range of habitat types such as in bog, heath, the margins of coniferous woodlands, in addition to being common in a range of grassland habitats, particularly those not subject to heavy grazing pressure, a spot-check confirmatory survey by the Project Ecologist will be required within these habitats prior to the commencement of the planting stage to confirm the presence/absence of individuals.
- Capture and relocation operations for this species can be extremely labour-intensive and in most cases the most efficient approach is to cut down and rake-off vegetation during warm weather, with the intention of displacing the resident lizards prior to earthworks or other activities that could result in their incidental mortality (NRA, 2009). Whether or not reptile-proof fencing is then required to exclude the animals will need to be reviewed on a location-specific basis by the Project Ecologist.
- Note: The proposed development is beyond the geographical range of the non-native Slow-worm (Anguis fragilis), thus this species does not require mitigation within this Project.

References

- NRA (2009). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. National Roads Authority, Dublin.

Appendix 5.2: Invasive Species Management Plan

The data and descriptions in this appendix have informed Chapter 5: Description of Development (UWF Replacement Forestry) of the EIA Report. The information presented in this Appendix 5.2 is outlined below and the relevant element(s) of the Whole UWF Project are also identified.

Appendix Heading	Relevant Individual Project Element
Invasive Species Management Plan	UWF Replacement Forestry UWF Related Works UWF Grid Connection

REFERENCE DOCUMENTS

UWF REPLACEMENT FORESTRY

Appendix 5.2
Invasive Species Management Plan

ECOPOWER

February 2018

REFERENCE DOCUMENTS

INVASIVE SPECIES MANAGEMENT PLAN

UPPERCHURCH WHOLE WIND FARM PROJECT, COUNTY TIPPERARY



January 2018

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Document Title: Invasive Species Management Plan

Project Location: Co. Tipperary

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V1.0	Final	12/01/18	HW	FG/CC

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ACRONYMS

EA	Environment Agency (UK)
EPA	Environmental Protection Agency (Ireland)
HK	Himalayan knotweed (*Persicaria wallichii*)
JKW	Japanese knotweed (*Fallopia japonica*)
NPWS	National Parks and Wildlife Service
RH	Rhododendron (*Rhododendron ponticum*)

EXECUTIVE SUMMARY

This report has been prepared by Mr. Howard Williams, Principal Ecologist with Inis Environmental Consultants Ltd. Dr. Frances Giaquinto, ecologist, PhD botanist and non-native invasive plant species specialist completed the site assessments and compiled the scientific information relating to each infestation.

This report documents site assessments of seven locations where Japanese knotweed or Himalayan knotweed infestations were recorded by Inis field ecologists during habitat assessments as part of their work on the Upperchurch Whole UWF Project. As part of the Whole UWF Project, UWF Grid Connection, UWF Related Works and UWF Ancillary Activities are planned near each of the seven invasive plant infestation locations.

The purpose of the site assessments was to estimate the severity of each infestation and, where appropriate, to make recommendations on the most appropriate measures to contain and make safe each infestation.

The site assessments were conducted by Dr. Giaquinto on the 24th September 2017 and 1st October 2017. Physical site, ecological and invasive species data were gathered by Dr. Giaquinto on those dates. On the 11th October 2017, Mr. Howard Williams and Mr. Peter O'Connor (GIS Specialist) from Inis Environmental Consultants Ltd visited each location (7 No.) to measure the exact extent of each infestation to allow for accurate GIS mapping of each infestation.

None of the 7 No. infestations that were identified are within 7 metres of the works and as such pose no risk of spreading through mechanical means. Notwithstanding this point, biosecurity measures are proposed throughout the construction phase. None of the 7 No. infestations need to be removed or destroyed to enable successful completion of the project.

It is important to note that no bio security measures guarantee containment, and the effectiveness of any measure will be largely dependent on the standards with which it is executed, combined with skilled monitoring. As such, an invasive species specialist will monitor each infestation location during all critical stages of construction works.

INTRODUCTION

During fieldwork on the Upperchurch Whole Windfarm Project, Inis field ecologists identified seven invasive plant infestations.

Invasive non-native species are any animal or plant introduced (deliberately or accidently) by human activity to an area in which they do not naturally occur. Invasive non-native species (INNS), sometimes referred to as 'invasive alien species', are those non-native species that have the ability to spread rapidly and become dominant in an area or ecosystem, causing adverse ecological, environmental and economic impacts. Examples of the negative effects caused by invasive non-native species include economic cost, structural damage, environmental degradation, aesthetic degradation, biodiversity loss, loss of land function and access restrictions.

Inis appointed Dr. Frances Giaquinto, an invasive plant specialist, to visit each invasive plant infestation location and complete an assessment of each infestation. The site assessments by Dr. Giaquinto confirmed the presence of Japanese knotweed (*Fallopia japonica*) at six locations and Himalayan knotweed (*Persicaria wallichii*) at one location. Rhododendron (*Rhododendron ponticum*) was recorded at one location. Both *R. ponticum* and Himalayan knotweed are regulated for control under the same legislation[1] as Japanese knotweed.

This report provides a description of the infestations at the seven locations with particular reference to notable site and infestation features. Recommended containment measures are presented, which are:

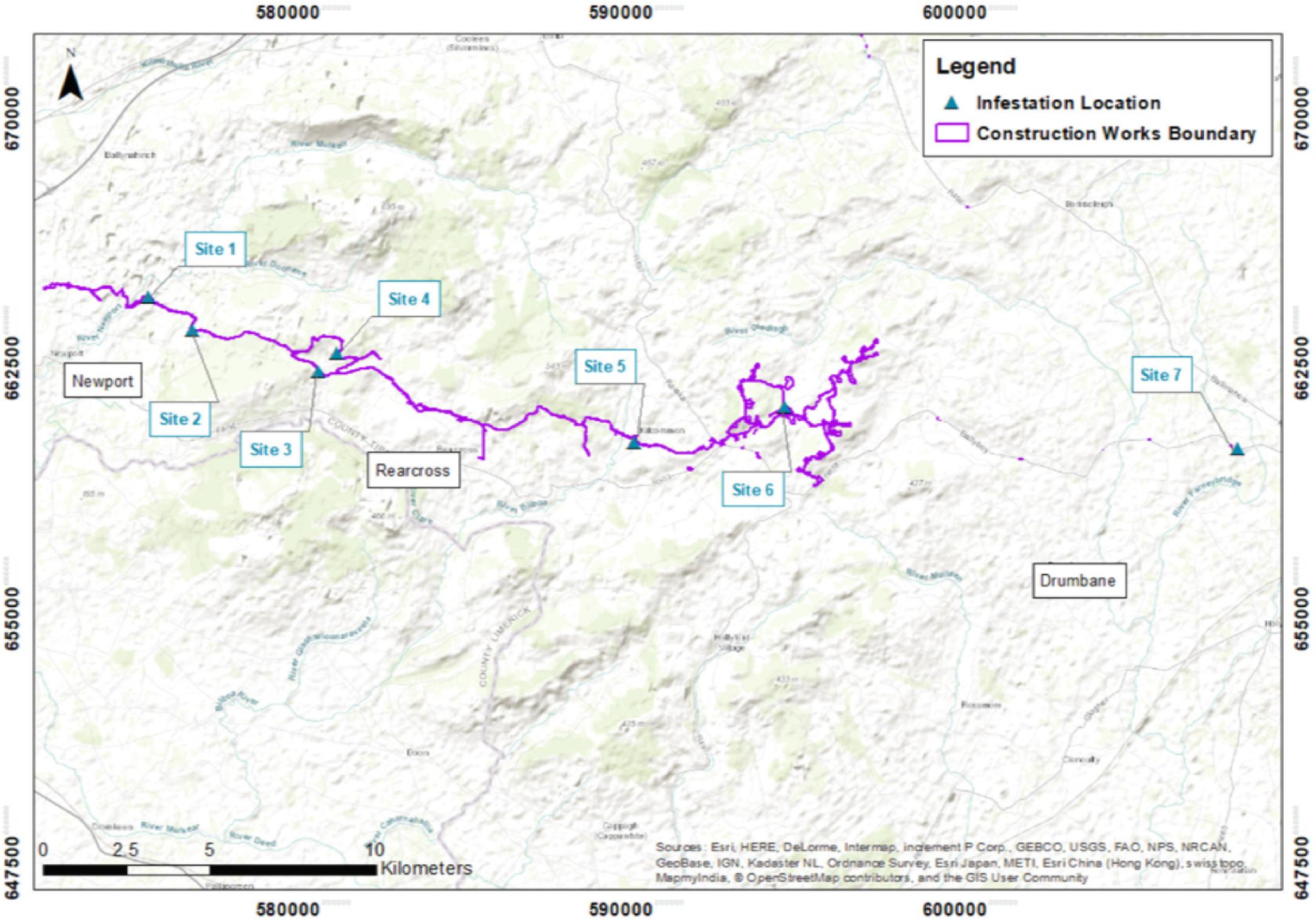
- most appropriate to each location;
- most likely to be effective;
- maintains compliance with EU and national legislation and guidelines pertaining to the control of invasive non-native plant species

[1] Relevant legislation includes: *European Communities (Birds and Natural Habitats) Regulations, 2011, S.I. No. 477*, which makes it an offence to *knowingly disperse or allow to escape* plant species listed in the Regulations.

DATA COLLECTED

At each location the following data (See Appendix R3) were gathered to assess the extent and severity of the 7 No. infestations:

- square meterage;
- height;
- flowering;
- mean size and number of basal crowns;
- mean number of canes per stand;
- mean thickness of canes;
- overall health and vigour;
- evidence of physical disturbance;
- and evidence of previous chemical treatment or other attempts at control or eradication.



REFERENCE DOCUMENTS
APPENDIX 5.2

RESULTS

INFESTATION NUMBER	**Site 1**
INFESTATION TYPE	Himalayan knotweed (*Persicaria wallichii*)
INFESTATION LOCATION	575348 E 664200 N (ITM)
DATES OF SITE ASSESSMENT	24/09/17, 01/10/17, & 11/10/17

DESCRIPTION

Himalayan knotweed was recorded on the roadway verge, 12 metres from the proposed construction area (See Plate 1). Knotweed shoots were dispersed 26 m along the bank and extended 3 to 4 m across the width of the bank, with varying density (See Location Map below and Plates 1-3). The infestation extends into the adjoining field which was grazed with horses on the day of the site assessment; there was evidence that the knotweed had been grazed extensively (Plate 3).
No other invasive non-native species were recorded at this location.

RECOMMENDATION TO MAKE SAFE

- Implement appropriate biosecurity measures as per Appendix R2.
- The infestation's outer edge is 12 metres from the proposed construction area and, as such, poses no to low risk. The knotweed extends into the field and has been grazed extensively by horses.
- Heras fencing or similar should be erected around the infestation with a 3 metre buffer zone to ensure the ground beneath and around the infestation is left undisturbed.

LOCATION MAP – SITE 1

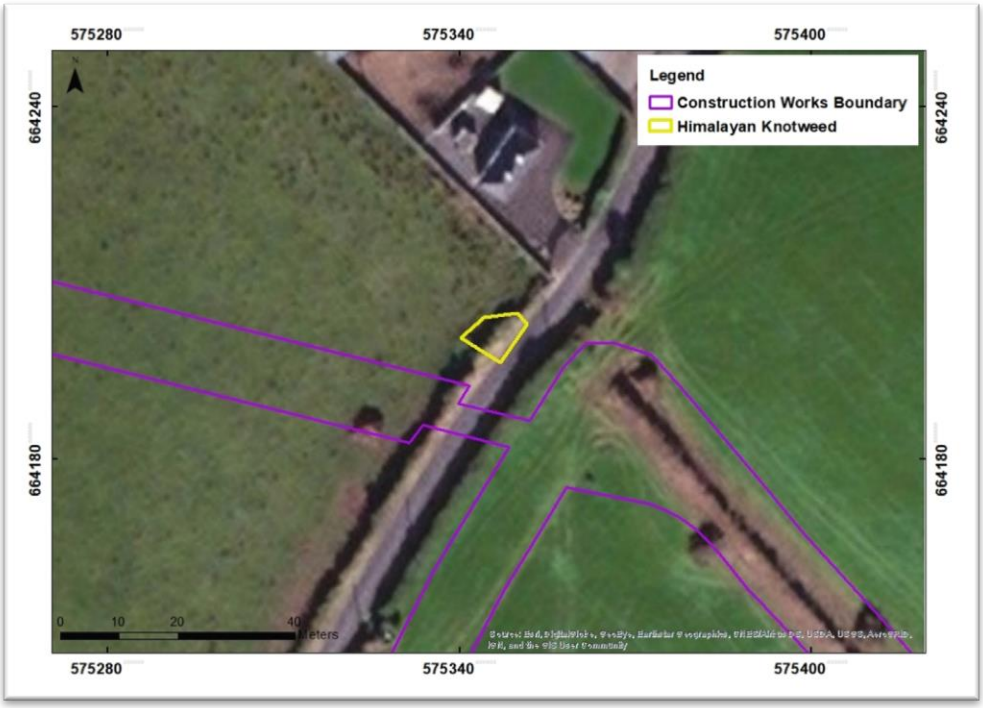


Plate 1 Location of Infestation Number: Site 1.

INFESTATION NUMBER	**Site 2**
INFESTATION TYPE	Japanese knotweed (*Fallopia japonica*)
INFESTATION LOCATION	676650 E 663221 N (ITM)
DATES OF SITE ASSESSMENT	24/09/17, 01/10/17, & 11/10/17

DESCRIPTION

An actively growing mature Japanese knotweed infestation was recorded at the edge of the forestry access road (See Location Map below and Plate 2), 11 metres from the construction area. The infestation appeared to be isolated in this location and is located well in from the edge of the road; no other infestations were recorded in the vicinity. There was minimal vegetation growing around the infestation, and there was no evidence of previous attempts at treatment.
No other invasive non-native species were recorded at this location.

RECOMMENDATION

- Implement appropriate biosecurity measures as per Appendix R2.
- The infestation's outer edge is 11 metres from the proposed construction area and, as such, poses no risk.
- Heras fencing or similar should be erected around the infestation with a 3 metre buffer zone to ensure the ground beneath and around the infestation is left undisturbed during construction.

LOCATION MAP- SITE 2

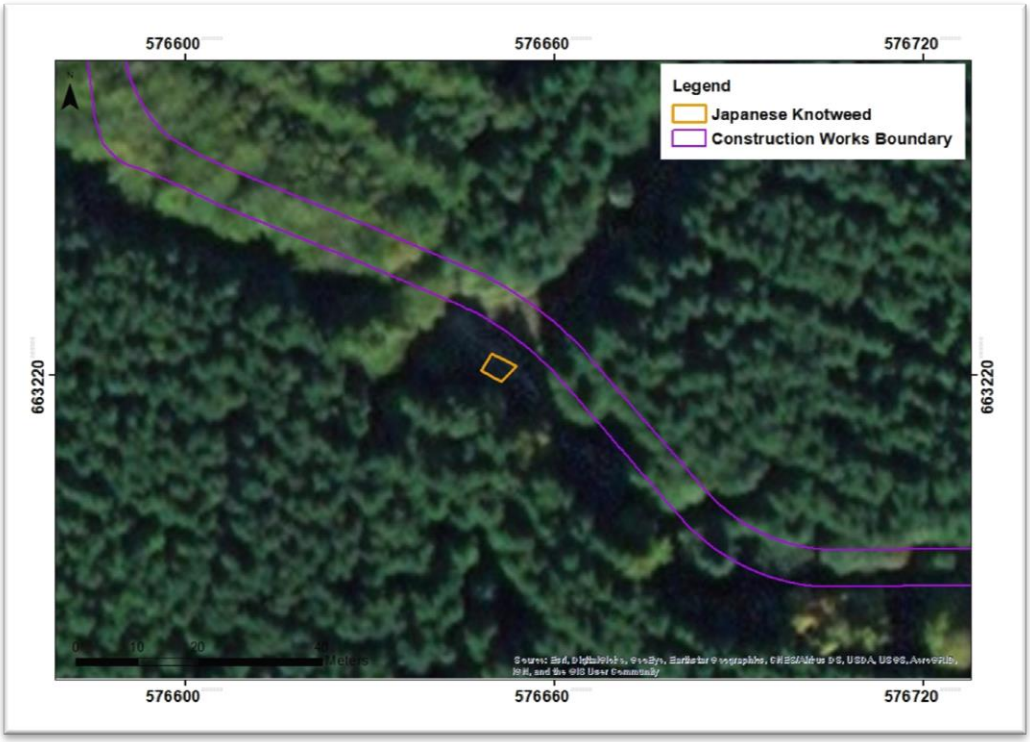


Plate 2 Location of Infestation Number: Site 2.

INFESTATION NUMBER	**Site 3**
INFESTATION TYPE	Japanese knotweed (*Fallopia japonica*)
INFESTATION LOCATION	580451 E 661921 N (ITM)
DATES OF SITE ASSESSMENT	24/09/17, 01/10/17, & 11/10/17

DESCRIPTION

A large tract of Japanese Knotweed was found in this location (See Plate 3). A bank of earth separates the infestation from the adjacent roadway. The infestation is mature and has been dispersed due to attempted failed eradication episodes. The infestation's outer edge is 10 metres from the proposed construction area and poses no risk to construction.

RECOMMENDATION

1. An invasive species specialist will monitor this site throughout the construction period.
2. Implement appropriate biosecurity measures as advised in Appendix R2.
3. Heras fencing or similar should be erected around the infestation with a 3 metre buffer zone to ensure the ground beneath and around the infestation is left undisturbed during construction.

LOCATION MAP- SITE 3

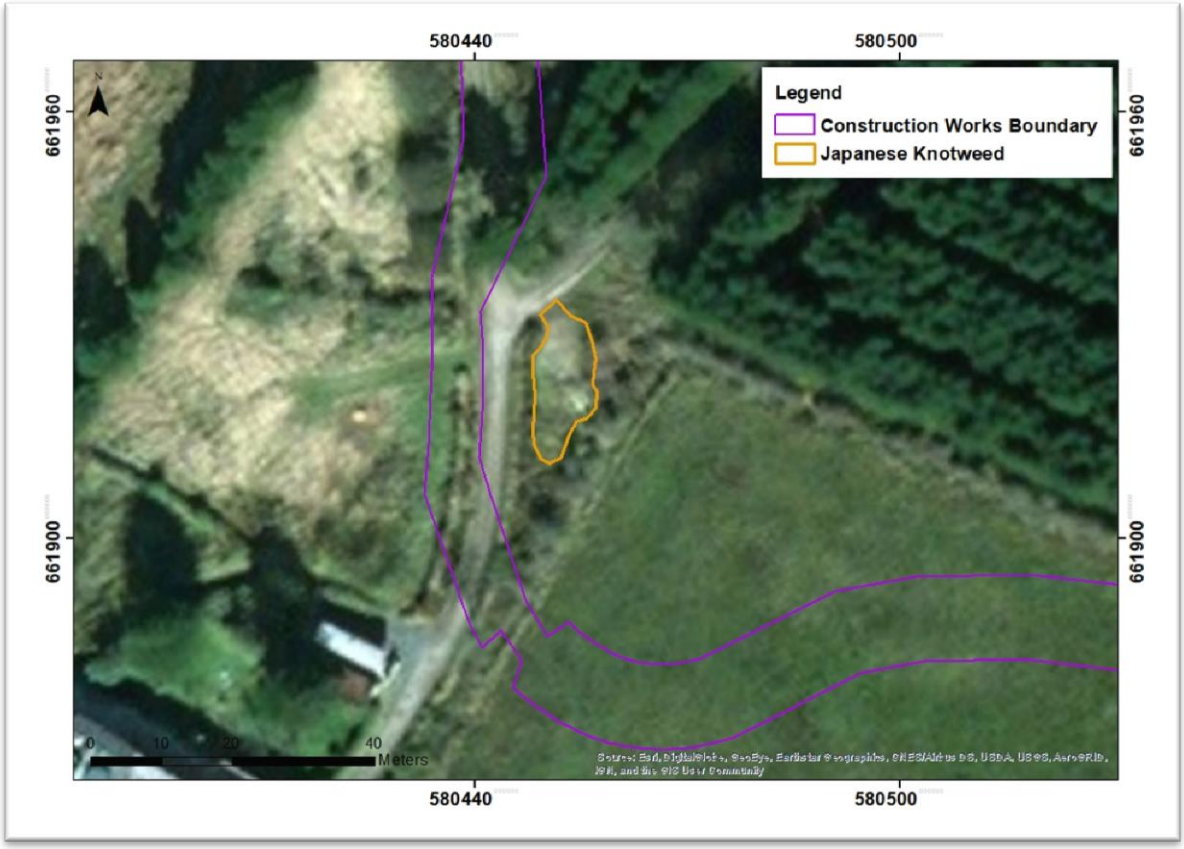


Plate 3 Location of Infestation Number: Site 3.

INFESTATION NUMBER	**Site 4**
INFESTATION TYPE	Japanese knotweed (*Fallopia japonica*)
INFESTATION LOCATION	580983 E 662504 N (ITM)
DATES OF SITE ASSESSMENT	24/09/17, 01/10/17, & 11/10/17

DESCRIPTION

Japanese knotweed (Plate 4) was recorded as an isolated infestation, 4 m from the centre of the adjacent forestry track. This track will be used for passing construction material deliveries/construction traffic only, with no construction work/excavation works in this track. The infestation is well contained with no evidence of disturbance or dispersal and thus poses no risk. No other invasive non-native species were recorded at this location.

RECOMMENDATION

1. An invasive species specialist will monitor this site throughout the construction period.
2. Implement appropriate biosecurity measures as advised in Appendix R2.

LOCATION MAP- SITE 4

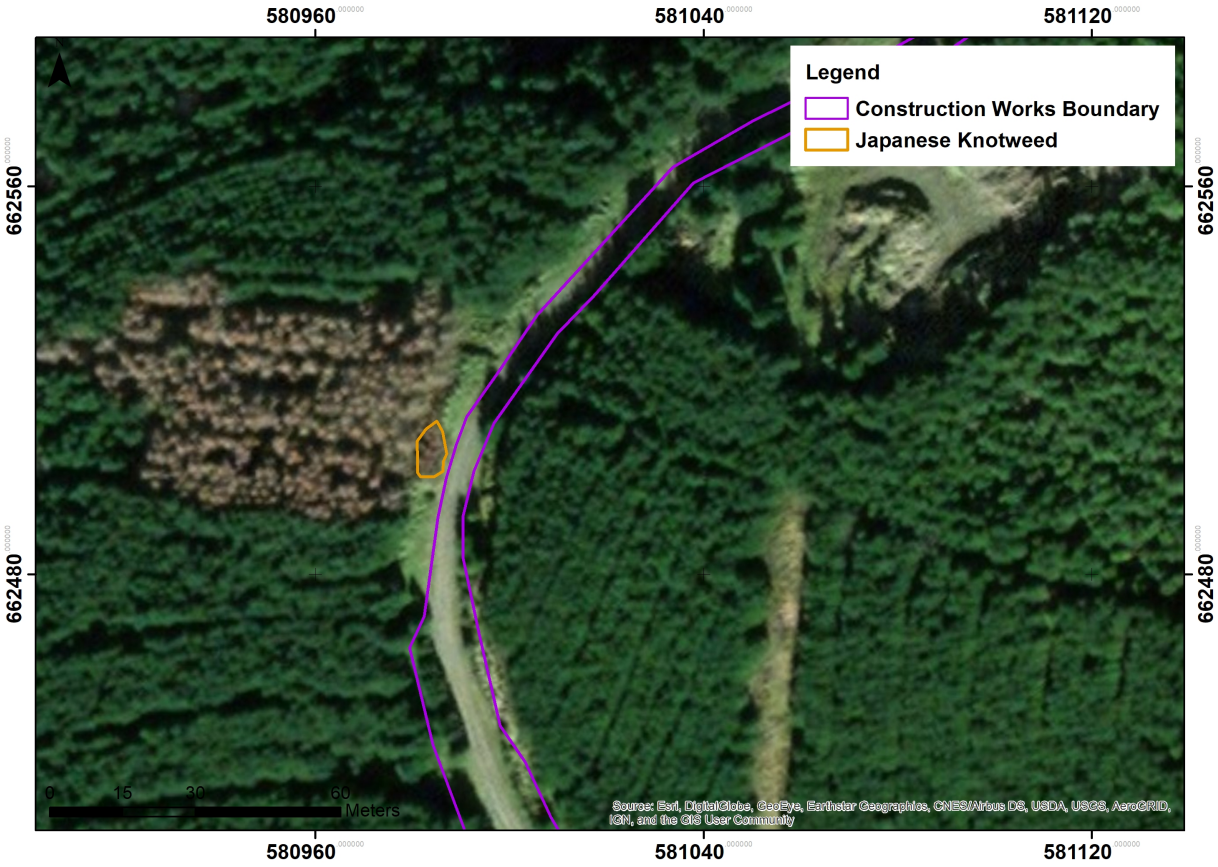


Plate 4 Location of Infestation Number: Site 4.

INFESTATION NUMBER	**Site 5**
INFESTATION TYPE	Japanese knotweed (*Fallopia japonica*)
INFESTATION LOCATION	589940 E 659894 N (ITM), 589923 E 659853 N (ITM), 589917 E 659824 N (ITM)

DESCRIPTION

Three infestations of Japanese Knotweed exist in this general area. Only one small isolated patch exists within the works boundary (See Plate 5) at a gate where no works are proposed. This patch is 9 metres from any proposed works, is well contained with no evidence of disturbance and thus poses no risk. The other two areas consist of extensive, severe Japanese knotweed (*Fallopia japonica*) infestations present within adjacent fields but these are outside the construction works area. No other invasive non-native species were recorded in this area.

RECOMMENDATION

1. An invasive species specialist will monitor this site throughout the construction period.
2. Implement appropriate biosecurity measures as advised in Appendix R2.
3. The infestation's outer edge is 9 metres from the proposed construction area and, as such, poses no risk to construction.
4. Heras fencing or similar should be erected around the infestation with a 3 metre buffer zone to ensure the ground beneath and around the infestation is left undisturbed during construction.

LOCATION MAP SITE 5



Plate 5 Location of Infestation Number: Site 5.

INFESTATION NUMBER	**Site 6**
INFESTATION TYPE	Japanese knotweed (*Fallopia japonica*)
INFESTATION LOCATION	594434 E 660905 N (ITM)

DESCRIPTION

A stand of young, actively growing Japanese knotweed was recorded by a farm gate (See Plate 6). It was 2 m high, with no more than 15 canes arising from a single basal crown. On the other side of the gate, the infestation extended for a further 2m beside the hedgerow bordering the road way. The infestation is 7 m from the proposed construction area and, as such, poses a low risk to construction activities.

RECOMMENDATION

1. Implement appropriate biosecurity measures as advised in Appendix R2.
2. The infestation's outer edge is 7 metres from the proposed construction access route and, as such, poses no risk.
3. Herras fencing or similar should be erected around the infestation with a 3 metre buffer zone to ensure the ground beneath and around the infestation is left undisturbed.

LOCATION MAP- SITE 6



Plate 6 Location of Infestation Number: Site 6

INFESTATION NUMBER	**Site 7**
INFESTATION TYPE	Japanese knotweed (*Fallopia japonica*)
INFESTATION LOCATION	608032 E 659632 N (ITM)

DESCRIPTION

Not proximal to the construction works boundary this infestation was recorded as growing on the hard shoulder of the tertiary road R503 (See Plate 7). This road will be used for the delivery of turbines and no construction is proposed anywhere near this infestation.

The infestation is mature, well-established, over 3 m tall with an uneven canopy and many large basal crowns. The site has been used for disposing rubbish and the ground surface beneath the infestation is heavily littered and uneven.

No construction is happening at this location i.e. turbine deliveries will be passing the infestation along a public road. No contact with the infestation is possible due to it being 6 metres from the roadway.

RECOMMENDATION

1. Implement appropriate biosecurity measures as advised in Appendix R2.
2. The infestation's outer edge is more than 7 metres from the required access area and, as such, poses a low risk.
3. There is no need for Herras fencing or similar as there is no chance of any traffic coming into contact with the plant at this location.

LOCATION MAP

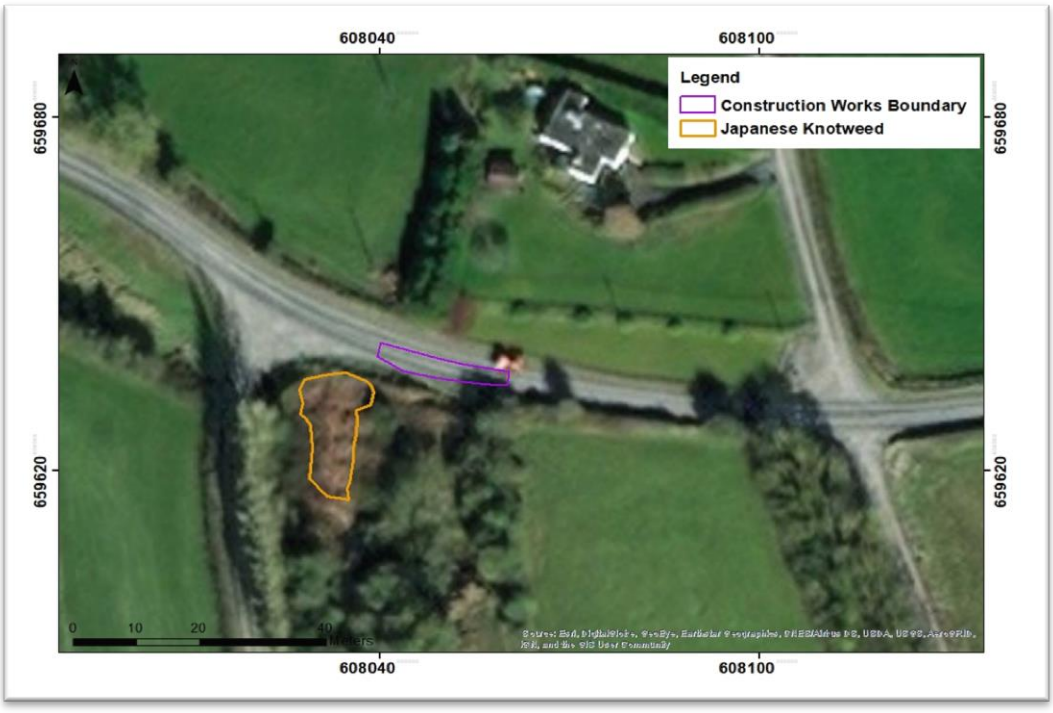


Plate 7 Location of Infestation Number: Site 7

APPENDIX R1

ILLUSTRATIVE PLATES

1		**Site 1** Himalayan knotweed on an infill bank of soil at road verge.
2		**Site 1** As above, showing varying intensity of infestation along the bank
3		**Site 1** Himalayan knotweed dispersed through the field and grazed by horses.

4		**Site 2** Isolated infestation, actively growing**.**
5		**Site 3** Disturbed Japanese knotweed by forestry track. Note infill in foreground which may have been used in an attempt to curb the infestation but has led to dispersal.
6		**Site 4** Disturbed Japanese knotweed by forestry track which will be used by construction traffic only. No construction will occur anywhere near this infestation.

7		**Site 5** Isolated Japanese knotweed infestation at the gate of a house**.**
8		**Site 6** Young, isolated Japanese knotweed infestation by farm gate.

9		**Site 7** Extensive mature infestation growing on the verge of the tertiary road R503.

APPENDIX R2

BIOSECURITY MEASURES

Biosecurity measures

The following biosecurity measures will be applied at each location, where appropriate:

1. A full time invasive species specialist will be appointed to monitor key stages in construction, particularly when soil excavation begins near infested areas. The invasive species specialist will have a 'stop works' authority;
2. The full time invasives species specialist will design and provide a toolbox talk, to all workers, on invasive plant species on the project;
3. The invasive species specialist will assist in designing all access/transit points that are proximal to any infestation and, where possible, will cordon off all infested areas to include a buffer zone (≤7 m) to prevent unauthorized access;
4. The Contractor, as PSCS, will be responsible for the management of all construction onsite and as such will be responsible for the provision to operatives of on-site invasive species training which will include details on dispersal prevention.

APPENDIX R3

INFESTATION INFORMATION

Site #	Spp.	Extent_m2	dis_extent	Ave_ht_(m)	BC	BC_no/m2	BC-Sz	Cane_d(cm)	Cane_ave_no	Dispersed	Risk_cause	soil_type	Prev_treat
1	HK	104	28+	1	n/a	n/a	n/a	n/a	n/a	yes	LM, grazing	infill, banked	cutting, herbicide
2	JKW	20	no	3	yes, but immature	2	≤40cm	3cm	24	no	prox to forestry track	woodland	no
3	JKW	≥1000	massive	3m	mature	4	≤40cm	3cm	varies	yes	prox to track, LM	farmland	cutting
4	JKW	20	no	2.5	mature	2	≤40cm	3cm	18	no	prox to forestry track	woodland	no
5	JKW	≥1000	massive	varies	mature in hedgerow	4		4cm	22	yes	LM, grazing	farmland	cutting
6	JKW	10	no	1.5	no	n/a	n/a	2cm	5	beginning	natural dispersal	farmland	no
7	JKW	≥500	no	3	v few	1	≤30	1-3cm	varies	yes	natural dispersal	road verge	cutting

REFERENCE DOCUMENTS
APPENDIX 5.2

LEGEND

Extent_m^2	Extent of infestation, square metres
dis_extent	Extent of dispersed infestation
Ave_ht_(m)	Average height of canes (m)
BC	Basal crowns: presence/absence
BC_no/m^2	Ave. no. basal crowns per 1 m^2
BC-Sz	Ave. diameter basal crowns (av. of 20)
Cane_d(cm)	Cane diameter (cm). average of 20, different stands
Cane_ave,no	Ave. no. canes
Dispersed	Extent of dispersal of infestation due to disturbance.
Risk_cause	LM – land management practices

Please note: Basal crowns (size and diameter) and diameter of canes can be used to estimate age / maturity. In a dense infestation, evidence of basal crowns, cane diameter and height can give an indication of previous treatment (cutting back, herbicide treatment).

Appendix to Chapter 5: Description of Development (UWF Replacement Forestry)

Appendix 5.3: Description of Development (UWF Grid Connection)

The data and descriptions in this appendix have informed Chapter 5: Description of Development (UWF Replacement Forestry) of the EIA Report. The information presented in this Appendix 5.3 is outlined below and the relevant element(s) of the Whole UWF Project are also identified.

Appendix	Title	Relevant EIAR
A.5.3	Description of Development (UWF Grid Connection)	UWF Grid Connection

UWF Grid Connection

Volume C2: EIAR Main Report

Chapter 5

Description of Development
(UWF Grid Connection)

ECOPOWER

May 2018

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Note: The numbering system for Figures follows the sequence 'Chapter Number- Figure Number'.

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Glossary of Terms

Term	Definition
EIA Directive	European Union Directive 2011/92/EU (as amended by Directive 2014/52/EU)
Environmental Factors	The factors in the environment required to be identified, described and assessed during the EIA process. These are specified in Article 3 (1) of the EIA Directive as Population and Human Health; Biodiversity; Land; Soils; Water; Air; Climate; Material Assets; Cultural Heritage and Landscape.
Competent Authority	The body legally delegated to decide on the Planning Application
Competent Expert	Experts who are qualified and competent in their field of expertise
Consented Windfarm	Upperchurch Windfarm – 22 wind turbines, substation, windfarm roads and ancillary works, consented in August 2014 under Planning Reference: Tipperary County Council 13/51/0003, ABP PL 22.243040
Element	One of the 5 No. elements listed in 'Whole UWF Project' below.
Project Design Environmental Protection Measures	Measures for environmental protection, incorporated into the design of the project.
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.
Whole UWF Project	Project made up of 5 No. elements – UWF Grid Connection; UWF Related Works, UWF Replacement Forestry, Upperchurch Windfarm (UWF) and UWF Other Activities.

List of Abbreviations

Abbreviation	Full Term
ABP	An Bord Pleanála
EDL	Ecopower Developments Limited
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
PD	Ecopower Project Design Environmental Protection Measure developed by members of the EIAR Team
RFI	Response to Further Information
SAC	Special Area of Conservation
SPA	Special Protection Area (for wild birds)
OCM	Outline Construction Methodologies
OHL	Overhead Line
UWF	Upperchurch Windfarm
UGC	Underground Cables

5 Description of Development - UWF Grid Connection

5.1 Introduction to Chapter 5

UWF Grid Connection is described in this chapter, in the following order:

Section 5.2	• A Description of the Location and Characteristics of the subject development (UWF Grid Connection) • The Project Design Environmental Protection Measures incorporated into the design to avoid, prevent or reduce likely significant adverse effects on the environment.
The Development as described in Section 5.2 At the conception of the UWF Grid Connection, the design team evaluated the potential or likely significant effects of the subject development, on the receiving environment. Any potential or likely significant effects were avoided by integrating mitigation measures into the fundamental design of the UWF Grid Connection. Various measures, particularly options for mitigation by avoidance and mitigation by prevention, were considered; these included alternative locations, alternative designs and alternative processes. Once the chosen location, design and process was decided the proposal was examined for opportunities to incorporate further mitigation measures (generally mitigation by reduction) in the final iteration of the development to be evaluated in the EIA Report. The development, as described in Section 5.2, is the final iteration of the UWF Grid Connection. It is this final iteration that is examined in Chapters 6 to 17, for effects on the prescribed environmental factors, by the topic competent experts.	
Section 5.3	The durations and timing, main activities, personnel and material requirements for both the construction and operation stages. Any changes to the UWF Grid Connection, such as decommissioning.
Section 5.4	The use of natural resources, emissions and production of wastes for each stage.
Section 5.5	The vulnerability of the UWF Grid Connection to major accidents and natural disasters.
Section 5.6	Cumulative Descriptions: For the purposes of cumulative assessment of the whole Upperchurch windfarm (UWF) project, a description of the other elements of the Whole UWF Project namely; UWF Related Works; UWF Forestry Replanting; the already consented Upperchurch Windfarm (UWF) and UWF Other Activities, is provided. For the purposes of a cumulative assessment with Other Existing or Consented Projects or Activities, a description of Other Existing or Consented Projects or Activities that were scoped in by the EIAR Team is also provided.

5.2 Characteristics of the UWF Grid Connection

The UWF Grid Connection proposal comprises of the following parts:

- Mountphilips Substation
- Mountphilips – Upperchurch 110kV Underground Cable (110kV UGC)
- UWF Grid Connection Access Roads and
- UWF Grid Connection Ancillary Works.

5.2.1 Purpose of UWF Grid Connection

The purpose of UWF Grid Connection is to connect the Consented UWF Substation at Upperchurch Windfarm (UWF) to the substation at Mountphilips. Mountphilips substation will be connected to the existing, adjacent Killonan - Nenagh 110kV overhead line and thereby export electricity, from Upperchurch Windfarm when constructed and operational, to the national grid.

5.2.2 Location and overview description of UWF Grid Connection

Mountphilips Substation: The new substation is proposed for a location adjacent to the existing Killonan - Nenagh 110kV overhead line in agricultural grassland in Mountphilips townland, 2km north of Newport, 4km south of Birdhill, 17km north east of Limerick City and 23km west of the Upperchurch Windfarm. The new 110kV electrical substation will comprise 2 No. End Masts located at the Killonan – Nenagh 110kV overhead line; a compound, 230 meters east of the overhead line, measuring circa. 95 meters x 94 meters which will contain a control building; 110kV busbars; circuit breakers; line disconnects; current and voltage measuring equipment; cable chairs; surge arresters; lightening protection monopoles and other electrical apparatus. The 2 No. End Masts will be connected to the electrical equipment in the compound via underground cable.

Mountphilips - Upperchurch 110kV UGC: The 110kV UGC will connect the Mountphilips Substation to the Upperchurch Windfarm through the Consented UWF Substation, through the installation of underground cables. The route of the underground cables, which is 27.5km in length, will follow a generally west/east course through a mix of agricultural grassland (11.9km), commercial forestry plantations (1.9km), private forestry and farm roads (c.12km) and public roads (c.1.7km) through the townlands of Mountphilips, Coole, Freagh, Oakhampton, Newross, Castlewaller, Killeen, Knockacullin, Bealaclave, Baurnadomeeny, Goulmore, Laghile, Churchquarter, Knocknabansha, Knockmaroe, Knockcurraghbola Crownlands and Knockcurraghbola Commons. The 110kV UGC will be installed underground in trenches, which will be laid with ducts through which the electrical cables and communications cables will be pulled. The cable lengths will be pulled through and joined together at Joint Bay locations, in joint bay chambers. The ducts will be surrounded by concrete and the trench backfilled with excavated material or aggregate depending on the location. The only surface expression of the 110kV UGC will be the man-hole type covers over the Joint Bays and the over-ground identification marker posts and marker plates.

UWF Grid Connection Access Roads: To provide access to Mountphilips Substation and the Joint Bay locations along the 110kV UGC, New Permanent Access Roads will be constructed. Permanent access will also include upgraded existing farm and forestry roads.

UWF Grid Connection Ancillary Works will support the construction of UWF Grid Connection and will include the construction of Temporary Access Roads along the 110kV UGC construction works areas;

Permanent Site Entrances (including the provision of sightlines) at Mountphilips, Bealaclave and Knockcurraghbola Commons; Temporary Site Entrances at public road crossings along the 110kV UGC; installation of temporary and permanent watercourse crossing structures; construction and use of 3 No. Temporary Compounds, installation of drainage systems at Mountphilips Substation, around Temporary Compounds and along new UWF Grid Connection Access Roads; forestry felling; temporary and permanent hedgerow/tree removal; permanent hedgerow replanting; fencing; relocation of existing overhead electricity and telephone services and; storage of excavated materials at various locations within the construction works area boundary.

Relevant Volume C3 EIAR Figures:

Figure GC 5.1: Location of the UWF Grid Connection on OSI Discovery Mapping

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Figure GC 5.3: UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Construction Works Area Boundary: All construction works e.g. machinery movement; excavations; excavated materials storage, will take place within the construction works area boundary as delineated on **Figure GC 5.3**. This construction works area is approximately 12m in width, except when traversing Bleanbeg Bog NHA or the River Shannon SAC when the area is reduced to encompass the forestry or farm track (as applicable) only.

UWF Grid Connection is abbreviated throughout this chapter as GC. All the Figures Numbers are prefaced by GC per e.g. Figure GC 5.1

5.2.3 Characteristics of UWF Grid Connection

5.2.3.1 Mountphilips Substation

The Mountphilips Substation will be constructed close to the existing Killonan - Nenagh 110kV overhead line. The design is based on similar high voltage looped-in 110kV substations, and will comprise:

- Substation Compound measuring c.8930m^2 in area, and will contain a control building; 110kV busbars; circuit breakers; line disconnects; current and voltage measuring equipment; cable chairs; surge arresters; lightening protection monopoles (c.18m in height) and other electrical apparatus, underground cabling and access roads. Secure perimeter fencing comprising 2.7m high palisade security fencing, which will surround the Substation Compound and will include 4.8m wide entrance gates. A permanent surface water drainage network will be installed around the compound. The Mountphilips to Upperchurch 110kV UGC will connect to the electrical equipment in the compound from the north side of the compound.
- Control Building, measuring c.205m^2 in area, located inside the Substation Compound, and will contain circuit breakers, electrical metering equipment and other electrical equipment, communications and control equipment, and welfare facilities comprising a self-contained toilet and an integrated rainwater harvesting system.
- 2 No. End Masts and associated underground 110kV cables will be used to facilitate the connection of the Mountphilips Substation onto the existing Killonan – Nenagh 110kV overhead line (OHL). These End Masts will be constructed beneath the existing Killonan – Nenagh 110kV OHL and are identified as End Mast No.1 and End Mast No.2. The End Masts will be lattice towers and will each be c.16m in height. 110kV cables will connect to the Killonan side of the overhead line at End Mast No.1, be affixed to the mast and then through underground ducting to the Mountphilips compound, through the electrical equipment and control building and then back onto the overhead line via a second set of underground ducting to End Mast No.2, routed up and affixed to End Mast No.2 and onto the Nenagh side of the overhead line. The cables from End Mast No. 1 and End Mast No.2 will connect to the electrical equipment in the compound from the south side of the compound.



Plate 5-1: Example of similar 110kV substation with End Masts connecting to overhead 110kV line

Relevant Volume C3 EIAR Figures:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Map 1)
Figure GC 5.4: Plan of the Mountphilips Substation Compound
Figure GC 5.5: Elevation of the Mountphilips Substation Compound
Figure GC 5.6: Plan and Elevation of the Control Building at Mountphilips Substation
Figure GC 5.7: Plan and Elevation of the End Masts at Mountphilips Substation

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-03: Mountphilips Substation Compound
GC-OCM-04: New End Masts at Mountphilips Compound

5.2.3.2 Mountphilips – Upperchurch 110kV UGC

Underground 110kV cabling works, referred to herein as the 'Mountphilips to Upperchurch 110kV UGC' or the '110kV UGC', will connect the Mountphilips Substation to the Consented UWF Substation. The design of the Mountphilips – Upperchurch 110kV UGC complies with ESB Networks specifications and technical and operational requirements.

The 110kV UGC will comprise:

- Up to 27.5km each of 3 No. underground 110kV electrical cables and 2 No. underground communication cables; and copper cable (where required), each to be contained within ducting and laid in a trench (**Cable Trench**), 1.25m deep and 0.6m wide, along with semi-dry lean-mix concrete, red cable protection strip, yellow warning tape, protective plates (if required) and backfill material, as illustrated on Figure GC 5.8
- 38 No. Joint Bays, comprising joint bay chambers, communication chambers and link box chambers, to be located underground. All Joint Bays will be located at least 25m from a Class 1 or Class 2 watercourse. A typical joint bay is illustrated on GC Figure 5.9.
- Marker posts and marker plates as necessary,
- The connecting of the underground cables to the Mountphilips Substation, at one end, and the Consented UWF Substation at the other end of the 110kV UGC.



Plate 5-2: Examples of underground cable trenches

5.2.3.2.1 Road Works for UWF Grid Connection

Road works will be required along the 110kV UGC where the route crosses or is aligned along the public road network. There will be no joint bays along the public road corridor, and road works will be limited to the Cables Trench. In total there are 13 No. locations (labelled R1 to R13) where trenching will occur within the road corridor, as described in Table 5-1.

Table 5-1: Road Works associated with UWF Grid Connection

No.	Road No.	Location	Extent of trenching	Duration of Road Works	Traffic Management
R1	L2166-0	Coole / Freagh	7.5m	1 day	Road Crossing
R2	L2156-11	Oakhampton	170m	3 days	One lane closure
R3	L2157-5	Newross	5m	1 day	Road Crossing
R4	L6011-10	Castlewaller	4.5m	1 day	Road Crossing
R5	L95032-8	Killeen	65m	1 day	Road Crossing (end of cul-de-sac)
R6	L21141-0	Knockacullin	3.2m	1 day	Road Crossing
R7	L2114-0	Bealaclave	1270m	c.20 days	One lane closure
R8	L6085-0	Baurnadomeeny	130m	4 days	Road Closure
R9	L6086-5	Laghile	2.5m	1 day	Road Crossing
R10	L2266-0	Kilcommon	10m	1 day	Road Crossing
R11	L6182-0	Kilcommon	4.2m	1 day	Road Crossing
R12	R497	Knocknabansha / Knockmaroe	8.3m	1 day	Road Crossing
R13	L2264-50	Knockmaroe/ Knockcurraghbola Commons	7m	1 day	Road Crossing

Road Closure: It is expected that the L6085-0 in Baurnadomeeny will be closed for c.4 days to accommodate the trenching works. The closure will not be continuous throughout a given day, but will be timed by arrangement with the local residents (8 No.). In any case, works will take place during school holidays, and there is an alternative traffic route available during the closures.

One lane closures**:** The works on the public roads L2156-11 at Oakhampton and the L2114-0 at Bealaclave, can be accommodated with one-lane closures. Traffic flow will be maintained using a stop/go system with flagmen.

Road Crossings: The remaining roadworks for the UWF Grid Connection relate to locations where the 110kV UGC crosses the road. Traffic flow will be maintained by placing a steel plate over the trench to allow traffic to pass over, while the works are on-going and flagmen will control a stop/go system.

All road closures will be subject to Road Closure application to Tipperary County Council. All road works will be subject to a Road Opening License application to Tipperary County Council and will be carried out in accordance with the Tii Guidelines on the Opening, Backfilling and Reinstatement of Openings in Public Roads.



Plate 5-3: Example of trenching along a public road

Relevant Volume C3 EIAR Figures:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)
Figure GC 5.8: Cross Sections of Mountphilips - Upperchurch 110kV Underground Cables Trench
Figure GC 5.9: Views of 110kV UGC Joint Bays
Figure GC 5.10: Cross Sections of 110kV UGC in Public Road Pavements or Verges

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-05: 110kV Trenching and Ducting
GC-OCM-06: 110kV Joint Bays and Associated Chambers
GC-OCM-07: 110kV Cable Pulling
GC-OCM-08: 110kV Cable Jointing

5.2.3.3 UWF Grid Connection Access Roads

UWF Grid Connection Access Roads will consist of 8.1km of existing private roads, which will require upgrading, along with 4.4km of newly constructed permanent access roads.

5.2.3.3.1 Existing Access Roads

Existing private roads, comprising 5.6km of forestry roads and 2.5km of farm roads, occur at a number of locations between the Mountphilips Substation and the Consented UWF Substation. These existing private roads will be upgraded by overlaying crushed stone over the road. Where private roads will provide access to Joint Bays, the road will be widened to 3.5m. Any existing drains alongside widened roads will be realigned alongside the newly widened road edge. In general, the existing farm roads will be widened, whereas the existing forestry roads are already at least 3.5m wide.

5.2.3.3.2 New Permanent Access Roads

Permanent access roads are required by ESB Networks to gain access to Joint Bay locations.

In total 4.4km of new permanent access roads will be constructed, to provide access to the Mountphilips Substation and to the Joint Bays along the 110kV UGC. These new roads will be constructed of crushed stone over a layer of geotextile material and will incorporate permanent roadside drains including check dams and settlement ponds, where required, to slow down flow and settle suspended solids in water runoff.

Outside the SPA: 2.7km of these roads will be located outside of the boundary of the Natura 2000 site, the Slievefelim to Silvermines SPA, generally in agricultural fields. The new road will be bounded with new earthen berms which will be planted with a mix of grasses and native hedgerow species.

Inside the SPA: The remaining 1.7km of new permanent access roads will be located inside the boundary of the Slievefelim to Silvermines SPA. These new roads will generally comprise excavated stone roads, with a section of floating road across peat in Section 39 in Castlewaller and Killeen townlands. *(Note: Sections are identified on Figure GC 5.3).*

All the new roads (within the SPA) will be concealed beneath vegetation directly after construction - to be called Concealed Access Roads. This will be achieved by laying a rigid geocell paving material over the stone road, filled with peat/soil and planted with heather and grasses. The vegetation mix will reflect the land cover which existed prior to construction (in the case of grassland) and a heather and grass mix (in the case of forestry). The geocells will be planted to a density of 40 native Heather: Grass Nurse per m^2, at a ratio of 75:25, which will provide an excellent level of expected survival and cover.

Already matured heather and grass nurse plants will be used. The mature vegetation will be created off-site, by nursery production of heather and grasses (Native Irish or Scottish) and planting-out of the young plantlets into the rigid geocell and then allowing time for the plant roots to establish themselves, within the geocell. These planted rigid cell sections, can then be transported to the Concealed Access Road locations and used to cover the newly created roads directly after construction, creating an instant mature vegetation cover. At the roadside margins, where there will be no vehicular traffic, mature heather and grass plants can be planted directly into the ground, as a support structure will not be required for vehicles and plants. Vehicular traffic and access to the Concealed Access Roads will be restricted for 18 months, by fencing and locked gates

These 'vegetated roads' are referred to Concealed Access Roads or 'concealed roads' or 'concealed geocell roadways' in this EIA Report.

The vegetated surface of these Concealed Access Roads will be put in place according to the methodology by Dr. Mary O'Connor. Dr. O'Connor's methodology is included as Appendix 5.8: Vegetation Reinstatement Methodology along Concealed Access Roads.

Relevant Volume C3 EIAR Figures:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Maps 1 to 15 – except Map 4)
Figure GC 5.11: Cross Sections of 110kV UGC in Existing Farm Roads (Upgraded)
Figure GC 5.12: Cross Sections of 110kV UGC in Existing Forestry Roads (Upgraded)
Figure GC 5.13: Cross Sections of 110kV UGC in the Existing Forestry Road through Bleanbeg Bog NHA
Figure GC 5.14: Cross Sections of New Permanent Access Roads outside Slievefelim to Silvermines SPA
Figure GC 5.15: Cross Sections of New Permanent Concealed Access Roads inside Slievefelim to Silvermines SPA
Figure GC 5.16: Cross Sections of New Permanent Concealed Floating Access Road through Castlewaller (inside the SPA)
Figure GC 5.16.1: Plan and cross section views of the New Permanent Concealed Floating Access Road and existing drains through Castlewaller (Section Number S39)

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-09: Widening or Resurfacing Existing Private Roads
GC-OCM-10: New Permanent Access Roads
Appendix 5.8: Vegetation Reinstatement Methodology along Concealed Access Roads

5.2.3.4 UWF Grid Connection Ancillary Works

5.2.3.4.1 Temporary Access Roads

During the construction stage, up to 9.3km of temporary access roads will be constructed within the Construction Works Area Boundary, to facilitate the movement of machinery and vehicles along the Cable Trench. Three methods will be employed to provide temporary access roads, where needed: 1. Excavate and Fill, 2. Floating road and 3. Matting. In general, the method of temporary road construction employed at any particular location will depend on the prevailing soil and weather conditions at the time of construction, and will be determined by the Contractor in conjunction with the Environmental Clerk of Works. These three methods for temporary access road construction are illustrated on Figure GC 5.17.

Relevant Volume C3 EIAR Figures:

Figure GC 5.17: Cross Sections of Temporary Access Road Types (3 types)

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-11: Temporary Access Roads

5.2.3.4.2 Temporary Compounds

3 No. temporary compounds will be set up during the construction stage to support the construction of the Grid Connection. These compounds will be provided at the Mountphilips Substation location (Temporary Compound C1), approximately halfway along the Mountphilips – Upperchurch 110kV UGC at Bealaclave (Temporary Compound C2) and, adjacent to the Consented UWF Substation location (Temporary Compound C3).

Temporary Compound C1 will be approximately 1090m^2 in area and Temporary Compounds C2 and C3 will each be approximately 860m^2 in area. These compounds will accommodate parking, site offices, and canteen and welfare facilities along with designated storage areas for materials, wastes, oils and fuels.

Relevant Volume C3 EIAR Figures:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Map 1, 8 & 15)
Figure GC 5.18: Plan View of Temporary Compound C1 (Mountphilips)
Figure GC 5.19: Plan Views of Temporary Compounds C2 (Bealaclave) & C3 (Knockcurraghbola Commons)

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-13: Temporary Compounds

5.2.3.4.3 Permanent Site Entrances

Three separate permanent site entrances will be provided through existing farm entrances. These entrances will provide access to the Mountphilips Substation and to the Temporary Compounds, as per

- A permanently widened entrance (Site Entrance E1) will be provided off the L2166-0, for the Mountphilips Substation and Temporary Compound C1, and
- As requested by Tipperary County Council Roads Department, a permanently widened entrance (Site Entrance E15), off the L2114-0, for Temporary Compound No.2 in Bealaclave
- As requested by Tipperary County Council Roads Department, a permanently widened entrance (Site Entrance E34), off the L6188-0, for Temporary Compound No.3 in Knockcurraghbola Commons.

For the construction stage, the three existing farm entrances will be widened to 10m, with a visibility splay of 160m provided at Site Entrances E1 and E15 and 90m at Site Entrance E34. The sightlines are based on the 85th percentile ambient traffic speed on the Local Road serving the access, as recorded during traffic count surveys.

These sightlines will be provided through the partial removal of the roadside boundary and the pruning of any hedgerow or trees within the visibility splay. Any hedges or trees that are removed will be replaced with an equivalent length of hedge and/or number of trees which will be replanted behind the sight lines. Each entrance will be fenced with post and rail and an entrance gate will be installed set back 4.8m from the road edge.

Following the completion of construction works, the operational stage sightlines, at all three entrances, will satisfy the sightline requirements as set out in Table 10.1 of the North Tipperary County Development Plan 2010 (as amended), being reduced at Site Entrance E1 and Site Entrance E15 to 90m sightlines, and reduced to 70m at Site Entrance E34.

Relevant Volume C3 EIAR Figures:

Figure GC 5.20: Plan View of Permanent Site Entrance E1 at Coole (Mountphilips Substation & Temporary Compound C1)

Figure GC 5.21: Plan View of Permanent Site Entrance E15 at Bealaclave (Temporary Compound C2)

Figure GC 5.22: Plan View of Permanent Site Entrance E34 at Knockcurraghbola Commons (Consented UWF Substation and Temporary Compound C3)

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-12: Temporary and Permanent Site Entrances

5.2.3.4.4 Temporary Site Entrances

To facilitate the installation of the Cable Trench and the delivery of materials to construction works areas from the public road network, a total of 25 No. temporary site entrances will be required. 20 No. of these will be through existing farm or forestry entrances, and the remaining 5 No. will comprise a new entrances through the roadside boundary.

Existing agricultural field entrances will be widened to 5m. Similarly, the 5 No. new entrances will involve the removal of 5m of the roadside boundary to gain access to construction works areas on the adjacent agricultural lands. No works are required at forestry entrances.

Flag-men will be used to control traffic at temporary entrances.

Relevant Volume C3 EIAR Figures:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Maps 1,2,3,6,7,8,9,11,12,13 & 14)
Figure GC 5.23: Plan View of Typical Temporary Site Entrances

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-12: Temporary and Permanent Site Entrances

5.2.3.4.5 Watercourse Crossing

The construction of the UWF Grid Connection will involve crossing a total of 90 No. watercourses, which range in size from rivers to drains as outlined on Table 5-2.

Table 5-2: Watercourse Classifications at Crossing Points

Class	Watercourse Description	Number
1	EPA mapped blue line, major river or stream (fisheries value)	20
2	Headwater Stream Equivalent to EPA blue line but not mapped (fisheries value)	14
3	Sub-optimal, heavily vegetated with low or no flow during dry periods (low fisheries value)	10
4	Drain (no fisheries value)	46

The construction of the UWF Grid Connection will involve:

- Crossing of 49 No. existing structures (Watercourse Crossing Type A1 and A2)
- Replacement of 3 No. existing crossing structures, (Watercourse Crossing Type B1)
- Construction of 12 No. new permanent crossing structures, (Watercourse Crossing Type C1)
- Construction of 15 No. temporary crossing structures (Watercourse Crossing Type C2)
- Trenching and ducting for the 110kV UGC only (no traffic crossing) across 7 No. streams. (Watercourse Crossing Type C3)
- Construction of 1 No. new permanent crossing structures (no cable, traffic crossing only), (Watercourse Crossing Type C4)
- Installation of the 110kV UGC (no traffic crossing) using drilling techniques at 3 No. rivers - the Newport (Mulkear), Clare and Bilboa rivers (Watercourse Crossing Type D)
- Instream works at Class 1 and Class 2 watercourses, will only be carried out during the months of July, August and September. In order to progress construction works across watercourses outside of that period, portable bailey bridges will be used to facilitate the passage of traffic across the watercourse without the need for any instream works. (Watercourse Crossing Type E).

All permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be at least 900mm in diameter regardless of the anticipated flood flow. 900mm culverts will be embedded into the bed of the watercourse to a depth of 300mm, while 1200mm culverts will be embedded to a depth of 500mm.

New and replaced permanent crossing structures will be construction in accordance with the Office of Public Works (OPW) guidelines Construction, Replacement or Alteration of Bridges and Culverts (2013), and as agreed with OPW (telephone consultation, February 2018) will be subject to a Section 50 application to OPW following the grant of planning permission.

The treatment of each watercourse crossing along the UWF Grid Connection is specified in **Volume C4: EIAR Appendices:** Appendix 5-2: Classification and Crossing Method for UWF Grid Connection Watercourses.

Relevant Volume C3 EIAR Figures:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Maps 1 to 15)
Figure GC 5.24: Watercourse Crossing Type A1 & A2 – Existing Crossing Structure
Figure GC 5.25: Watercourse Crossing Type B1 – Replaced Crossing Structure

Figure GC 5.26: Watercourse Crossing Type C1 – New Permanent Structure

Figure GC 5.27: Watercourse Crossing Type C2 - New Temporary Structure & Watercourse Crossing Type C4 - New Permanent Structure

Figure GC 5.28: Watercourse Crossing Type C3 – 110kV UGC Trenching and Ducting only

Figure GC 5.29: Watercourse Crossing Type D – Directional Drilling at the Newport (Mulkear) River (W10)

Figure GC 5.30: Watercourse Crossing Type D - Directional Drilling at the Clare River (W36)

Figure GC 5.31: Watercourse Crossing Type D - Directional Drilling at the Bilboa River (W57)

Figure GC 5.32: Watercourse Crossing Type E –Portable Temporary Bailey Bridge

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-14: Horizontal Directional Drilling

GC-OCM-15: Instream Works Preparation and Reinstatement

GC-OCM-16: Instream Works

GC-OCM-17: Temporary Bailey Bridge

5.2.3.4.6 Drainage Systems

New Hardstanding/hard surface areas: An integrated drainage system will be installed around the Substation Compound, the hardstanding area at the End Mast locations, the Temporary Compounds and along new permanent roads. This integrated drainage system will keep 'clean' water upslope of the works separate from 'dirty' water runoff from construction works areas, while maintaining the existing drainage regime through the regular piping and release of clean water from the upslope side the works area to the downslope side. The integrated drainage system will include the installation of check dams, settlement ponds, clean water cross drains and outfall weirs. These parts of the drainage system will effectively avoid any contribution to flooding risk, minimise erosion, maintain drainage regimes, and minimise the amount of sediment entering downslope watercourses, through the attenuation (slow-down) of water flow rates and the settlement of suspended solids (sediment).

Temporary roads will be constructed upslope of the cables trench so that any surface water runoff will flow into the trench. Where dewatering of trenches or excavations is required, there will be no direct discharge of treated water into any watercourse or drain. Rather, all pumped water will be treated prior to discharge using an infiltration trench, settlement pond or suitable water treatment train such as a Siltbuster, or controlled release across existing vegetation, as appropriate.

Existing roadside drainage which occurs close to road works associated with the Cables Trench, or at Permanent Entrances or Temporary Entrances, will be piped to maintain flow. A concealed drain will be installed at all permanent entrances to prevent water runoff from construction areas, flowing onto the public road. These drains will be directed into an infiltration trench.

The drainage system will be left in place for the operations phase. Settlement ponds will be removed following construction. The drainage system at temporary works locations will be removed.

Relevant Volume C3 EIAR Figures: The drainage system is identified on:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Maps 1, 8 & 15)

Figure GC 5.4: Plan of the Mountphilips Substation Compound
Figure GC 5.7: Plan and Elevation of the End Masts at Mountphilips Substation
Figure GC 5.11: Cross Sections of 110kV UGC in Existing Farm Roads (Upgraded)
Figure GC 5.12: Cross Sections of 110kV UGC in Existing Forestry Roads (Upgraded)
Figure GC 5.13: Cross Sections of 110kV UGC in the Existing Forestry Road through Bleanbeg Bog NHA
Figure GC 5.14: Cross Sections of New Permanent Access Roads outside Slievefelim to Silvermines SPA
Figure GC 5.15: Cross Sections of New Permanent Concealed Access Roads inside Slievefelim to Silvermines SPA
Figure GC 5.16: Cross Sections of New Permanent Concealed Floating Access Road through Castlewaller (inside the SPA)
Figure GC 5.16.1: Plan and cross section views of the New Permanent Concealed Floating Access Road and existing drains through Castlewaller (Section Number S39)
Figure GC 5.18: Plan View of Temporary Compound C1 (Mountphilips)
Figure GC 5.19: Plan Views of Temporary Compounds C2 (Bealaclave) & C3 (Knockcurraghbola Commons)

5.2.3.4.7 Forestry Felling

Small areas of coniferous forestry at various locations along the 110kV UGC will be permanently felled to facilitate the construction and operation of the 110kV UGC. In total, 1.3 hectares of forestry will be felled, this felling will be carried out under a felling license from the Forest Service, and an equivalent area of forestry will be replanted, under the conditions of this license, in Co. Tipperary – this replanting will be part of the UWF Replacement Forestry element of the whole UWF project. Further information on the UWF Replacement Forestry element is provided in Section 5.6 of this chapter.

Relevant Volume C3 EIAR Figures: Forestry felling locations are identified on:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Map 3, 5, 6, 9, 10, 11, 12 & 13)

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-18: Forestry Felling

5.2.3.4.8 Fencing

Fencing will be erected at a number of locations during the construction and operation of the 110kV UGC per;

- Permanent timber post and rail fencing with gates will be erected along the new permanent access road to the Mountphilips Substation, at the 3 No. permanently widened site entrances and along either side of the 110kV UGC where the route passes through forestry or forestry firebreaks/clearlines;
- Temporary post and wire, or battery powered electric fencing will be used to delineate construction works areas and to prevent livestock from entering works areas and will also be used to protect reinstated lands until vegetation has re-established;
- Temporary timber post and rail fencing with gates will be erected at the temporarily widened site entrances;
- Temporary goal posts to mark the location of overhead electricity and telephone lines along construction works areas;
- Temporary bat crossing structures at selected hedgerow crossing locations along the 110kV UGC;
- Existing fencing which is required to be removed from the works areas or from widened existing site entrances will be replaced, in the original alignment and position, following construction works.

5.2.3.4.9 Relocation of local overhead services

In order to facilitate the safe construction of the UWF Grid Connection, 2 No. existing overhead lines will be altered, (in conjunction with the infrastructure owner), as follows:

- In Section 60 at Baurnadomeeny, 1 No. existing telephone pole will be moved 10m closer to the field boundary; *(Note: Sections are identified on Figure GC 5.3).*
- In Section 74 at Laghile, 2 No. existing electricity poles will be replaced with taller poles in order to raise up a 110m length of existing overhead 38kV electricity line. This is to provide greater clearance to construction machinery. *(Note: Sections are identified on Figure GC 5.3).*

Relevant Volume C3 EIAR Figures:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Maps 8 & 12)

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-19: Relocation of Overhead Lines

5.2.3.4.10 Provision of electricity supply to Mountphilips Substation

Mountphilips Substation will require a low voltage electricity supply, in order to energise and run electrical plant and general services at the compound. This supply will be taken from an overhead electrical line which passes through the 1st field, 105m from the substation access point (E1) off the public road. The line is a 10kV overhead line carried on a standard wooden pole. The pole will be fitted with a transformer in order to transform the electricity to low voltage (230kV), which is suitable for use in the substation. The electricity thus transformed will be cabled underground to the substation, 420m to the west, in a duct which will be laid alongside the 110kV UGC ducting.

5.2.3.4.11 Storage of Excavated Materials

In total, approximately 14,050 m^3 of soils will need to be permanently excavated and relocated. This will mainly arise from the 110kV UGC trenching/joint bays, Mountphilips Substation ground works and Grid Connection Access Roads; comprising topsoil (9,615m^3), peat (1,265 m^3), subsoil, (2,390m^3), rock (120m^3), and spoil from public road excavations (660m^3).

In addition, up to 11,140m3 of soils will be excavated from the construction works area boundary, including from the cable trench and from the footprint of any excavated temporary stone roads.

This excavated material will be managed as follows:

- The 660m^3 of spoil from the public road excavations will be removed to a licensed waste facility.
- 8,370m^3 of the excavated material will be permanently stored along the 110kV UGC works area as linear berms and remainder (5,020m^3) will be reinstated within the works area.

Relevant Volume C3 EIAR Figures: Storage locations are identified on:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Maps 1 to 15)

Relevant Appendix 5. Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-20: Formation of Overburden Storage Berms.

5.2.3.4.12 Reinstatement of Construction Works Areas

Following the completion of construction works in an area, with the exception of new permanent infrastructure such as New Permanent Access Roads or permanently felled forestry areas, the lands under the construction works areas will be reinstated to their former condition and returned to the landowner for use as before.

Reinstatement of construction works areas: the temporarily stored excavated soils will be used to backfill and landscape the works areas. These areas will then be sown with native, Irish sourced, certified seeds, seedlings or plants to reflect the habitats that were present before the work.

Landholding boundaries including any existing gates will be reinstated on their original alignment and locks will be fitted to new gates which will be erected along New Permanent Access Roads, where the new road crosses multiple landholdings. A gate fitted with a lock will also be erected at both ends of the floating road section in Castlewaller/Killeen townlands. Gates will also be erected at field boundaries along the New Permanent Access Roads.

Reinstatement of hedgerow: will involve the replanting of the removed section of hedgerow like for like with established (at least 3 year old) native hedgerow plants in their original locations, immediately following the completion of the works in the area.

Along **sensitive bat corridors**, the bat crossing structures which will be installed during construction works will remain in place post-construction until the hedgerow has sufficiently regrown to provide viable habitat for bats. These bat crossing structures will be monitored by a suitably qualified bat specialist and maintained on a yearly basis until they are removed.

Relevant Volume C3 EIAR Figures:

Figure GC 5.33: Cross Sections of Hedgerow Removal and Reinstatement

Figure GC 5.34: Cross Sections of Bat Crossing Structure

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-21: Reinstatement of Lands

5.2.3.4.13 Reinstatement of Public Roads

Trenches within road pavements will be reinstated in accordance with the Tii Guidelines on the Opening, Backfilling and Reinstatement of Openings in Public Roads. Where the cables trench crosses perpendicular to the road, full width surface overlay to a distance of 5m beyond either side of the trench will be carried out. Where the cables are aligned along the length of the road, full-width surface overlay will be carried out on any sections of road where the Surface Curvature Index (SCI), measured during FWD testing, is greater than 250.

Along **construction materials haulage routes**, confirmatory condition surveys involving pre-construction and post-construction inspections, high definition video surveys and FWD surveys will be undertaken along the routes of concentrated construction traffic between the R503 and the site access points on the local road network, and on the local road network from the junction of the R497 with the L2266-11 road. Whilst it is not expected to occur, any damage to structures or road pavements will be repaired to at least as good a condition as pre-works, and on damaged sections of roads where the Surface Curvature Index (SCI), measured during FWD testing, is greater than 250, full-width surface overlay will be carried out.

Reinstatement of **roadside boundaries**: All road boundaries at temporary site access points will be reinstated along the existing alignment.

5.2.4 Environmental Protection Measures designed into the UWF Grid Connection

The design of UWF Grid Connection includes the Project Design Environmental Protection Measures listed on Table 5-3, which were devised to avoid, prevent or reduce likely or potentially significant effects on the environment.

Relevant individual Project Design Environmental Protection Measures from the list below are duplicated in the Environmental Factor topic chapters, and the list is duplicated in full as a set of Environmental Commitments in Volume D: UWF Grid Connection Environmental Management Plan with the planning application.

The interaction of Project Design Environmental Protection Measures across the various Environmental Factors is provided in matrix format in Chapter 18: Interaction of the Foregoing.

Table 5-3: Environmental Protection Measures as part of the UWF Grid Connection design

PD ID	Project Design (PD) Environmental Protection Measure
PD01	All construction works will be carried out during daylight hours.
PD02	Flag-men will be used at temporary site entrances rather than creating sightlines by the removal of roadside boundaries. These flagmen will control the movement of traffic on the public road, so that road users can continue to use the local road network in a in a safe and efficient manner.
PD03	Construction works in Knockmaroe and Knockcurraghbola Commons townlands, which are within 350m of local residences, will not take place at the same time as either the UWF Related Works or Upperchurch Windfarm.
PD04	Confirmatory consultations with Irish Water, Eir and ESB and confirmatory ground surveys at service locations will be carried out ahead of works; 'Goal Posts' will be used to identify and highlight the height of nearby overhead lines; and a foreman will look out for underground pipes during excavations near services.
PD05	Land reinstatement will not be carried out during very wet weather or when the soil is waterlogged.
PD06	If any compaction has occurred along the construction works area, these areas will be ploughed with a sub-soiler to loosen the subsoil layer
PD07	Construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted
PD08	All initial groundworks will be monitored by an archaeologist under license from the National Monuments Service, to archaeologically record and preserve, either in situ or by record, any structures, features or objects of archaeological significance which may be encountered during the works.
PD09	New permanent access roads will have a permanent surface water drainage network in place which will include check dams. These check dams will settle suspended solids in water runoff while also slowing down the rate of water run-off from these areas.
PD10	Only precast concrete culverts or structures will be used at watercourse crossing locations. No batching of wet cement will take place on-site.
PD11	Instream construction works will be followed by site-specific reinstatement measures to ensure the restoration of flow character and morphology within the affected reach. Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margin to stabilise banks, add flood protection and provide riparian buffer.
PD12	A phased approach will be undertaken in relation to watercourse crossing works, earthworks, forestry felling and excavation dewatering, where these works occur within 50m of a Class 1 or Class 2 watercourse. The phased approach will only permit one of main potential sediment producing activities, listed above, to be carried out within 50m of a Class 1 or Class 2 watercourse, at any one time.

PD ID	Project Design (PD) Environmental Protection Measure
PD13	All excavated material will be removed for temporary or permanent storage at a suitable location more than 50m away from all other Class 1 and Class 2 watercourses.
PD14	Temporary silt control methods such as silt fencing or containment berms will be placed around all overburden storage areas.
PD15	Permanent overburden storage berms will be graded and seeded immediately after emplacement.
PD16	For works within 50m of a Class 1 or Class 2 watercourse, additional mitigation measures include double silt fencing, temporary drain blocking, placement of straw bale arrangements along preferential surface water flowpaths and, where necessary, the use of matting to prevent ground erosion and rutting.
PD17	Where dewatering of trenches or excavations is required, there will be no direct discharge of treated water into any watercourse or drain. Rather all pumped water will be treated prior to discharge using an infiltration trench or settlement pond or suitable water treatment train such as a Siltbuster, as appropriate.
PD18	There will be no refuelling of vehicles or plant permitted within 100m of a watercourse
PD19	The main fuel stocks for, and chemical wastes arising from, construction activities will be stored in a designated location, away from main traffic activity, within the temporary compound. All fuel will be stored in bunded, locked storage containers.
PD20	Overnight parking of plant and machinery will only be permitted at locations which are greater than 50m from watercourses and where there is an existing hard-core surface in place.
PD21	No refuelling of plant or equipment will be permitted within 100m of identified wells
PD22	In-stream works at Class 1 and Class 2 watercourses will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
PD23	In-stream works will not be undertaken without isolation of flow within the watercourse, any fish within the isolated section will be removed using electrofishing and, following collection of biometrics, transferred immediately downstream of the crossing point and placed back in the water. The water will then be isolated from the works by over pumping, flume (pipe) or channel diversion methods.
PD24	All new permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be a minimum of 900mm in diameter regardless of the anticipated flood flow.
PD25	All new permanent culverts in Class 1 and Class 2 type watercourses will be bottomless or clear spanning.
PD26	If works are programmed to begin in the Hen Harrier breeding season (March to August) confirmatory hen harrier breeding surveys will be completed, before such works initiate, such that all pre breeding nuptial activity, nesting activity and active nests are recorded within 2km of the construction works area boundary. These surveys will be completed prior to the start-up of all construction activities, until construction is complete and for 3 years thereafter. No construction works will take place within 500m of an active hen harrier breeding attempt or active nesting activity, during the breeding season (March to August).
PD27	During the hen harrier roosting season (October to February inclusive), construction works within 1000m of a roost will be limited to the period between one hour after sunrise to one hour before sunset.
PD28	Hedgerow removal and clearance of any other breeding bird vegetation will take place outside of the bird breeding season *i.e.* not during the period of March to August inclusive where possible. This includes hedgerow and scrub removal in addition to hedgerow trimming.
PD29	Confirmatory surveys for active Otter holts and activity (particularly holts at which breeding females or cubs are present) will be carried out 150m upstream and downstream of watercourse crossing locations.
PD30	All construction works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer/outside of 1 hours after sunrise or before sunset during winter.
PD31	If an active holt (particularly holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken *while cubs are present in the holt* and NPWS will be notified immediately

PD ID	Project Design (PD) Environmental Protection Measure
PD32	No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding otter Holts, and light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under license.
PD33	The prohibited working area associated with otter holts will, where appropriate, be fenced with temporary fencing prior to any possibly invasive works and declared as 'out of bounds'. Fencing will be in accordance with Clause 303 of the NRA's Specification for Roadworks (National Roads Authority). Appropriate awareness of the purpose of the enclosure will be conveyed through toolbox talks with site staff and sufficient signage will be placed on each exclusion fence. All contractors or operators on site will be made fully aware of the procedures pertaining to each affected holt (NRA, 2006) and subject to audits and non-conformance records in the event of non-compliance, to be included in reports submitted to Local Authorities and relevant Statutory Consultees.
PD34	Confirmatory surveys will be carried out within 50 m of either side of the construction works area boundary of identified badger setts to determine the current status of known badger setts (i.e. active or inactive) and to determine if any new setts have been established in the intervening period following initial pre-planning surveys and the commencement of construction activity. These confirmatory badger surveys will be undertaken no more than 12 months in advance of proposed construction activities, during the period November and April when vegetation cover is reduced. NWPS will be notified immediately if the sett previously identified is confirmed as active or if a further active sett is located within 50 meters of the footprint of the development. If sett exclusion is required, this will be undertaken by an experienced ecologist under the necessary license and following best practice guidance (NRA, 2005).
PD35	No construction works will be carried within 50m of an active sett during the main breeding season (December 1st to June 30th).
PD36	Construction activity in the environs of a known active badger sett outside of the breeding period will follow NRA (2005) guidelines, i.e. no heavy machinery will be used within 30m of badger setts (unless carried out under license); lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances.
PD37	All construction works will be carried out during daylight hours. Security lighting will be used at compounds. All lighting will be cowled in order to prevent light spill and no lighting will be left turned on overnight. Lighting will be controlled by motion and time sensors to minimise the amount of time the lights are operational.
PD38	Confirmatory surveys will be carried out at all trees with bat suitability that will require felling or other major modifications (e.g. removal of rotten branches). These trees will be subject to a ground-level visual inspection by the Project Ecologist (or a bat specialist acting on their behalf) prior to site clearance works in order to confirm the findings of the 2016 / 2017 surveys. (Note: 17 trees with low suitability were identified within the UWF Grid Connection construction works area boundary during 2016/2017 surveys).
PD39	Where a tree with moderate or high bat suitability is to be felled, a presence/absence bat surveys will be carried out. (Note. It is not expected that any trees with moderate or high suitability will be felled).
PD40	Felling of trees with bat roost suitability will be undertaken in the period late-August to late-October/early-November. Trees with low suitability for bats will be felled carefully and slowly in order to avoid impact-related injuries to any bats that may be roosting inside them. Sections of the tree with potential roost features for bats (e.g. crevices, damaged branches) will be cut in sections, lowered carefully to the ground and left undisturbed for 48 hours before removal.
PD41	Where the felling of trees with bat suitability is carried out, robust, weather-proof bat-boxes, for example Schwegler type 1FF and 2F models, will be placed in each of the affected sections to compensate for the loss of potential tree roosts. The number of bat boxes will match the number of trees with bat suitability to be felled.
PD42	Installation of bat crossing structures at severed hedgerows, proximate to areas of high bat activity or roost locations. And following the completion of construction works, the replanting of these severed hedgerows with semi-mature shrubs/trees (like for like) and limits on temporary lighting near

PD ID	Project Design (PD) Environmental Protection Measure
	hedgerows.
PD43	Pre-construction survey of the distribution of Devil's-bit Scabious (larval food plant of Marsh Fritillary) during the last available April prior to the commencement of construction works. This requires that any areas of Devil's-bit Scabious that are located within the construction works area boundary, will be strimmed/cut to ground level in the last available late April / early May period prior to the commencement of construction.
PD44	All deliveries of construction materials that pass Kilcommon National School will be scheduled to take place outside of school drop-off/pick-up times - 9am to 9.30 am and 3pm to 3.30.
PD45	At Mountphilips Substation, water for welfare facilities will be obtained from a Rain Water Harvesting system. Waste water will be collected in tanks and removed from site by an appropriately licensed operator, for treatment in a licensed water treatment plant. These two measures will avoid the need for a new well or mains water connection and will avoid the need to treat waste water on-site.
PD46	Mountphilips Substation will have a permanent surface water drainage network in place which will include check dams. These check dams will settle suspended solids in water runoff while also slowing down the rate of water run-off from these areas.
PD47	All Joint Bays will be located at least 25m from a Class 1 or Class 2 watercourse, with 35 no. of the total 38 no. located greater than 50m from a Class 1 or Class 2 watercourse.
PD48	Only precast concrete chambers will be used at joint bays locations. No batching of wet cement will take place on-site.
PD49	Lower River Shannon SAC: The route of the 110kV UGC is located along an existing farm track within the SAC boundary. Construction works will be confined to the existing track within the SAC boundary.
PD50	Lower River Shannon SAC: There will be no storage of overburden within the Lower River Shannon SAC
PD51	Lower River Shannon SAC: All excavated material will be removed for temporary or permanent storage at a suitable location more than 100m away from the Newport (Mulkear) River, Clare River and Bilboa River.
PD52	Lower River Shannon SAC: No in-streams works are proposed at the Newport (Mulkear) River and Bilboa River crossings (which are located within the SAC) and therefore there will be no placement of cement within the river channels. The 110kV UGC will be installed by horizontal directional drilling technique.
PD53	Lower River Shannon SAC: All runoff from the construction works areas associated with the horizontal directional drilling works at the Newport (Mulkear) River and Bilboa River (which are located within the Lower River Shannon SAC) and at the Clare River (which is located upstream of the SAC), will be directed into a suitable water treatment train such as a Siltbuster and treated for sediment. This will also mean that in the unlikely event of an oil/fuel spill or leak, any contaminated water can be contained and removed off-site.
PD54	Lower River Shannon SAC: At the Newport (Mulkear) and Bilboa River crossings, drilling activities will be carried out at least 15m from the Lower River Shannon SAC boundary. Double silt fencing will be set up between the drilling rig and the SAC boundary – the 1st silt fence close to the rig and the 2nd silt fence close to the SAC boundary. No works or activities will be conducted on the SAC side of these fences. For the Clare River (which is not in an SAC) drilling activities will be carried out at least 15m away from the river bank. Double silt fencing will be set up as before and no works or activities will be conducted on the river side of these fences.
PD55	Lower River Shannon SAC: Drilling fluid returns will be contained within a sealed tank / sump, and pumped onto a skip for removal off-site to an appropriately licenced facility.
PD56	Lower River Shannon SAC: The drilling works at the Newport (Mulkear) River and Bilboa River will not be carried out during the months of May, June or July.
PD57	Lower River Shannon SAC: There will be no refuelling of vehicles or plant, no storage of fuels and no overnight parking permitted within the boundary of the Lower River Shannon SAC.
PD58	Lower River Shannon SAC: There will be no storage of fuels within 100m of the Newport (Mulkear) River, Clare River or Bilboa River.

PD ID	Project Design (PD) Environmental Protection Measure
PD59	Bleanbeg Bog NHA: The route within Bleanbeg Bog NHA is along an existing forestry track. There will be no excavation of blanket bog
PD60	Bleanbeg Bog NHA: There will be no storage of overburden within the Bleanbeg Bog NHA boundary.
PD61	Bleanbeg Bog NHA: There will be no refuelling of vehicles or plant, no storage of fuels and no overnight parking permitted within the boundary of the Bleanbeg Bog NHA.
PD62	Slievefelim to Silvermine Mountain SPA: All new permanent access roads within the SPA will be 'concealed access roads' which will be created immediately following construction works by covering the hardcore surface of the new road with a vegetated layer using the following method - firstly a geotextile material is laid on the road, covered in a layer of load bearing root-zone mix of peat and stone and then covered in turn by interlocking rigid geocells. The geocells and roadside berms (where present) will be planted with a mix of mature native Irish or Scottish heathers and grasses, with the mix depending on location. Where heather is being planted a depth of at least 150mm of peat will be provided. These 'concealed access roads' will provide a load bearing surface for occasional maintenance vehicles. Within the SPA, the establishment of the Concealed Access Roads will be overseen by a competent peatland ecologist and a hen harrier expert.
PD63	Slievefelim to Silvermine Mountain SPA: All temporary storage berm locations will be re-instated to the biodiversity value of the underlying habitat. Permanent berms will be immediately re-seeded with native heather and upland grass species. Harvester crossing points will be covered with topsoil and reseeded immediately as will any other temporary land-use change locations. Within the SPA, this reinstatement will be overseen by a competent peatland ecologist and a hen harrier expert, outside the SPA this reinstatement will be overseen by the Project Ecologist.
PD64	Slievefelim to Silvermine Mountain SPA: Annual visual inspections of the lands over the 110kV UGC and the testing/inspection/planned maintenance at Joint Bays, will be scheduled outside of the hen harrier breeding season, on those parts of the 110kV UGC which occurs within the boundary of the Slievefelim to Silvermines SPA.
PD65	No construction works will take place within 800m of an active curlew nest, or active nesting attempt, within the breeding season (March to August).

5.2.4.1 Environmental Management Plan

An Environmental Management Plan (EMP) is included with Volume D of the planning application. The purpose of the EMP is to communicate environmental control measures that apply to the development of the UWF Grid Connection to those with responsibility for carrying out works on site so that any likely significant adverse effects of the development on the receiving environment can be prevented.

The Environmental Management Plan includes the list of Project Design Environmental Project Measures (listed above), along with the Best Practice Methods that are included at the end of topic Chapters 6 to 17. Management plans for Traffic, Waste, Surface Water Quality and Invasive Species are also included in the EMP.

See: Volume D: UWF Grid Connection Environmental Management Plan

Note: The environmental protection measures for UWF Other Activities which relate to UWF Grid Connection will be included in the UWF Grid Connection Environmental Management Plan.

5.3 Life Cycle Stages of the UWF Grid Connection

5.3.1 Construction Stage - UWF Grid Connection

5.3.1.1 Overview of the Construction Process

The construction process for the UWF Grid Connection, is a relatively straightforward civil build. A number of separate dedicated 'crews' will work from each compound, each working on a different part of the UWF Grid Connection. The workers will arrive and depart daily to and from the relevant construction compounds, parking spaces will be provided at the site compounds. The various crews will then be transported to the specific works location by means of 'crew-cab' 4x4 vehicles or similar. Bulk deliveries of materials will be delivered to the site compounds and stored there until needed. Materials needed at works locations will be transported by way rigid body vehicle or tractor and trailer. Aggregate and concrete will be delivered directly to works locations.

5.3.1.2 Duration & Timing

The duration and timing of the construction of the UWF Grid Connection is outlined in Table 5-4.

Table 5-4: Duration and Timing of the Construction Phase of UWF Grid Connection

Construction Activities	Duration of the Construction Stage	Timing of Construction Activities
Pre-Construction - detailed design, confirmatory surveys, felling, hedgerow/tree removal or pruning etc.	3-6 months	Immediately prior to the commencement of the main construction period, or where seasonal timing is relevant to pre-confirmatory surveys or habitat works – during the appropriate season prior to works in the relevant sections of UWF Grid Connection
Main Civil and Electrical Construction Activities - Construction of Mountphilips Substation, 110kV UGC, UWF Grid Connection Access Roads, UWF Grid Connection Ancillary Works	6 – 8 months	Projected Start Date: 2018/2019
Cable Jointing Activities	3 months	It is expected that the period associated with Cable Jointing will overlap with the period associated with the Main Construction Activities.
Electrical commissioning activities	3 months	Commissioning will take place after the Main Construction and Cable Jointing works are complete.

The duration of works provided are approximate and may be shorter or longer, depending on the final number of crews used, weather conditions etc. A formal programme of works will be prepared by the appointed Contractor prior to the commencement of construction activities.

5.3.1.2.1 Construction Hours of Work

Normal construction times will be 07.00 to 19.00hrs Monday to Friday and 08.00 – 16.30hrs on Saturdays. These normal hours of work will be further restricted at particular locations as outlined in Scheduling of Works.

5.3.1.2.2 Scheduling of Works

To protect residential amenity, surface water quality and biodiversity, the following timing or scheduling of works will be implemented during the Construction Stage:

- Construction works will be carried out during daylight hours.
- Construction works in Knockmaroe and Knockcurraghbola Commons townlands, which are within 350m of any local residences, will not take place at the same time as other elements of the Whole UWF Project.
- All deliveries of construction materials that pass Kilcommon National School will be scheduled to take place outside of school drop-off/pick-up times - 9am to 9.30 am and 3pm to 3.30pm
- To reduce the potential for localised in-combination effects on surface water quality from the main potential sediment sources during construction works (i.e. Watercourse Crossing Works, Earthworks, Tree Felling and Excavation Dewatering), a phased approach will be undertaken during the construction works for these activities, where works within 50m of a Class 1 or Class 2 watercourse are required. The phased approach will only permit one of main potential sediment producing activities to be carried out at any one time within the local catchment to a watercourse (refer to Chapter 11: Water).
- Hedgerow removal and clearance of any other breeding bird vegetation will take place outside of the bird breeding season *i.e.* not during the period of March to August inclusive where possible. This includes hedgerow and scrub removal in addition to hedgerow trimming.
- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses.
- Drilling activities at the Newport (Mulkear) River and Bilboa River will not be carried out during the months of May to July inclusive.
- No construction works will take place within 500m of an active hen harrier nest, or active nesting activity, during the breeding season (March to August). Additionally, during the roosting season, (October to February), construction works will only be carried out during the period between one hour after sunrise and one hour before sunset in areas within 1000m of an active winter roost.
- No construction works will take place within 800m of an active curlew nest, or active nesting attempt, within the breeding season (March to August).
- No construction works will be carried within 50m of an active main badger sett during the main breeding season (December 1st to June 30th).
- Felling of trees with bat roost suitability will be undertaken in the period late-August to late-October/early-November.
- If an active otter holt (holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken *while cubs are present in the holt.*
- All construction works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer/outside of 1 hours after sunrise or before sunset during winter.

5.3.1.3 Construction Personnel

It is expected that approximately 100 No. persons will be involved in the pre-construction, main construction, cable jointing and commissioning works, broken down as follows:

- c.15 No. persons will be involved in pre-construction activities both on and off-site,
- The construction of the Mountphilips Substation will require c.20 construction workers,
- The construction of the Mountphilips – Upperchurch 110kV UGC will require c.35 construction workers during the construction of the 110kV UGC, organised in 6 No. crews,
- Security and canteen services will require c.12 personnel,
- Cable pulling will involve c.4 personnel organised in 2 No. cable pulling crews,
- Jointing works will involve c. 6 No. personnel in total, organised in 3 jointing crews and
- 8 No. electrical commissioner's personnel, for commissioning and energisation.

5.3.1.3.1 Welfare Facilities

Temporary Compounds will each contain site offices, a canteen and a self-contained toilet block.

Welfare Facilities at active construction works areas will consist of solar powered, single, self-contained portable toilets.

Toilet Servicing: All toilets will be serviced on a weekly (Toilet blocks at the Temporary Compounds) or bi-weekly (portable toilets at construction works areas) basis. A record of servicing will be kept by a licensed waste removal operator, such as Arlo Group. Servicing shall include internal cleansing, emptying and recharging with water and toilet additive and replenishing of all consumables.

5.3.1.4 Construction Stage Activities

Construction stage activities will involve the following main works:

- Pre-Construction Activities
- Construction Works Area Preparation
- Mountphilips Substation Compound
- New End Masts at Mountphilips Substation
- 110kV Trenching and Ducting
- 110kV Joint Bays and Associated Chambers
- 110kV Cable Pulling
- 110kV Cable Jointing
- Widening or Resurfacing Existing Private Roads
- New Permanent Access Roads
- Temporary Access Roads
- Temporary and permanent site entrances
- Temporary Compounds
- Horizontal Directional Drilling
- Instream Works Preparation and Reinstatement
- Instream Works
- Temporary Bailey Bridge
- Forestry Felling
- Relocation of Overhead Lines
- Overburden Storage Berms
- Reinstatement of Land

Individual Outline Construction Methodologies (OCMs) for all of the above listed main works and activities of UWF Grid Connection can be found at Appendix 5-1: Outline Construction Methodologies for UWF Grid Connection**.** In the OCMs, a brief description of the work involved; the duration of this work; personnel, machinery, equipment and tools requirements; construction materials; details of the standard methodology for the construction activities and any variations to those methods are also outlined. These OCMs are specific to each distinct body of work or activity. The final Method Statements for the construction works will be developed by the appointed Contractor and will be based on these OCMs, prior to construction.

The OCMs are also provided in Volume D: UWF Grid Connection Environmental Management Plan (EMP) which comprises the main EMP statement; environmental commitments, environmental control measures and management plans; and Best Practice Measures. The purpose of the EMP is to communicate environmental control measures that apply to the development to those with responsibility for carrying out works on site. An Environmental Clerk of Works will be appointed and it will be their responsibility to ensure that the EMP is implemented through liaising with the Construction Site Manager and the Project Manager and by carrying out weekly audits on EMP compliance.

5.3.1.5 Use of Machinery and Equipment

The main machinery, equipment and tools which will be required during the construction stage are listed in Table 5-5. A full list of machinery, equipment and tools which will be used during the construction of the UWF Grid Connection is listed on the Outline Construction Methodologies in Appendix 5.1.

Table 5-5: Construction machinery, equipment and tools

Construction Machinery	Construction Equipment and Tools
1 No. 90/200 tonne crane	1 No. Cement Mixer
6 No. 12ton excavators	1 No. Masonry cutting tool
7 No. 6ton excavators	7 No. De-Watering pumps
7 No. dump trucks	7 No. water pumps and associated pipes
6 No. Vibrating roller	7 No. Diesel generator
1 No. 14tn roller	Hand tools
3 No. trucks for waste removal	Sand bags
6 No. large vans	Silt traps and silt fences
1 No. Tarring vehicle	Oil absorbent booms
2 No. Cable Pulling machine	5 No. siltbuster units and skips
1 No. drilling rig – horizontal directional drilling	Wooden stakes and wooden fencing lats
Jointing Containers	Boundary tape and wire
	10 Battery powered electric fencers

5.3.1.6 Use of Hydrocarbons

Hydrocarbons will be used on-site during construction activities and will be limited to the diesel or petrol fuel and mechanical oils used by the site vehicles and machinery, delivery vehicles and any mobile generators used.

Grease may also be used to line the cable ducts to aid in cable pulling during the construction stage.

5.3.1.7 Other Facilities - Fuel Storage & Tool Storage

All fuels required for construction activities will be stored in a designated location, away from main traffic activity, within the Temporary Compounds. All fuel will be stored in bunded, locked storage containers. Overnight parking of plant and machinery will only be permitted at designated sites along the route where there is a hardcore surface in place.

Tools and smaller pieces of equipment will be stored in locked containers, at the Temporary Compounds, during the construction stage.

5.3.1.8 Imported Construction Materials

The construction materials, which will be brought onto the Grid Connection site, are listed in Table 5-6 along details of the quantity and source of the materials.

Table 5-6: Quantities, type and source of construction materials

Materials	Quantity1	Source of Materials
Semi-dry Lean Mix Concrete	9,490m³ / 1050 No. loads	Roadstone Killough, Co Tipperary Roadstone Bunratty, Co Clare
Aggregate (crushed stone)2	5,470m³ / 455 No. loads	Shanballyedmond, Rear Cross
Hard core for temporary surface (public road sections)	700 m³ / 59 No. loads	Clare
Surface dressing (public road sections)	1300 m³ / 108 No. loads	Clare
Geotextile/Geocell material	10 No. loads	Nenagh
Control Building doors	1 load	Tullow, Co Carlow
Lattice towers (End Masts)	4 No. loads	Cork
Electrical cabling and plant	5 No. loads	EU
Switchgear	5 No. loads	EU
Reinforcing Steel	5 No. loads	Various Irish Suppliers
Communication cabling and equipment	2 No. loads	EU

[1] Based on use of stone on all temporary access roads

Materials	Quantity1	Source of Materials
General building materials	10 No. loads	Various Irish Suppliers
Joint bay chamber and cover	10 No. loads	Offaly
Communication chamber and cover	5 No. loads	Offaly
Link Box Chambers and cover	5 No. loads	Offaly
Earth Sheet Link Boxes and connections	5 No. loads	UK
Duct jointing collars and draw ropes	5 No. Loads	Cork
Profiles for ducting and chambers	5 No. Loads	Cork
HDPE Ducting	20 No. loads	Cork
HDPE Comms Ducting	14 No. loads	Cork
110kV electrical cable	26 No. loads	Cork
Fibre Optic communication cables	5 No. loads	Cork
Red cable protection strip	1 No. loads	Cork
Yellow warning tape	1 No. loads	Cork
Steel protection plate	1 No. loads (if required)	Birr, Co Offaly
Marker posts and plates	1 No. load	Dundrum, Co Dublin
Hedging and tree species	1 No. load	Established nurseries in Ireland or Scotland
Fencing materials, posts, rails, wire	1 No. load	Arrabawn Co-Op, Reiska

5.3.1.8.1 Material and Delivery Traffic Haulage Route

The delivery of construction materials will be managed in the following manner:

Aggregate and Concrete

HGV loads of aggregate, concrete and public road dressing will be delivered directly to construction works areas. These HGVs will travel to the works areas using both the regional and local road networks, using the haul routes specified in Figure GC 5.35.

Other Construction Material

Other materials, such as ducting, geotextile and other construction materials, will be sourced from various suppliers and will be transported to the Temporary Compounds via the national and regional road network as identified on Figure GC 5.36.

This material will be stored at the Temporary Compounds until required at works areas. Each day a smaller truck will be used to deliver the daily volume of ducting, cable protection strip, warning tape, duct jointing collars etc. to each active works area, using the haul routes specified in Figure GC 5.35.

Relevant Volume C3 EIAR Figures:

Figure GC 5.35: Haul Routes for Aggregate and Concrete Deliveries (Overview Map & Map 1)
Figure GC 5.36: Haul Route for Other Construction Materials & Equipment.

5.3.1.9 Traffic Management

5.3.1.9.1 Road Licences

All road closures will be subject to Road Closure application to Tipperary County Council.

All road works will be subject to a Road Opening License application to Tipperary County Council and will be carried out in accordance with the Tii Guidelines on the Opening, Backfilling and Reinstatement of Openings in Public Roads.

5.3.1.9.2 Flagmen

Flagmen will be employed at temporary site entrances and road work locations to control the movement of traffic on the public road, so that road users can continue to use the local road network in a in a safe and efficient manner.

5.3.1.9.3 Advance warning signage

Advance warning signage will be erected on both approaches to temporary site entrance locations and road works locations. The placement of this signage has been designed based on the recorded 85th percentile traffic speeds, or the posted limit, whichever is the higher.

5.3.1.9.4 Reinstatement of road boundaries

Following the completion of construction works, all road boundaries at temporary site access points or at temporary road widening locations will be reinstated along the existing alignment.

5.3.1.9.5 Engagement with Local Residents regarding Traffic

Contact will be maintained with local residents on the day to day timing of the works. A Community Liaison Officer (CLO) will be appointed as the point of contact between the developer, the local community and the wider public. The CLO will keep very active contact with local residents on the traffic arrangements around the works day to day.

5.3.1.9.6 Traffic Management Plan

A Traffic Management Plan is included in Volume D: UWF Grid Connection Environmental Management Plan.

Relevant Volume C3 EIAR Figures:

Figure GC 5.37: Advance Warning Signage for Road Works & Site Entrances.

5.3.1.10 Environmental Management Plan

An Environmental Management Plan (EMP) is included with Volume D of the planning application. The purpose of the EMP is to communicate environmental control measures that apply to the development of the UWF Grid Connection to those with responsibility for carrying out works on site so that any likely significant adverse effects of the development on the receiving environment can be prevented.

The Environmental Management Plan includes the list of Project Design Environmental Project Measures (listed above), along with the Best Practice Methods that are included at the end of topic Chapters 6 to 17.

Management plans for Traffic, Waste, Surface Water Quality and Invasive Species are also included in the EMP, which accompanies the planning application as Volume D: UWF Grid Connection Environmental Management Plan.

5.3.2 Operational Stage - UWF Grid Connection

5.3.2.1 Overview of the Operational Stage

Once commissioned and energised, the Grid Connection will be taken in charge by ESB Networks and the Mountphilips Substation and the Mountphilips – Upperchurch 110kV UGC will become part of the national electricity network. The new asset will be managed and operated by ESB Networks.

5.3.2.2 Duration and Timing of Operational Stage

Table 5-7: Duration and Timing of the Operation Phase of UWF Grid Connection

Description	Duration
Operation of the UWF Grid Connection	The UWF Grid Connection will be operated on a **permanent** basis by ESB Networks.
Mountphilips Substation: • Routine Monthly Inspections (c.2hrs) • Annual Maintenance • Daily Remote Monitoring,	c. 2hrs for monthly inspections c.2 days for annual maintenance - equates to a total of c.5 days per year associated with on-site inspections and maintenance.
110kV UGC: • Annual Inspection and testing at Joint Bay link boxes • Visual inspection of the lands over the 110kV UGC	Up to 8 days per year associated with on-site inspections and testing carried out by a 2 man crew.
110kV UGC: • Planned Maintenance of the 110kV UGC - Infrequent, if at all, during the lifetime of the Grid Connection	c.8 – 10 days per cable pulling activity: 2 days for cable pulling, 1 week for cable jointing 1 day for testing
110kV UGC: • Unplanned Repair of the 110kV UGC – not likely or expected that there will be any requirements for unplanned repairs to the 110kV UGC.	In the unlikely event that repairs are required, they will be of a similar duration as the Planned Maintenance, above.

The duration of works in the operational stage provided above are approximate and may be shorter or longer, depending on the work involved, number of crews/personnel, weather conditions etc.

The timing of operational activities for the UWF Grid Connection will be scheduled by ESB Networks on an on-going basis and are not subject to timing restrictions, with the exception of Scheduling of Works in relation to Hen Harrier within the Slievefelim to Silvermines Mountains SPA, per:

Scheduling of Works in relation to Hen Harrier: Inspection, testing and planned maintenance on the parts of the 110kV UGC within the SPA will only be carried out during the months September through to February – i.e. outside the Hen Harrier breading season which is March to August.

5.3.2.3 Operational Personnel

It is expected that scheduled inspection and maintenance activities will be carried out by ESB Networks personnel (2 men crews) over a total of 13 days per year.

Very infrequent planned maintenance or unplanned repairs may be required, if at all, during the lifetime of the Grid Connection, it is expected that one crew with c.6 ESB Networks personnel would be required for 1 week – 2 weeks duration, depending on the nature of the repairs work.

5.3.2.4 Operational Activities

5.3.2.4.1 Mountphilips Substation

Daily monitoring: The Mountphilips Substation will not be permanently manned, as the equipment will be operated by remote computer link which will be connected to the EirGrid National Control Centre.

Monthly Inspection: will mainly involve the testing of the electrical equipment and apparatus and testing of the electrical, communications and control systems along with visual inspections of the Substation Compound and Control Building. The security and condition of the surrounding palisade fence and entrance gates will also be inspected during these monthly visits.

Monitoring of the communication cables will be carried out remotely.

Annual Maintenance: will involve testing of equipment, apparatus and systems, and may also involve the replacement of electrical parts within the Substation Compound or Control Building. All parts and tools will be brought into the Mountphilips Substation as required. Mobile generators and hoists may also be required for some maintenance activities.

5.3.2.4.2 Mountphilips - Upperchurch 110kV UGC

Annual Inspection:

The electric cables will be inspected annually by ESB Networks. The annual inspection which will include checks, inspections and testing via the link boxes which will have been installed in a link box chamber at Joint Bays. The man-hole type cover over the link box chamber, which is at ground surface level, will be removed by hand to provide access to the link box within. Checks and testing of the electric cables will be carried out using hand held tools. The entire length of the 110kV UGC will also be visually inspected, by walk/drive over of the route.

The annual inspections will be carried out by a 2 man crew, who will use a four-wheel drive vehicle to access the Joint Bays from the Regional and Local Road networks and from the existing forestry and farm road network and from the new lengths of permanent access roads. Sections of 110kV UGC, between Joint Bays, across grassland fields, forestry fire breaks and concealed geocell roads will be visually inspected on-foot.

Planned Maintenance

Access for planned maintenance, if required, will be from the public and private road network identified on Figure GC 5.38 (Overview and Maps 1 to 5).

The minimum lifecycle of the electrical cables and electric plant is 80 - 100 years in accordance with ESB Networks Specifications. As the cables will be factory tested to a high standard, sourced from ESBN approved suppliers and buried in a concrete enclosed trench in accordance with ESBN specifications, it is not expected that the cables will require replacement during their operational life. However, if any particular cable is found not to be performing to its specification, it will be scheduled for replacement.

Replacement of cables will involve the use of an excavator to remove the groundcover and concrete covers from the top of the joint bay chambers at each end of the cable to be replaced. The sand inside the chambers is then removed and the cable joints opened. The cable can then be pulled out of its duct using a cable winch set up at one of the joint bays, and a new cable is then be pulled into the duct and jointed at both ends. The sand will then be backfilled into the chambers and the covers replaced. Testing and commissioning in a similar manner to the construction phase will then be carried out.

Unplanned Repairs

It is not likely or expected that there will be any requirements for unplanned repairs to UWF Grid Connection during its operation. However, in the unlikely event that repairs are required, the associated activities will be similar to the planned maintenance activities described above.

Relevant Volume C3 EIAR Figures:

Figure GC 5.38: Operational Stage Access to Mountphilips Substation and 110kV UGC (Overview & Maps 1 to 5)

5.3.2.5 Use of Machinery and Equipment

The main machinery, equipment and tools which will be used during the operation of the Grid Connection are listed in Table 5-8.

Table 5-8: Use of Machinery and Equipment during the Operation of the Grid Connection

Machinery	Equipment	Materials
Mountphilips Substation		
Mobile Generator, and associated fuel	Hand tools	Replacement electrical or communication parts,
Mobile lifts – e.g. hoists, cherry pickers etc.	Testing equipment	Small volumes of sulphur hexafluoride (SF6) compressed gas
Van – equipped with any necessary hand tools and testing equipment	Equipment or apparatus for Mountphilips Substation	Small volumes of grease/oils
Mountphilips – Upperchurch 110kV UGC		
Four wheel drive vehicles – equipped with an necessary hand tools and testing equipment	Jointing Containers for very infrequent Planned Maintenance or Unplanned Repairs	Replacement 110kV or communication cables and ancillary equipment
Excavator for very infrequent Planned Maintenance or Unplanned Repairs		
Cable pulling winch and spool trailer and tractor for very infrequent Planned Maintenance or Unplanned Repairs		

5.3.2.6 Use of Hydrocarbons

A small volume of hydrocarbons will be used on the UWF Grid Connection site during operational activities and is limited to the diesel or petrol fuel used by the site vehicles and machinery and any mobile generators used.

Small volumes of oil and grease will be used during maintenance of electrical equipment the Mountphilips Substation.

5.3.2.7 Welfare Facilities

There will be no requirement for office facilities at the operational Mountphilips Substation. Self-contained toilet facilities, serviced by a rain water harvesting system will be installed at the Control Building. This toilet will include waste water storage tanks, as illustrated on Figure GC 5.6: Plan and Elevation of the Control Building at Mountphilips Substation.

5.3.2.8 Other Facilities - Fuel Storage & Tool Storage

Fuel Storage: There will be no requirement for fuel storage facilities during operations.

Tool Storage: There will be no requirement for tool storage facilities, all tools will be brought onto site as required.

5.3.3 Changes to UWF Grid Connection

Decommissioning: The UWF Grid Connection will remain permanently in place as part of the national electricity network and thus decommissioning is not envisaged.

5.4 Use of Natural Resources, Emissions & Wastes

5.4.1 Use of Natural Resources

The resources which will be imported onto the UWF Grid Connection site or which will be obtained from within the site during the development of the UWF Grid Connection are described below.

5.4.1.1 Use of Resources: Land

In order to safely accommodate the construction works and construction traffic, the land requirement for the construction of the UWF Grid Connection is greater than for the operation of the UWF Grid Connection.

5.4.1.1.1 Requirements for Land

Construction Land Requirement: In total construction works areas will be located on 39.1 hectares of land, as follows; 6.0ha of farm roads, 12.9ha of agricultural land, 16.0ha of forestry road, 1.0ha of forestry firebreak, 1.3ha of forestry and 1.9ha of public road.

The construction stage land requirements is the Construction Works Area boundary as delineated in RED on Figure GC 5.3.

Operational Land Requirement: Once the Development is constructed, the requirement for lands will reduce considerably, and mainly comprises the footprint of the Mountphilips Substation, and the footprint of any access roads located outside of the wayleave areas which will provide access to the Joint Bays.

In total 15.7Ha are required during operation of the project, as follows; 2.4ha of farm roads, 5.2ha of agricultural land, 6.4ha of forestry road, 0.4ha of forestry firebreak, 0.5ha of forestry and 0.8ha of public road. These lands are identified on Figure GC 5.39.

Relevant Volume C3 EIAR Figures:

Figure GC 5.3: UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15).

Figure GC 5.39: Operational Stage Land Use Change (Overview & Maps 1 to 5).

5.4.1.1.2 Land use Restrictions

Restrictions on the use of land by landowners is limited to the Construction Stage, during which the use of the lands by the landowner will be restricted to varying degrees depending on the location and type of works taking place, as per:

- The use of agricultural lands, firebreaks and felled forestry in the construction works area (Figure GC 5.3) will be restricted during construction works on these areas, with restrictions continuing until vegetation has re-established following construction works; and
- The use of farm or forestry roads can continue during the construction works with some restrictions in place, forestry traffic if it occurs will use alternative routes along the forestry road network where available.
- Access will be maintained to lands at all times during construction, by arrangement with the individual landowners.

Following construction, the majority of the lands will be returned to their former use.

5.4.1.1.3 Land use Change

As a result of the construction of the UWF Grid Connection, 4.2ha of land will permanently change use as outlined below and illustrated on Figure GC 5.39;

- At the Mountphilips Substation site, 1.5ha of land will change ownership to ESB Networks, and this land will also change use from agricultural land to utility/hard-core surface/ access road,
- For New Permanent Access Roads, 1.4ha of land will change use from grassland to hard core access road (1.1Ha) and Concealed Access Road (0.3Ha).
- For New Permanent Access Roads, 0.5ha of land will change use from forestry to Concealed Access Roads. In addition 0.8Ha of forestry will change use to an unplanted area and 0.1Ha grassland will change use to road margin.
- 0.5Ha of New Permanent Berms will be reinstated with heathers and grasses from forestry road margin (0.4Ha) and grassland (0.1ha).
- Along the 110kV UGC, 11.1ha of lands will be subject to a 4m wide wayleave with ESB Networks. With the exception of building structures or planting forestry on the wayleave, use of these lands can continue as normal.

Relevant Volume C3 EIAR Figures:

Figure GC 5.39: Operational Stage Land Use Change (Overview & Maps 1 to 5)

5.4.1.2 Use of Resources: Biodiversity

5.4.1.2.1 Field Boundaries – Earthen Banks/Hedgerow/Trees

Hedgerows and earthen banks occur at most field boundaries within the UWF Grid Connection works areas. The removal of field boundaries and the pruning or removal of hedgerows and trees is limited to the construction stage.

Pruning: In total, 820m of hedgerows, which include trees of varying maturity, located close to works areas will be pruned to facilitate passage of machinery along works areas. All pruning will be conducted outside of the bird breeding season.

Permanent Removal: In total, 45m of hedgerow and 30 No. of trees of varying maturity will be permanently removed to facilitate a permanently widened entrance off the public road and a new permanent access road. These hedgerows and trees will be replaced with an equivalent length of new native hedgerow along with an equivalent number of native trees immediately adjacent to the area. All tree felling and hedgerow removal will be conducted outside of the bird breeding season.

Temporary Removal: During construction a total of 585m of field boundaries which include earthen banks, hedgerow and trees of varying maturity, will be required to be removed along the 110kV UGC construction works area boundary to accommodate the construction of UWF Grid Connection.

Bat Crossing Structures: On a number of hedgerows, a specially designed bat crossing structure will be erected at new entrances. These structures will be timber frames with vegetation attached, which will provide a continuation of flight-line for bats during the works.

Reinstatement of Hedgerows: Following the completion of construction works in an area, **the temporarily removed** section of field boundary will be reinstated to their original condition, with the formation of earthen banks and the replanting like for like with established (at least 3 year old) native hedgerow plants

in their original locations. Reinstatement will be carried out immediately following the completion of the works in the area.

Where hedgerow is removed to create **permanent sightlines**, new hedgerow will be planted as near as possible to their original location behind the sightlines.

Along **sensitive bat corridors**, the bat crossing structures installed during construction works will remain in place post-construction until the hedgerow has sufficiently regrown to provide viable habitat for bats. These bat crossing structures will be monitored by a suitably qualified bat specialist and maintained on a yearly basis until they are removed.

New Hedgerow created: c.700m of new hedgerow will be planted with locally sourced native species alongside the New Permanent Access Road between Site Entrance No.1 and the new Mountphilips Substation.

5.4.1.2.2 Forestry

Forestry felling is limited to the construction stage. In total 1.3ha of coniferous forestry will be permanently felled[3], under a felling license from the Forest Service. This forestry felling will be carried out outside of the bird breeding season.

5.4.1.2.3 Invasive Species

Packaging will be checked for the presence of white toothed shrew and prior to arrival on site, contractor's vehicles and equipment will be thoroughly cleaned and then dried. High-pressure steam cleaning, with water hotter than 65 degrees Celsius, in addition to the removal of all vegetative material, will be required for all vehicles and equipment involved in construction works.

An Invasive Species Management Plan will be implemented to prevent the spread of knotweed species, this Plan is included in Volume D: UWF Grid Connection Environmental Management Plan.

Relevant Volume C3 EIAR Figures:

The location and treatment of hedgerows/trees is shown on:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Maps 1-3, 6-9, 12-15)
Figure GC 5.20: Plan View of Permanent Site Entrance E1 at Coole (Mountphilips Substation & Temporary Compound C1)
Figure GC 5.21: Plan View of Permanent Site Entrance E15 at Bealaclave (Temporary Compound C2)
Figure GC 5.33: Cross Sections of Hedgerow Removal and Reinstatement
Figure GC 5.34: Cross Sections of Bat Crossing Structure

[3] A condition of the felling license will require that an equivalent area of forestry be replanted in another location. The New Native Woodland at Foilnaman, (UWF Replacement Forestry element of the Whole UWF Project) will fulfil this obligation.

5.4.1.3 Use of Resources: Water

5.4.1.3.1 Drilling Activities

Some water will also be required to cool the cutting head and aid in the removal of cut material from the bore hole during the drilling activities at the three rivers along the Mountphilips – Upperchurch 110kV UGC. This water will be sourced from a local municipal supply and brought onto UWF Grid Connection site as required. Water used in the bore hole will be collected and removed for treatment in a licenced water treatment plant as requested during consultations with Inland Fisheries Ireland (IFI).

5.4.1.3.2 Potable Water

During construction, there will be no requirement for an on-site well or mains water connection at the Mountphilips Substation. Bottled drinking water will be stored in the canteen at each of the three Temporary Compounds, and will be carried in small volumes by each crew or other personnel working at locations away from Temporary Compounds.

During operation, the demand for potable water will be very low, and, as the substation will only be occupied occasionally, bottled drinking water will be brought into the Mountphilips Substation, as needed.

5.4.1.3.3 Non-potable water

During construction, non-potable water for hand washing or toilet flushing will be imported to the Temporary Compounds from a local municipal supply and stored in water holding tanks at the toilet blocks at the Temporary Compounds. Non-potable water will also be stored in small water holding tanks in the single portable toilets, which will be located at works areas.

During operation, non-potable water for hand washing or toilet flushing will be supplied from a rainwater harvesting system which will be integrated into the Control Building at Mountphilips Substation during its construction (this **mitigation measure is part of the design of the UWF Grid Connection** and will avoid impacts to groundwater). The rainwater harvesting system will provide all of the water requirements for welfare facilities at the Mountphilips Substation during its operation.

5.4.1.4 Use of Resources: Soils

5.4.1.4.1 Excavated Soils

During the construction of the UWF Grid Connection, natural materials, such as topsoil, subsoil and rock, will arise from excavation works during the construction of the UWF Grid Connection. Approximately 9,615m^3 of topsoil, 1265m^3 of peat, 2,390m^3 of subsoil and 120m^3 of rock will be permanently excavated and relocated from the works areas. In addition, up to 11,140m3 of soils will be excavated from the construction works area boundary, including from the cable trench and from the footprint of any excavated temporary stone roads.

5.4.1.4.2 Permanent Storage

Some of the excavated material will be permanent stored, as follows:

- 8,370m^3 of the excavated material will be permanently stored along the 110kV UGC works area as linear berms and remainder (5,020m^3) will be reinstated within the works area.

5.4.1.4.3 Temporary Storage

The remaining material excavated from UWF Grid Connection construction works areas will be temporarily stored, within the construction works area identified in red on Figure GC 5.3. Topsoil, subsoil and rock will be stored separately, with as much surface vegetation left intact on the topsoil layer as possible. Suitable excavated competent material will be used to backfill the Cables Trench and following the completion of works in any area; the temporarily stored topsoil and subsoil will be used to backfill, reinstate and landscape the works areas.

5.4.1.4.4 Public Road Arising's and Contaminated Material

Approximately, 660m^3 of spoil will also arise during excavations in public roads. The excess material arising from lengths of 110kV UGC excavated in the public road or contaminated material arising during the construction of UWF Grid Connection will be collected by Arlo Group and transported to their approved licensed facilities at Thurles, County Tipperary,

5.4.1.4.5 Imported Rock

Up to 5,470m^3 of graded crushed stone will be imported onto the UWF Grid Connection work areas from the local Rear Cross Quarry.

5.4.1.4.6 Operational Stage - Soil

No excavations of soils will be required during the routine operation of the UWF Grid Connection.

Planned maintenance or unplanned repairs, if any occur, on the 110kV UGC, is likely to involve the re-opening of the underground chambers, at Joint Bays. This work which will result in very small volumes of crushed stone and sand being temporarily removed from the area directly over the joint bay covers, stored adjacent to the Joint Bay, and re-used to reinstate the top of the Joint Bay following the completion of the repairs.

Very small volumes of peat compost may be required during the establishment phase (first 18 months) of the Concealed Access Roads to apply a top dressing to the geocells if required.

5.4.2 Emissions

The main potential for emissions arises during the Construction Stage.

5.4.2.1 Dust

Dust may arise during the construction stage, due to the transportation of aggregate to site, movement of delivery vehicles both on and off the site; the movement of excavated material within the site, and from stored excavated materials at the works areas, particularly during dry and windy weather. During operation, the presence of excavations on-site, and therefore dust emissions, will be negligible – excavations, will generally only occur at Joint Bays during planned maintenance/unplanned repairs, which are expected to occur only very infrequently (if at all) during operation, and will involve the excavation of crushed stone and sand rather than soils.

5.4.2.2 Vehicle Exhausts

During the construction stage, all of the machinery used will be run on hydrocarbons and will emit nitrogen dioxide and other greenhouse gas emissions. During the operational stage, the presence of vehicles on site, and therefore nitrogen dioxide and other greenhouse gas emissions, will be negligible with a van or four wheel drive vehicle being used c.12 days per year, split roughly half and half between the Mountphilips Substation and the 110kV UGC.

5.4.2.3 Noise

During the construction stage, heavy machinery and vehicles which will be used at works areas will emit noise during their operation, noise will also be emitted from certain construction activities such as drilling, excavation or rock breaking or by mobile generators which may be used at work areas. During the operational stage, the presence of vehicles on site, and therefore noise emissions, will be negligible with a van or four wheel drive vehicle being used c.13 days per year, split roughly half and half between the Mountphilips Substation and the 110kV UGC.

5.4.2.4 Vibration

Construction works, including excavations and the use of heavy machinery will cause low levels of ground vibration. **No blasting or piling** will occur at the UWF Grid Connection construction works areas. No vibration emissions are expected during the operation of the UWF Grid Connection.

5.4.2.5 Light

Lighting will be used at the Temporary Compounds during construction and at the Mountphilips Substation Compound to illuminate the Substation Compound, the Control Building and access points during its operation. This lighting will use a cowled design along with motion-sensor and timer controlled lights which will not remain turned-on overnight. The 110kV UGC does not require any lighting.

5.4.2.6 Electromagnetic Radiation

Low frequency electrical and magnetic fields (EMF) will be present anywhere electricity is generated, distributed or used and therefore these electromagnetic fields are a common occurrence in everyday life. The operational Mountphilips Substation and the underground 110kV cables will each be a source of very low frequency (50Hz) electromagnetic fields. No electromagnetic fields will occur during the construction stage.

5.4.3 Waste

The greatest potential for waste occurs during the Main Construction stage of the project.

5.4.3.1 Waste Water

During the construction stage, self-contained toilets, with integrated waste water storage tanks, will be provided for construction workers, at the Temporary Compounds. Single self-contained, solar-powered toilets (portaloos) will also be provided at each of active works areas. The waste water storage tanks associated with the above toilet facilities will be emptied on a regular basis.

During the operational stage, toilet facilities will be installed in the Mountphilips Substation Control Building. The waste water storage tanks associated with the toilet facility at Mountphilips will be emptied on a regular basis.

5.4.3.2 General Waste

During the construction stage, materials such as pallets, packaging, and excess construction and building materials will be generated in small quantities at construction works areas. All individual waste streams will be identified at source, separated into recyclable and landfill waste and stored in a designated area at the Temporary Compounds.

During operation, general waste will arise in small quantities during maintenance activities at the operational Mountphilips Substation, including empty containers, packaging, materials and rags etc. This waste will be stored in a suitable container in a designated area with the secure Substation Compound.

5.4.3.3 Chemical waste

During construction, very small quantities of chemical waste will be generated, this waste is limited to solid waste oil, such as oily rags. All chemical wastes will be stored in secure, bunded and covered storage containers, in a designated secure part of the Temporary Compounds.

During operation, small volumes of chemical wastes, including oil and grease, may arise during the operational stage. These wastes will be taken off-site by the maintenance personnel and disposed of in an appropriately licensed facility.

5.4.3.4 Arisings

During the construction stage, arisings from any excavations within the structure of the public road will consist of old chip, tar, subsoils and rock material. Arisings also include any contaminated soils from off-road construction works areas. No arisings are expected during the Operational Stage.

5.4.3.5 Waste Management Plan

Any wastes which result from the operation of the UWF Grid Connection will be managed under the Waste Management Plan. The Plan includes a hierarchy of controls in relation to waste; Prevent, Reduce, Reuse, Recover and Responsibility and the controls and procedures which will be undertaken as part of the management of waste are specified. A strict chain of custody system will be set up as part of the Waste Management Plan to enable all wastes to be controlled in the appropriate manner.

The **Waste Management Plan** is included in Volume D: UWF Grid Connection Environmental Management Plan**.**

5.5 Vulnerability of the Project to Major Accidents and Natural Disasters

Major accidents or natural disasters which have the potential to affect the UWF Grid Connection are described hereunder. The vulnerability (exposure and resilience) of the UWF Grid Connection to major accidents and disasters and the risk of these accidents or disasters is classified according to the *Guide to Risk Assessment in Major Emergency Management* (DoEHLG, 2010). This Guide is included as Appendix 5.7 Volume C4: EIAR Appendices.

5.5.1 Vulnerability to Major Accidents

It is clear from the EIA Directive that 'major accident' mainly applies to notified Seveso establishments which operate under the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015, where Dangerous Substances are identified in Schedule 1.

The UWF Grid Connection **is not vulnerable to Major Accidents**, due to the minimal volumes of the Dangerous Substances which will be used, limited to small volumes of diesel fuel used by vehicles during the construction and operation of the UWF Grid Connection, and very small volumes of grease and sulphur hexafluoride (SF6) gas used at the Mountphilips Substation during its operation. Furthermore there are no Seveso sites in proximity to the UWF Grid Connection site, the closest being Grassland Agro in Limerick.

5.5.2 Vulnerability to Natural Disasters

Natural disasters which could potentially affect the UWF Grid Connection include land slippage and flooding. The likelihood of these natural disasters occurring is discussed below, with likelihood of the natural disaster occurring rated according to the DoEHLG 2010 Guidelines. The risk classification tables are included in Appendix 5.7: A Guide to Risk Assessment in Major Emergency Management Jan 2010.

5.5.2.1 Land-slippage

A Peat Stability Assessment was carried out by Dr Paul Jennings of Applied Ground Engineering Consultants (AGEC), chartered geotechnical engineer with over 30 years' experience in design and construction of sub-surface structures with particular expertise in forensic investigations of landslides. Dr Jennings concludes that the location of the UWF Grid Connection (110kV UGC) has a low and acceptable risk of potential peat failure, and has an acceptable margin of safety and is suitable for the development of the 110kV UGC.

The Peat Stability Assessment can be found in Appendix 10.3: Peat Stability Assessment, of Volume C4 EIA Report Appendices.

It is considered that the UWF Grid Connection is not vulnerable to natural disasters such as land slippage, due to the absence of peat and inherent stability of the subsoils on most of the site and the acceptable margin of safety along the part of the 110kV UGC in deeper peat. Therefore it is considered that the likelihood of land slippage disaster occurring along the UWF Grid Connection is **Very Unlikely**.

5.5.2.2 Flooding

In recent years, high rainfall events and subsequent flooding have become more frequent in Ireland. Where complete the Catchment Flood Risk Assessment and Management (CFRAM)[4] OPW Flood Risk Assessment Maps are now the primary reference for flood risk planning in Ireland and supersede the Preliminary Flood Risk Assessment Maps (PFRA) maps. CFRAM mapping is not currently available for the area of the UWF Grid Connection and therefore the PFRA maps have been consulted.

A Stage II Flood Risk Assessment was completed for the subject development by Hydro Environmental Services, a specialist hydrological and hydrogeological consultancy, who concluded that there is a low risk of impact on the UWF Grid Connection as a result of potential flooding because based on the PFRA mapping all of the above-ground permanent infrastructure (i.e. Mountphilips Substation, new permanent access roads and Joint Bays are located in mapped Flood Zone C – where the probability of flooding is low (less than 0.1% or 1 in 1,000).

Also, there will be no potential of increased local flood risk as a result of the UWF Grid Connection as most of the subject development is located underground (i.e. 110kV cable). The footprint of the above-ground permanent infrastructure is minimal and distributed over several catchments and all new permanent watercourse crossing culverts will be suitably designed to accommodate flood flows

The Flood Risk Assessment can be found in Appendix 11.3: Flood Risk Assessment, of Volume C4 EIA Report Appendices**.**

Due to the fact that the UWF Grid Connection 110kV cable is not vulnerable to flooding due to the underground nature of the cable within a trench and the fact that permanent access roads to joint bay locations and the Mountphilips Substation are located in Flood Zone C (Low Risk), it is considered that the likelihood of flooding disaster occurring along the UWF Grid Connection is **Unlikely**.

5.5.2.3 Consequences of Natural Disasters Occurring

The consequence of the impact if the event occurs is described here.

Due to the low number of personnel working on-site at any one location, the consequence of any flooding or land slippage events, if they did occur, is considered to be **Limited**.

Due to the low number of people living or working locally, the consequence of any flooding or land slippage events, if they did occur, is also considered to be **Limited.**

The consequences to water quality due to land slippage or flooding could be **Serious** due to the widespread effects and extended duration of sedimentation effects in downstream watercourses.

5.5.2.4 Overall Risk

When the likelihood and the consequence of a potential land slippage or flooding event occurring is applied to the risk matrix from the DoEHLG 2010 guidelines, a broad indication of the critical nature of each risk can be determined.

[4] CFRAM is Catchment Flood Risk Assessment and Management. The national CFRAM programme commenced in Ireland in 2011, and is managed by the OPW. The CFRAM Programme is central to the medium to long-term strategy for the reduction and management of flood risk in Ireland.

In relation to on-site personnel and other people in the locality, a land slippage or flooding event would be classed a 'normal emergency' - based on a likelihood rating of Very Unlikely and Extremely Unlikely and a consequence rating of Limited.

In relation to downstream water quality, due to the higher level of effect (Serious) on water quality a land slippage or flooding event could be a major emergency. According to the DoEHLG 2010 guidelines, both flooding and landslip events would be at the lower extreme of 'major emergency'.

5.5.2.5 Mitigation Measures

In relation to flooding, construction works for the underground cables will be carried out during dry periods in locations within mapped fluvial or pluvial flooding zones. Instream works on Class 1 and Class 2 watercourses will also be carried out during dry periods in the months of July, August and September, and all new permanent crossing structures will be sized to cope with a minimum 100 year flood event.

In relation to land slippage, the 110kV UGC in the area of deeper peat in the Castlewaller/Killeen area has been designed in conjunction with AGEC, who have also stipulated the construction methodologies and control measures which will be implemented in this area. In addition, contingency measures have been developed by AGEC, to ensure that the effects of landslippage, in the very unlikely event that it occurs, are minimised and that an emergency response can be implemented quickly and effectively. This contingency plan is included in Volume D: UWF Grid Connection Environmental Management Plan .

Should a disaster occur, unconnected to the project but in the locality – the above mitigation measures already designed into the project will ensure that the project will not make the consequences of the event worst. In addition the presence of the project will not increase the likelihood of such an event occurring.

5.6 Cumulative Descriptions

Table 5-9: Subject Development: UWF Grid Connection - Element 1 of the Whole UWF Project

	The Subject Development	Composition of the Subject Development	Planning Status and Competent Authority for the Subject Development
1	The Subject Development UWF Grid Connection (GC)	Mountphilips Substation Mountphilips – Upperchurch 110kV UGC Grid Connection Access Roads Grid Connection Ancillary Works	Current planning application to An Bord Pleanála

An **overview of Element 1, UWF Grid Connection**, the subject development, is provided in Section 5.2.2 above. A **full description** of the subject development is provided in the successive Sections 5.2 to 5.5.

5.6.1 Description of the Other Elements of the Whole UWF Project

In order that a cumulative evaluation can be carried out for the UWF Grid Connection, an overview description is provided hereunder of all the other elements of the whole UWF project.

Table 5-10: Element 2 to 5 of the Whole UWF Project

	Element of the whole UWF project	Composition of each Element	Relevant Appendix Location for description of each element
2	UWF Related Works (RW)	Internal Windfarm Cabling Realigned Windfarm Roads Haul Route Works Telecom Relay Pole RW Ancillary Works	Appendix 5.3
3	UWF Replacement Forestry (RF)	Replacement Forestry at Foilnaman	Appendix 5.4
4	Upperchurch Windfarm (UWF)	Consented UWF Turbines Consented UWF Substation Consented UWF Roads UWF Ancillary Works	Appendix 5.5
5	UWF Other Activities (OA)	Haul Route Activities Upperchurch Hen Harrier Scheme Monitoring Activities Overhead Line Activities	Appendix 5.6

Relevant Volume C3 EIAR Figures:

Figure CE 1.1: Location of UWF Grid Connection and the Other Elements of the Whole UWF Project on OSI Mapping.

An EIA Report has also been prepared to accompany concurrent planning applications to the relevant Competent Authorities, for the UWF Related Works and UWF Replacement Forestry.

This information on the other elements of the whole UWF project can be found in the following locations;

- **Full EIA Report** or EIS (as appropriate) for **Elements 2, 3, and 4** in Volume F: Reference Documents for Other Elements of the Whole UWF Project.
- **Description of each element 2, 3, 4, and 5** (presented in a format similar to this chapter and with smaller scale reference mapping and figures) in Appendices 5.3 to Appendix 5.6**,** see Volume C4: EIAR Appendices**.**
- **Overview description of each elements 2, 3, 4, and 5** of each other element in this Section hereunder.

5.6.1.1 Element 2: UWF Related Works

An application for planning permission for UWF Related Works has been submitted to Tipperary County Council. This application is accompanied by an EIA Report.

The full **EIA Report including mapping and figures for UWF Related Works** is included in Volume F: Reference Documents for Other Elements of the Whole UWF Project.

An extract from Volume F of the **detailed description** of the UWF Related Works (presented in a format similar to 5.2 to 5.5 above) along with a **copy of the accompanying figures** is included in Appendix 5.3: Description of Development (UWF Related Works).

A summary overview of UWF Related Works is provided hereunder.

5.6.1.1.1 Location and Characteristics of UWF Related Works

The UWF Related works comprises of the following:

Internal Windfarm Cabling of c. 17.9km in length, to connect the Consented UWF Turbines to the Consented UWF Substation, through the installation of underground cables within ducts in trenches 1.25m deep and 0.6 wide. The majority (11.1km) of the Internal Windfarm Cabling will be installed under Consented Windfarm Roads or Realigned Windfarm Roads. The remainder of the Internal Windfarm Cabling will be installed in agricultural lands (4.6km), forestry lands (2.1km and forestry felling of 0.1ha), and crossing under 9 No. public roads (40 meters). The cabling will traverse the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnaman, Gleninchnaveigh, Coumnageeha, Coumbeg, Knocknamena Commons, Glenbeg and Seskin.

The Internal Windfarm Cabling consists of electrical cables and communication cables and the copper conductor cables which are installed inside High Density Polyethylene (HDPE) ducting in underground trenches. The trench will be excavated, ducting and warning tapes installed and trench backfilled and reinstated. When the ducting installation is finished and the trench reinstated, the electrical, communication and copper conductor cables will then be pulled through the ducting. The only surface expression of the Internal Windfarm Cabling will be the over-ground identification marker posts and marker plates which will be installed at regular intervals above the cables trench

Realigned Windfarm Roads to realign the consented UWF Windfarm Roads at three locations;

The consented windfarm road to Turbine No.5 in Shevry is 560m in length, and will replace this road in its entirety with a new road 230m in length through forestry. This will require forestry felling of 0.2ha.

The consented windfarm road between Turbine No.19, Turbine No. 20 and Turbine No. 21, is 840m in length. It will replace 370m of this road with a new road also 370m in length. 220m of this road will be located on grassland field, with the remaining 150m in length located on existing farm road. The existing farm road section will be upgraded during construction works.

A short length (30m) of new access road is between the consented windfarm roads in Knockmaroe to the new Telecom Relay Pole.

Haul Route Works are along public road verges, roadside boundaries and grassland fields in order to widen parts of the L4139-0, L4138-12, L2264-50, L6188-0, L6185-13 by between 0.5m and 1.5m and to widen an entrance off the R503 by 30m. These works will facilitate the delivery of turbine components to the Upperchurch Windfarm site and will take place in the following townlands: Shevry, Knockcurraghbola

Commons, Knocknabansha, Knockmaroe and Grousehall. Works include the removal of soils and laying of crushed stone and hard-core in roadside verges for 1710m in total; temporary removal and reinstatement of 1035m of hedgerow and earthen banks which form roadside boundaries; permanent removal of 25m of roadside boundary and the construction of 290m temporary access roads on private lands.

The **Telecom Relay Pole** will relay communication signals around the Consented UWF Turbines in order to avoid interference from the operating Upperchurch Windfarm. The Telecom Relay Pole will comprise a wooden pole, up to 18m in height, with relay equipment attached to the top of the pole. A small compound, 5m X 5m in size, will enclose the relay pole, along with a ground based outdoor cabinet 2m high, 1.2m long and 1m wide and ancillary equipment. The compound will be securely fenced with 2.4m high palisade fencing; a native hedgerow will be planted on the berm created from the excavations. A communications and low voltage (LV) electricity supply will be cabled to the compound, from the existing supply at the Foilnaman mast, by 300m in length of cabling.

RW Ancillary Works will facilitate the construction of the UWF Related Works and will include a change of use for and existing agricultural entrance to agricultural and forestry entrance in permanent use, and 14 No. temporary site entrances; 5300m of temporary access roads; temporary and permanent watercourse crossings, involving 24 No. small field drains and 8 no. streams; drainage systems around permanent features and temporary drainage around works areas; 0.3 hectares of forestry to be felled; temporary and permanent hedgerow/tree removal; temporary and permanent fencing, temporary goal posts and bat crossing structures; relocation of 5 No. existing telephone poles; 11,830m^3 of material will be excavated and temporarily stored for subsequent reinstatement or permanently placed in berms; reinstatement of roadside boundaries and public road surfaces.

5.6.1.1.2 UWF Related Works: Construction & Operation

UWF Related Works Construction Phase: All elements of the whole UWF project will be constructed at the same time and is expected to commence 2018/2019 and will take approx. 12 months. 5 of the c.100 persons working directly on the Upperchurch Windfarm site will work on UWF Related Works. A specialist communication engineering crew, made up of c. 2 personnel, will be involved in the erection and set up of the Telecom Relay Pole. The UWF Related Works, 23 No. loads of concrete and 292 No. loads of aggregate will be transported to the site by HGV, from local suppliers. A further 2 No. loads of road surfacing material and 43 No. loads of specific building materials will also be imported to the site, from various suppliers in the Region.

UWF Related Works Operational Phase: UWF has been granted permission to operate for 25 years from the date of commissioning. UWF Related Works will operate for the same period as the windfarm. The personnel employed in O&M for the windfarm will also maintain the UWF Related Works.

UWF Related Works use of Natural Resources: 20.9 hectares of land within the full UWF Related Works construction site which is reduced to just 25m^2 around the Telecom Relay Pole compound, during the operational phase; 4750m^3 of topsoil, 6670m^3 of subsoil and 360m^3 of rock will arise from excavation works; small amounts of potable and non-potable water will be imported onto the site as required; 170m of hedgerow and 4 No. trees will be removed and the equivalent amount replanted following construction.

UWF Related Works Emissions: Insignificant dust, construction machinery exhaust, noise, vibration and light will be emitted during the **Construction Stage**. During the **Operational Stage** there will be negligible dust, vehicle exhaust, noise, vibration and light emitted. The operational electrical plant will be a source of electromagnetic fields but these will not be at levels to cause significant effects.

UWF Related Works Waste UWF Related Works personnel will use the welfare facilities and waste facilities provided at the Windfarm Site Compound No. 1 and No. 2. At these facilities, waste water will be contained in self-contained units and emptied by a licenced facility or, in the case of the Site Offices, will be treated in the existing septic tank. General and chemical waste will be segregated and stored in allocated tanks, bins, skips or areas at Site Compound No.1 and collected by an appropriately licensed waste contractor. There will be minimal general and chemical waste during the **Operational Stage**. This waste will be stored in a designated and secure area at the windfarm site offices and collected by an appropriately licenced operator. Welfare facilities for the O&M crew will be provided at the windfarm site offices. Any wastes which result from the construction, operation and decommissioning of UWF Related Works will be managed under the Waste Management Plan for the operating UWF.

5.6.1.2 Element 3: UWF Replacement Forestry

An **application for an afforestation license** for UWF Replacement Forestry has been submitted to the Minister for Agriculture, Food and the Marine. This application is accompanied by an EIA Report.

The full **EIA Report including mapping and figures for UWF Replacement Forestry** is included with the planning application in Volume F: Reference Documents for Other Elements of the Whole UWF Project.

An extract from Volume F of the **detailed description** of the UWF Replacement Forestry (presented in a format similar to 5.2 to 5.5 above) along with **a copy of the accompanying figures** is included in Appendix 5.4: Description of Development (UWF Replacement Forestry).

A summary overview of UWF Replacement Forestry is provided hereunder.

5.6.1.2.1 Location and Characteristics of UWF Replacement Forestry

UWF Replacement Forestry relates to the planting with forestry, of 6ha of agricultural lands the purpose of which is to fulfil the replanting obligation which will arise from the felling of forestry for the development of the whole UWF project.

Located at Foilnaman townland, near Upperchurch, County Tipperary, 6 hectares (6ha) of agricultural grassland at will be planted with native woodland species, set in clusters of well-matched native species. There will be varied spacing created between the clusters according to Forest Service recommendations. A mixture of tall trees and understory shrubs will be planted, and the design includes wide ride-lines between deeper areas of core woodland. The ride-lines will create open spaces with tree-lined boundaries, which is much favoured by birds of prey during the day (e.g. hen harrier) and bats at night as hunting ground. A mixture of land cover – tall grasses, short grasses and scrub will be maintained under the planting and in the ride lines. Tree guards will be used to protect the saplings and young trees from rabbit damage. A livestock-proof fence will be erected around the perimeter of the planting.

The lands to be afforested are currently in two agricultural landholdings. A small watercourse, with an existing culvert crossing, runs through the centre. The existing riparian habitat along this watercourse will be enhanced through planting with hazel, alder and willow species and the entire afforestation land will be protected from livestock by the perimeter fencing.

There is a change of use required for an existing agricultural entrance to agricultural and forestry entrance which will remain in permanent use. This change of use is part of UWF Related Works – RW Ancillary Works.

The UWF Replacement Forestry will be designed and planted in accordance with the *Forest Service (2006) Information Note No. 5: Establishment, Design and Stocking Densities of New Native Woodland* and *Felling and Reforestation Policy published by the Forest Service (May 2017).*

5.6.1.2.2 UWF Replanted Forestry: Planting and Growth Stage

UWF Replanted Forestry Planting Stage: Tree planting will be carried out by 4 No. forestry professionals. Tree saplings, wooden fence posts and fencing wire and gates will be imported to the site by 4WD vehicle.

UWF Growth Stage: Once planted, the trees will go through numerous stages of growth from sapling, through to maturity, old age and eventual decay with natural regeneration occurring through the lifecycle of the native wood. Other than thinning activities and grass/scrub management, natural maturation, old age and regeneration, no other changes to the native woodland are expected. Felling is not envisaged.

Use of Natural Resources: 6ha of agricultural land will be planted with mixed species to create a native woodland, comprising tall trees and understory shrubs, along with wide ride-lines, and a mix of tall grasses, short grasses and scrub land cover maintained during the growth stage. This will enhance biodiversity in the area. New trees and shrubs will be set back from the watercourse which runs through the UWF Replacement Forestry site. The existing riparian habitat will be enhanced through the planting with hazel, alder and willow species and the lands will be protected from livestock by the perimeter fence. Planting will be carried out by hand using spades. Small localised patches of disturbed soil will occur at the sapling tree trunks.

Emissions – Planting and Growth Stage: Negligible.

Waste - Planting and Growth Stage - such as packaging, and excess planting materials will be generated in very small quantities and this waste will be removed at source and disposed of in an appropriate licensed facility

5.6.1.3 Element 4: Upperchurch Windfarm

An overview description of already consented Upperchurch Windfarm (UWF) is provided hereunder.

An application for planning permission for Upperchurch Windfarm (Consented UWF) was made to Tipperary County Council in January 2013. The windfarm was permitted by Tipperary County Council in January 2014 and the permission was upheld by An Bord Pleanála in August 2014. The application was accompanied by an EIA Report (known as EIS at the time) and Natura Impact Statement. The full planning documents for consented UWF can be found in Volume F: Reference Documents for Other Elements of the Whole UWF Project**.**

5.6.1.3.1 Overview of the Location and Characteristics of Upperchurch Windfarm

UWF will comprise 22 wind turbines with an overall height up to 126.6 metres, 2 meteorological masts with an overall height of up to 80 metres, turbine foundation and crane hardstanding areas, access roads and an electrical substation.

The Upperchurch Windfarm site is located in the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnaman, Gleninchnaveigh, Coumnageeha, Coumbeg, Knocknamena Commons, Glenbeg and Seskin. This is an area 2km west of Upperchurch village and 18km to the west of Thurles, County Tipperary.

The 22 wind turbines, associated crane hardstandings and ancillary works will be constructed on a series of small hills ranging in elevation from 280m to 401m OD, set out generally over four areas. The substation will be constructed in Knockcurraghbola Commons and the turbines will be connected by underground cables to the substation. There will be two meteorological masts erected, one in Grousehall and a second in Knocknamena townlands. Ancillary Works will include borrow pits in Shevry, Knocknamena, Knockmaroe and Grousehall; 1 No. site entrance from the R503 Regional Road at Graniera and; 10 No. site entrances from local public roads, through and around the site, which will provide access to the windfarm.

A document, with a **detailed description of the Upperchurch Windfarm,** has been compiled from the original 2013 Upperchurch Windfarm EIS, from the Reply to Further Information, the additional information submitted during the planning process and mitigation measures and planning conditions attaching to the Grant of Permission, to reflect a description of the development as it is now permitted. This compilation document has been prepared in the same format as the current application Chapter 5, for ease of cross referencing. The compilation document can be found in Appendix 5.4: Compiled Description of Upperchurch Windfarm.

The full planning documents for consented UWF can be found in Volume F: Reference Documents**.**

Upperchurch Windfarm (UWF) is comprised of the following parts:

- **Consented UWF Turbines** - 22 No. wind turbines of the three-bladed, tubular tower model, light grey in colour and an overall height to blade tip upto 126.6m. The turbines will be constructed on concrete bases with an adjacent hard-core hardstand area. There is no requirement for fencing of turbine areas. The turbines will be connected by underground cables to the Consented UWF Substation.
- **Consented UWF Substation** - 110kV substation compound which includes a control building, main transformer and other electrical equipment enclosed in a compound by a palisade fence. The substation will measure 64m x 41m.
- **Consented UWF Windfarm Roads** - 11.6km of windfarm access roads will comprise 8km of newly built 5m wide roads and 3.6km of existing farm roads which will require upgrading and widening (by an average of 2m).

- **Consented Ancillary Works** – The main items of ancillary works will include, 2 No. meteorological masts up to 80m in height; 11 No. site entrances; 1 No. stream crossing; site drainage system; 2 No. construction site compounds; 6 No. borrow pits from which most of the aggregate required will be won; forestry felling, hedgerow removal and reinstatement; excavation, storage and reinstatement of soils.

5.6.1.3.2 Upperchurch Windfarm: Construction & Operation

UWF Construction Phase: All elements of the whole UWF project will be constructed at the same time.

Construction of UWF is expected to commence 2018/2019 and will take approx. 12 months. Approximately 277 persons will be engaged in the civil, electrical, project management, legal and financial services, material supply and component deliveries for the windfarm. Approximately 950 No. loads of concrete; 15 No. loads of reinforcing steel and 5 No. loads of general building materials and 212 No. loads of electrical plant and equipment (abnormal size loads) will be imported to the site by HGV. The abnormal turbine loads will be transported from Foynes Port.

UWF Operational Phase: UWF has been granted permission to operate for 25 years from the date of commissioning of the wind turbines, whereupon there will then be an option to apply for continuance of use or decommission the plant and restore the site. There will be 8 permanent jobs created in operation and maintenance activities, legal, electricity sales and asset management during the operational phase.

UWF use of Natural Resources: 56.3 hectares of land within the construction works site will reduced to 6.4 ha during the operational phase; Approx. 108,000m^3 of excavated soils; 43,000m^3 of aggregate mostly won on-site and otherwise imported from local quarry at Shanballyedmond, Rear Cross; small amounts of potable and non-potable water, sourced at an existing well at the windfarm site offices in Site Compound No. 2; felling of 4.4 hectares of conifers; 960m of hedgerow removed.

UWF Emissions: Dust, construction machinery exhaust, noise, vibration and light will be emitted during the construction stage. There is no house within 200m of the construction works. During the **Operational Stage** there will be negligible dust, vehicle exhaust, vibration and light emitted. The turbines will emit noise during operation. Permitted noise emissions are prescribed by planning condition. The operational electrical plant will be a source of very low frequency (50Hz) electromagnetic fields but these will not be at levels to cause significant effects at the turbine locations, and no effects will occur at local residences.

UWF Waste: During construction, waste water from welfare facilities will be contained in self-contained units and emptied by a licenced facility or in the case of the Site Offices, will be treated in the existing septic tank. General and chemical waste will also arise from construction activities and processes. During operation, minimal general and chemical waste will arise on site. All waste will be stored in a designated and secure areas, for collection by an appropriately licenced operator. Any wastes which result from the construction, operation and decommissioning of the Windfarm will be managed under a specific Waste Management Plan.

5.6.1.4 Element 5: UWF Other Activities

Although UWF Other Activities do not require planning permission, they do form part of the whole UWF project and therefore are included in the cumulative evaluation. A **description of these activities,** along with **mapping and figures** is included in Appendix 5.6: Description of the UWF Other Activities.

An overview of UWF Other Activities is provided hereunder.

5.6.1.4.1 Location and Activities of UWF Other Activities

The **Haul Route Activities** will facilitate the transportation of turbine components to the Upperchurch Windfarm site and are located at various points on the national and regional road network along the UWF turbine component haul route between Foynes Port in County Limerick and junction of the R503 and R497 Regional Roads in Knockmaroe townland, County Limerick. Activities comprise the laying of matting over verges at up to 5 No. locations, removal and replacement of street furniture (mainly signposts) at 13 No. locations and the trimming of up to 960m of hedgerow/trees at up to 15 No. locations.

The **Upperchurch Hen Harrier Scheme** will enhance and protect habitat for hen harrier in the vicinity of Upperchurch Windfarm, in order to fulfil planning condition No.18, attaching to the windfarm. The Upperchurch Hen Harrier Scheme is located in Knockcurraghbola Commons, Coumnageeha, Foilnaman, Knockmaroe and Grousehall townlands on 128ha of agricultural lands between the Slievefelim to Silvermines SPA and the Upperchurch Windfarm. Activities associated with the Scheme includes once off activities such as planting of hedgerows and trees; enhancement of riparian corridors and scrub/wood areas; and the fencing off of watercourses and newly planted trees and shrubs. The Scheme also includes long-term farm management practices such as management of rush coverage, livestock grazing and the control of the use of lime, fertilizers and burning of gorse, amongst others. Nine local landowners are signed-up to the Scheme. Implementation involves a mix of initial once-off activities which will both create new habitat and protect and enhance existing habitat; and on-going farming practices which will result in the long term maintenance of hen harrier habitat.

Monitoring Activities will monitor the Whole UWF Project for compliance with the environmental protection measures and mitigation measures detailed in the UWF 2013 EIS and 2013 RFI (including the Construction Environmental Management Plan for Upperchurch Windfarm and the Ecological Management Plan for Upperchurch Windfarm); Planning Conditions attaching to the already consented UWF; and measures in the 2018 UWF Grid Connection EIA Report, the 2018 UWF Related Works EIA Report and the 2018 UWF Replacement Forestry EIA Report and associated UWF Grid Connection Environmental Management Plan and UWF Related Works Environmental Management Plans. Monitoring will also involve the supervision and recording of key construction activities, and monitoring of progress of land reinstatement.

Overhead Line Activities include re-sagging activities and fibre wrapping activities. The purpose of the re-sagging activities is to correct the tension of the existing overhead line, following the installation of the UWF Grid Connection End Masts, so that the lines are held within predefined tension parameters. The purpose of fibre wrapping is to provide a communication link to the newly installed Mountphilips Substation. The tension will be corrected on 2 no. Sections - i) between ESBN Angle Mast Structure No. 79 (c.200m south of Mountphilips substation) to New Mountphilips End Mast No. 1 and ii) between New Mountphilips End Mast No. 2 and ESBN Angle Mast Structure No. 90 (2.3 km north of Mountphilips substation). Wrapping the overhead line with fibre optic cable from Killonan ESBN substation (just east of Limerick City) to Mountphilips substation. The Overhead Line Activities will be carried out according to industry standard method statements, including standard health & safety and environmental management systems.

5.6.1.4.2 UWF Other Activities: Construction & Operation

Timing: The **Haul Route Activities** will occur prior to commencement of turbine component haulage and reinstatement will occur immediately after the passage of all components. The initial once-off activities associated with the **Upperchurch Hen Harrier Scheme** such as permanent planting and fencing of newly planted areas and watercourses will be carried out during the same period as the construction of UWF and UWF Related Works. There will be pre-construction **Monitoring Activities** before UWF and UWF Related Works commence. **Overhead Line Activities** will take place at the same time as the construction of Mountphilips substation.

UWF Other Activities Construction Phase: Approximately 50 persons will be engaged in UWF Other Activities including haul route activities, landowners involved in the hen harrier scheme, environmental experts engaged in the monitoring schemes and ESB Crews involved in overhead line activities. There will be very little materials delivered to the activity sites, these will include deliveries of geotextile matting, trees and shrubs, fencing materials and specialist ESB equipment.

UWF Other Activities Operational Phase: The same **Haul Route Activities** as for the construction phase, will be required in the occasional event of a large component delivery to UWF, if required, during the operational phase. The farming practices required under the **Upperchurch Hen Harrier Scheme** will continue throughout the lifetime of UWF. **Monitoring** of the success of Upperchurch Hen Harrier Scheme will be carried out during the operational lifetime of UWF. Monitoring will also include operational planning conditions and Ecological Management Plan compliance.

Use of Natural Resources: No land use changes required. No water or welfare facilities required. No mechanical excavations required; all planting will be carried out by hand. For haul route activities, up to 960m of roadside boundary hedges/treelines will be trimmed, outside of the general bird breeding season. For the Hen Harrier Scheme, 2.2ha of trees, 1.4km of riparian habitat and 2.8km of new hedgerow will be enhanced or created during initial activities. In total 128 hectares of agricultural lands will be management for the benefit of hen harrier.

There will be negligible **Emissions** from vehicles transporting personnel and any general **Waste** arising on-site will be removed by the crew themselves during the **construction** and **operational phase** of these Other Activities**.**

5.6.1.5 Cumulative Locational Context of all the Elements

The majority of the whole UWF project is located in County Tipperary with some minor activities along the Upperchurch Windfarm turbine component haul route and on the Killonan to Nenagh 110kV overhead line, in County Limerick (these activities are part of Element 5: UWF Other Activities).

The UWF Grid Connection is adjacent to and overlaps with Other Elements of the Whole UWF Project where:

- It is adjacent to the UWF Related Works and the Upperchurch Windfarm in Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola Crownlands,
- It overlaps with Upperchurch Windfarm at the Consented UWF Substation, and

Relevant Volume C3 EIAR Figures:

Figure CE 1.2: UWF Grid Connection and the Other Elements of the Whole UWF Project in the vicinity of Upperchurch Windfarm.

Figure CE 1.3: UWF Grid Connection and the Other Elements of the Whole UWF Project in Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola Crownlands.

5.6.2 Secondary Projects

The addition of Mountphilips Substation will add a new high voltage electrical substation in the Newport area. This may facilitate new connections to the Mountphilips substation in the future. There are no new connections planned at present.

5.6.3 Description of Other Projects and Activities

A cumulative evaluation of the effects of the subject development together with the Other Elements of the Whole UWF Project and Other Projects or Activities is presented in the Environmental Factor topic chapters.

Other Projects or Activities in the area were scoped using geographical and time-frame boundaries and conceptual site model exercises, see Appendix 2.3: Scoping of Other Projects or Activities. The results of this scoping exercise is presented in Table 5-11, where Other Projects or Activities which have been scoped in for cumulative evaluation are listed in the left hand column of the matrix table, and the relevant Environmental Factor topic is identified in grey shading in the matrix.

Table 5-11: List of Other Projects or Activities included in the Environmental Factor Cumulative Evaluation

Other Project or Activity *(These projects are identified on Figure CE 2.1: Other Projects or Activities Scoped In for Cumulative Evaluation in the Environmental Factor topic chapters)*	**Population**	**Human Health**	**Biodiversity**	**Land**	**Soils**	**Water**	**Air**	**Climate**	**Built Services**	**Roads & Traffic**	**Cultural Heritage**	**Landscape**
Existing Killonan to Nenagh 110kV Overhead Line							■		-			
Existing Shannonbridge – Killonan 220kV Overhead Line							■					
Consented Bunkimalta Windfarm	■	■	■			■						
Consented Castlewaller Windfarm			■		■		■					
Existing Milestone Windfarm (includes permitted turbine at Inchivara) currently under construction											■	■
Operational Windfarms in the Republic of Ireland								■				
Existing Communication Structures - Foilnaman Mast - Cummermore Communications Pole											■	■
Consented Project – Newport Distributor Road, Newport			■			■						
Consented Project - Industrial warehouse Units at Thurles			■									
Existing/consented Project - Thurles Regional Water Treatment Works			■									
Consented Gortnahalla Turbine			■									
Killuragh Digester Plant			■									
Housing Development in Doon and Annacotty			■									
Agricultural Developments - Milk Milking Parlour in Cappamore, Milking Parlour in Lisnagry, Slatted Sheds and Stores in Pallasgreen, Slatted Shed in Gortussa.			■									
Activity – Forestry			■									■
Activity – Agriculture			■									■
Activity –Turf-cutting			■		■							

A brief overview of each of the above listed projects is provided below. The location of each project in relation to the elements of the Whole UWF Project is identified on Figure CE 2.1: Other Projects or Activities Scoped In for Cumulative Evaluation in the Environmental Factor topic chapters.

5.6.3.1 Existing Killonan to Nenagh 110kV Overhead Line

A high voltage (110kV) overhead line which runs between Killonan Station and Nenagh ESB substation (County Tipperary). The existing line is located to the west of the UWF Grid Connection and does not pass over the route of the 110kV UGC. The new Mountphilips Substation will be connected to this line via two new End Masts in farmland, west of the substation compound.

5.6.3.2 Existing Shannonbridge – Killonan 220kV Overhead Line

A high voltage (220kV) overhead line which runs between Shannonbridge ESB substation in County Offaly and Killonan ESB substation in County Limerick. A section of the line passes close to the UWF Grid Connection 110kV UGC in the townlands of Coole and Mountphilips.

5.6.3.3 Consented Bunkimalta Windfarm

The Bunkimalta Windfarm is a consented 16-turbine windfarm, located on Coillte lands, c.2.5km to the north of the UWF Grid Connection at Bunkimalta, Bauraglanna, Lackabrack, Knockfune and Foilduff at, Keeper Hill, Co. Tipperary.

Bunkimalta Windfarm will comprise 16 wind turbines, each having a rated electrical output of approximately 2,500 - 3,000 kilowatts, access tracks, a fenced Electrical Transformer Station comprising a single-storey Control Building and Substation, an effluent treatment system, three anemometer masts, repository areas, borrow pits and all associated site works, above and below ground. Each wind turbine will comprise a tower up to a maximum of 100 metres high, with a diameter of about 4 metres at the base. Three blades, up to a maximum of 50 metres in length, will be attached.

The Bunkimalta Windfarm will connect to the National Grid via an already consented underground grid connection to the existing Nenagh Substation, on the outskirts of Nenagh town.

The Bunkimalta Windfarm could be constructed during the same period as the UWF Grid Connection and the Whole UWF Project. Bunkimalta Windfarm, when built, will be operational during the operational stage of the Whole UWF Project.

An Environmental Impact Statement and Natura Impact Statement accompanied the planning application 13510035.

5.6.3.4 Consented Castlewaller Windfarm

The Castlewaller Windfarm is a 16-turbine windfarm, comprising 16 wind turbine generators (each with a maximum hub height of 100m, maximum rotor diameter of 90m, and with a total tip height of 145m), one permanent meteorological mast, 2 borrow pits, a sub-station including a control building, new internal access roads, upgrading of existing internal access roads, expansion of drainage system, turbine hardstands, wastewater holding tank, underground cables and ancillary works which is located along part of the 110kV UGC route in Castlewaller townland.

An Environmental Impact Statement and Natura Impact Statement accompanied the planning application 11/51/0251 for Castlewaller Windfarm.

Castlewaller Windfarm has not as yet secured a grid connection offer to connect to the National Grid from either Eirgrid or E.S.B Networks and therefore is not likely to be in construction at the same time as the construction of the Whole UWF Project.

5.6.3.5 Existing Milestone Windfarm

Milestone Windfarm is a consented 6-turbine windfarm located adjacent to the southwest of the consented Upperchurch Windfarm with 5 No. turbines consented under planning ref: 12510385 at Knockcurraghbola Commons, Knockcurraghbola Crownlands, Graniera and Shevry and 1 No. turbine consented under planning ref: 1410 at Inchivara and Knockduff. When constructed, Milestone Windfarm will comprise of wind turbines each with a maximum tip height of 126m, along with new access tracks, and electrical substation, a borrow pit and associated works. The grid connection associated with the Milestone Windfarm is towards the south at ESBN Cauteen Station, to be cabled along the public road network. An Environmental Impact Statement accompanied the planning applications for Milestone Windfarm – Ref: 12510385 & 1410.

Milestone Windfarm is currently under construction with construction works expected to be completed before the commencement of the construction of the subject development or any of the other elements of the Whole UWF Project. Therefore there will be no overlap of construction periods.

Part of the landholding associated with the Milestone Windfarm occurs within one of the landholdings associated with the 110kV UGC element of the UWF Grid Connection, in Knockcurraghbola Commons townland.

5.6.3.6 Operational Windfarms in the Republic of Ireland

The Republic of Ireland has a generating capacity of 2,909.66 MW based on 233 windfarms.

5.6.3.7 Existing Communication Structures

Foilnaman Mast: An existing communications mast comprising a 30m steel lattice mast structure at Knockmaroe townland, in the vicinity of the UWF Related Works/Upperchurch Windfarm site.

Cummermore Communications Pole: An existing communications structure comprising a 20m support pole, c.2km to the southwest of the Upperchurch Windfarm, and within 4km of the UWF Related Works (Telecom Relay Pole). This existing pole carries radio aerials and a communications dish, together with associated equipment, cabling, gantry pole, GPS timing antenna, cabinet and fencing. Planning Ref: 14600313

5.6.3.8 Consented Project – Newport Distributor Road, Newport

Consented public road development at Newport, County Tipperary, comprising the demolition of two habitable dwellings and the provision of a distributor road between the R503 and local county road (Murroe Road) and associated site works including footpaths, lighting, cycle tracks and drainage, at Tullow, Newport County Tipperary The road development is within the Newport River catchment and also located upstream of the Lower River Shannon SAC. Planning Ref: 07511157.

5.6.3.9 Consented Project – Industrial Warehouse Units at Thurles

The construction of 1 No. Light Industrial/Warehousing building (gross floor area 2360.6sq.m.) at Bawntameena, Nenagh Road, Thurles, along with a roundabout and access Road from Nenagh Road (R498) complete with necessary improvement works and road markings, a car park and loading areas and ancillary

works; in addition the construction of a foul water pumping station and all associated works. Planning ref: 16600037.

5.6.3.10 Consented Project - Thurles Regional Water Treatment Works

The construction of a water treatment plant at Bohernacrusha, Killeenyarda, Holycross and outfall to the River Suir. The water treatment plant will consist of a water treatment and administration building, sludge dewatering building, ESB sub-station, generator & oil tank enclosure, raw water balancing tank, clear water tanks, sludge balancing tank, sludge thickening and sludge holding tank, washwater tank, sludge skip and emergency sludge storage area, chemical storage tanks, washwater storage tank and all associated site development and site excavation works above and below ground. Planning Ref: 16600877.

5.6.3.11 Consented Gortnahalla Turbine

Single wind generator with a maximum output set at 500kw, hub height 65m at Gortnahalla, near Upperchurch, Co Tipperary. Planning Ref: 12510368.

5.6.3.12 Killuragh Digester Plant

Development of a digester plant, associated ABP building and associated site works to process farm slurry and other organic material to provide renewable energy and fertilizer, in Killuragh, Pallasgreen, Co Limerick. Planning Ref: 111066.

5.6.3.13 Housing Development in Doon and Annacotty

Two housing developments: Construction of 25 no. houses consisting of 5 no. 4 bed detached dwellings, 20 no. 3 bed semi-detached dwellings, a bored well, entrance and roads together with associated site works and services at Bottle Hill, Doon, Co Limerick, Planning Ref: 16530; and Construction of 48 dwellings at Annacotty & construction of 240 dwellings in three areas/lots at Walkers Road, Annacotty, Co Limerick, Planning Ref: 137026 and 137094.

5.6.3.14 Agricultural Developments

Agricultural developments include a milk Milking Parlour in Cappamore, Co Limerick (Planning Ref: 15255), a Milking Parlour in Lisnagry, Co Limerick (Planning Ref: 15194), Slatted Sheds and Stores in Pallasgreen, Co Limerick (Planning Ref: 17133), and a Slatted Shed in Gortussa, Dundrum Co Tipperary (Planning Ref: 14600343).

5.6.3.15 Activities – Forestry, Agriculture

Agriculture and forestry are the predominant land uses in the area of the Whole UWF Project.

5.6.3.16 Activity – Turf-Cutting

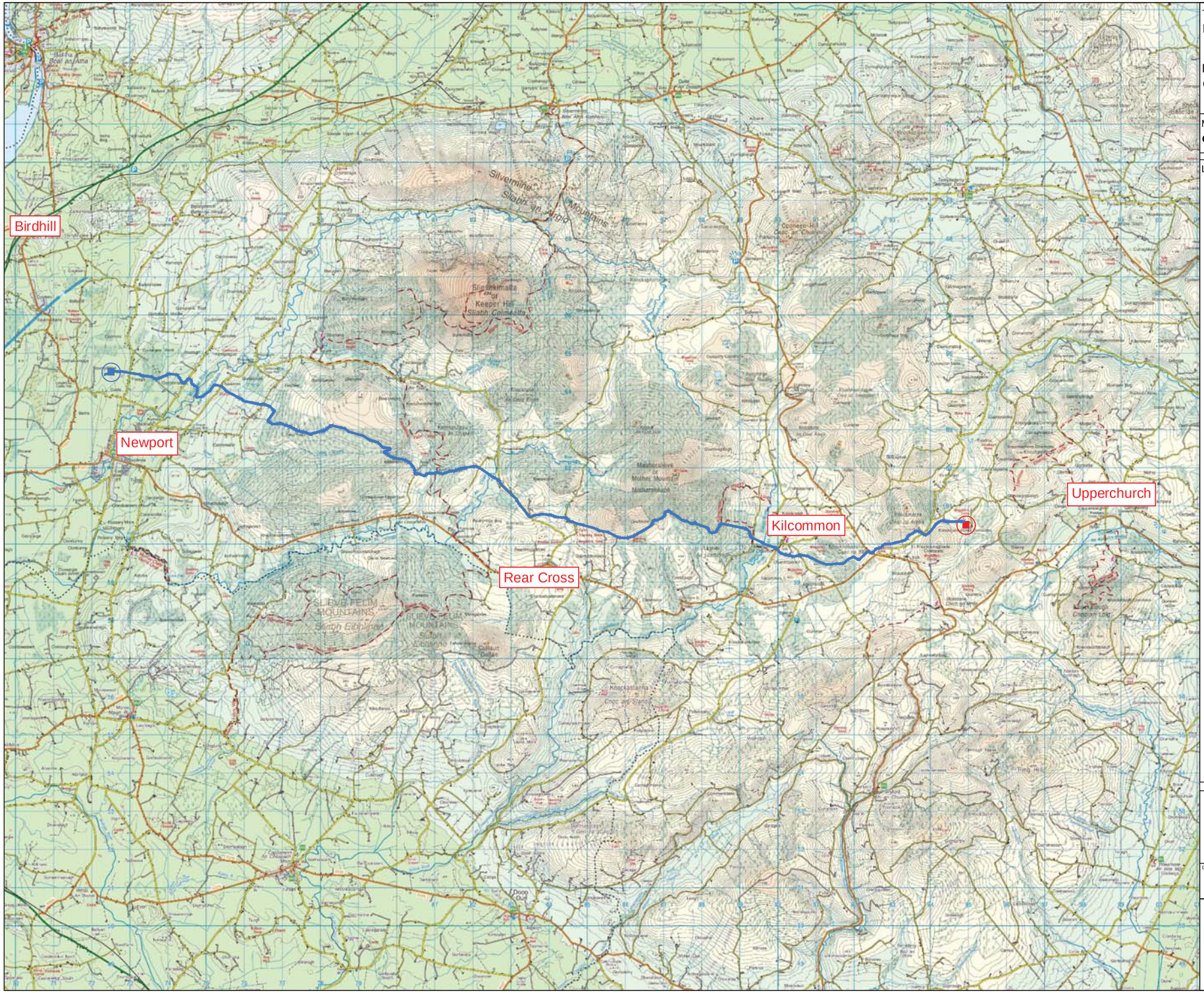
Turbary (rights to cut turf) exists at Bleanbeg Bog immediately to the north of the UWF Grid Connection (110kV UGC) in the Castlewaller area.

The above projects and activities are included in the cumulative evaluations in the Environmental Topic chapters – Chapters 6 to 17. The relevant Environmental Factor topic is identified on Table 5-11.

Appendix to Chapter 5: Description of Development (UWF Replacement Forestry)

Appendix 5.3: Description of Development (UWF Grid Connection)

Figures and Mapping



Title:

Figure GC 5.1

Location of the UWF Grid Connection on OSI Discovery Mapping

Map Number:

Overview Map on OSI Discovery Mapping

Legend:

- **UWF Grid Connection**
- **Mountphilips Substation**
- **Consented UWF Substation**

N

REFERENCE DOCUMENTS

Project:

UWF Grid Connection (GC)

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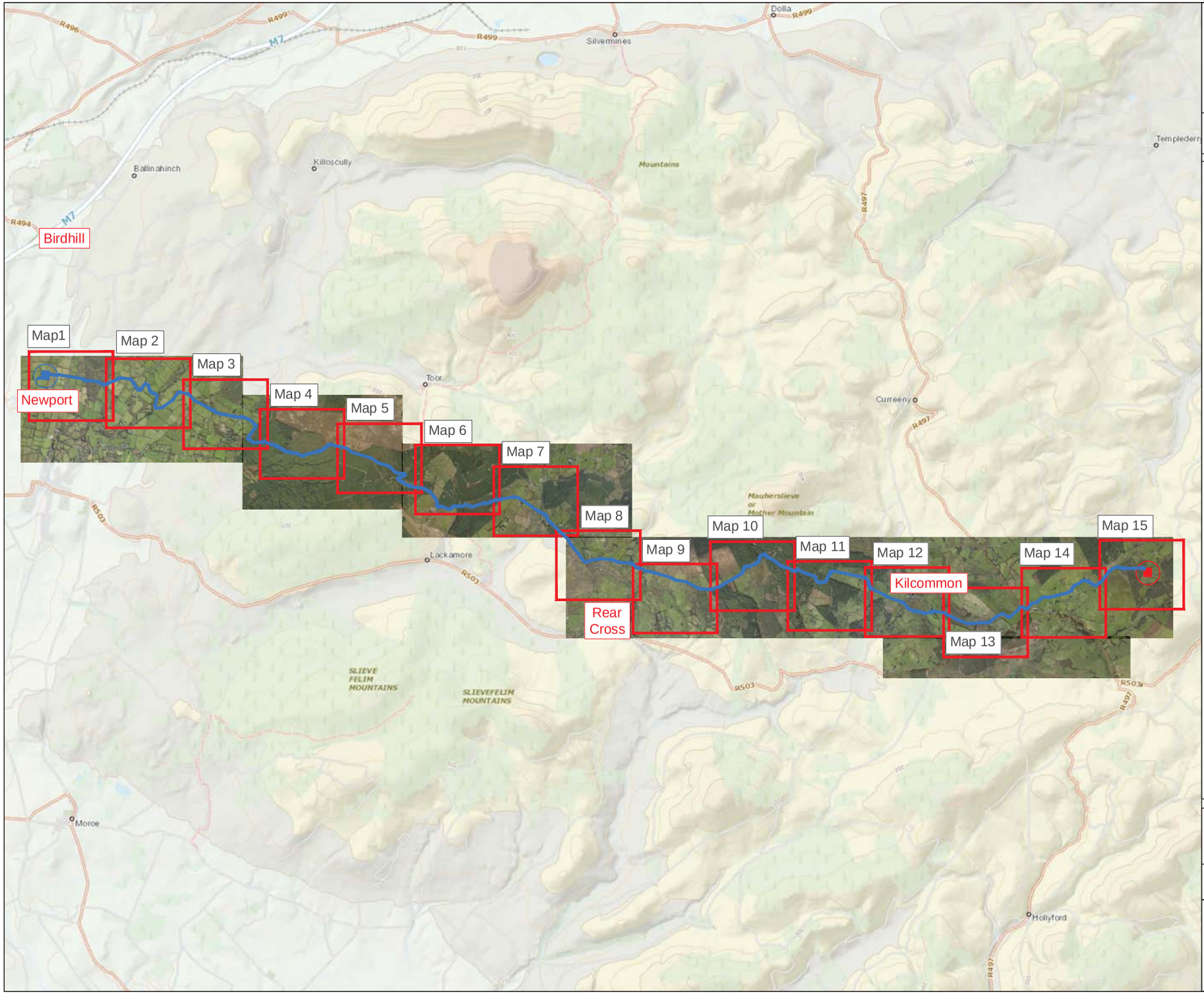

Title:

Figure GC 5.2

Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Map Number:

Overview Map on Aerial Photography Mapping

Legend:

- **UWF Grid Connection**
- **Mountphilips Substation**
- **Consented UWF Substation**
- Map 1 **Map 1 of 15**

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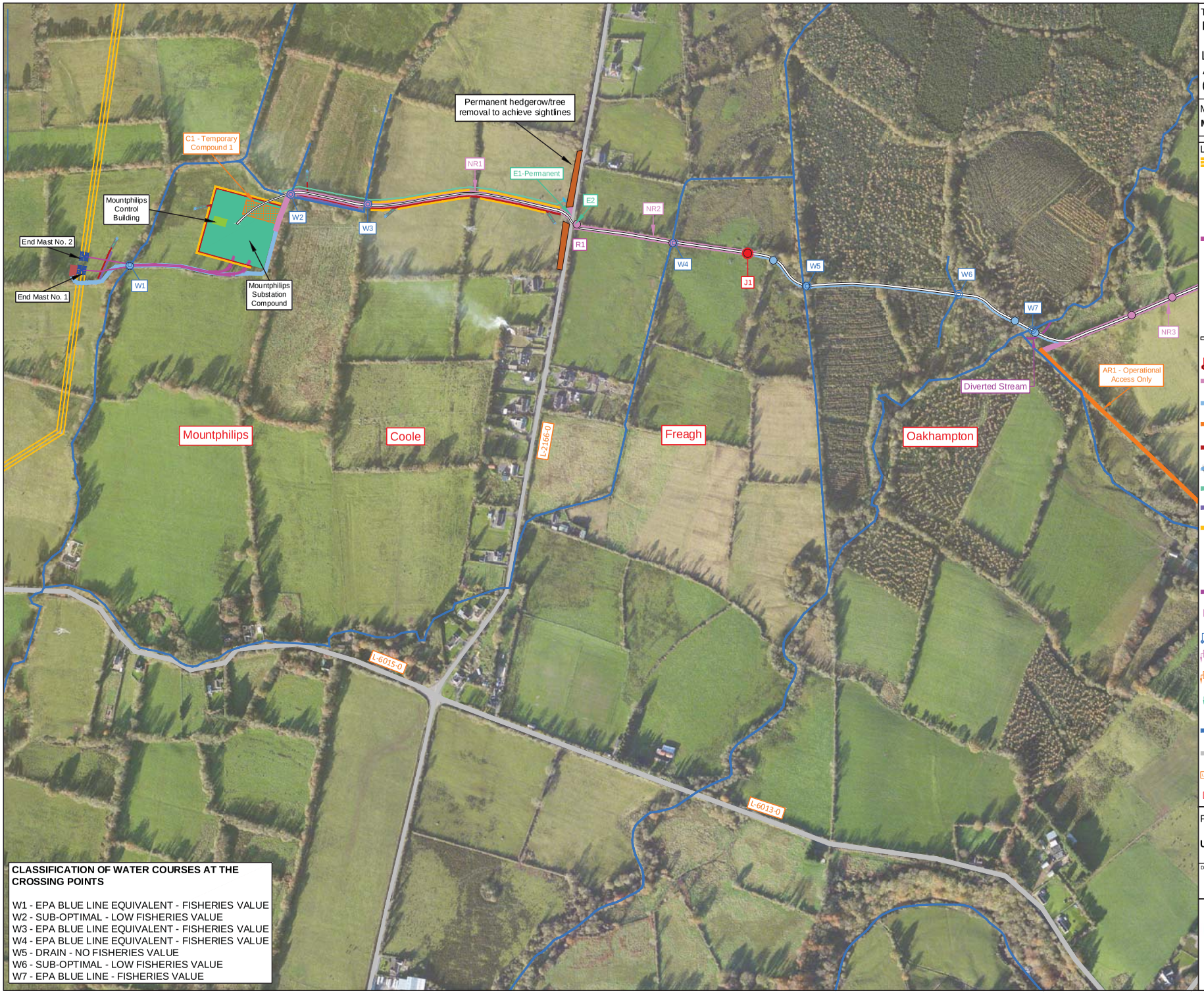

CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

W1 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W2 - SUB-OPTIMAL - LOW FISHERIES VALUE
W3 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W4 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W5 - DRAIN - NO FISHERIES VALUE
W6 - SUB-OPTIMAL - LOW FISHERIES VALUE
W7 - EPA BLUE LINE - FISHERIES VALUE

Title:

Figure GC 5.2

Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Map Number:

Map 1 of 15

Legend:

- Existing Nenagh to Killonan 110kV OHL
- End Masts
- End Masts temporary crane hardstands
- Underground Cable from Nenagh to Killonan 110kV OHLine into Mountphilips Substation
- 110kV Substation Compound
- 110kV Substation Control Building
- Temporary Construction Compound C1
- Mountphilips - Upperchurch 110kV UGC
- Joint Bay Locations
- New Permanent Access Roads
- Temporary Access Roads
- Existing Access Roads
- Dirty water drain
- Settlement Pond
- Clean water drain
- Drainage Berm
- Permanent Berm
- Temporary hedge/tree removal & pruning
- Permanent hedge/tree removal
- Diverted Stream
- Grid Connection Road Crossings
- Grid Connection Water Crossings
- New Permanent Road ID
- Existing Access Road ID
- Temporary Site Entrance (unless indicated permanent on map)
- Watercourse
- Public Road
- Public Road Number
- Townlands

N

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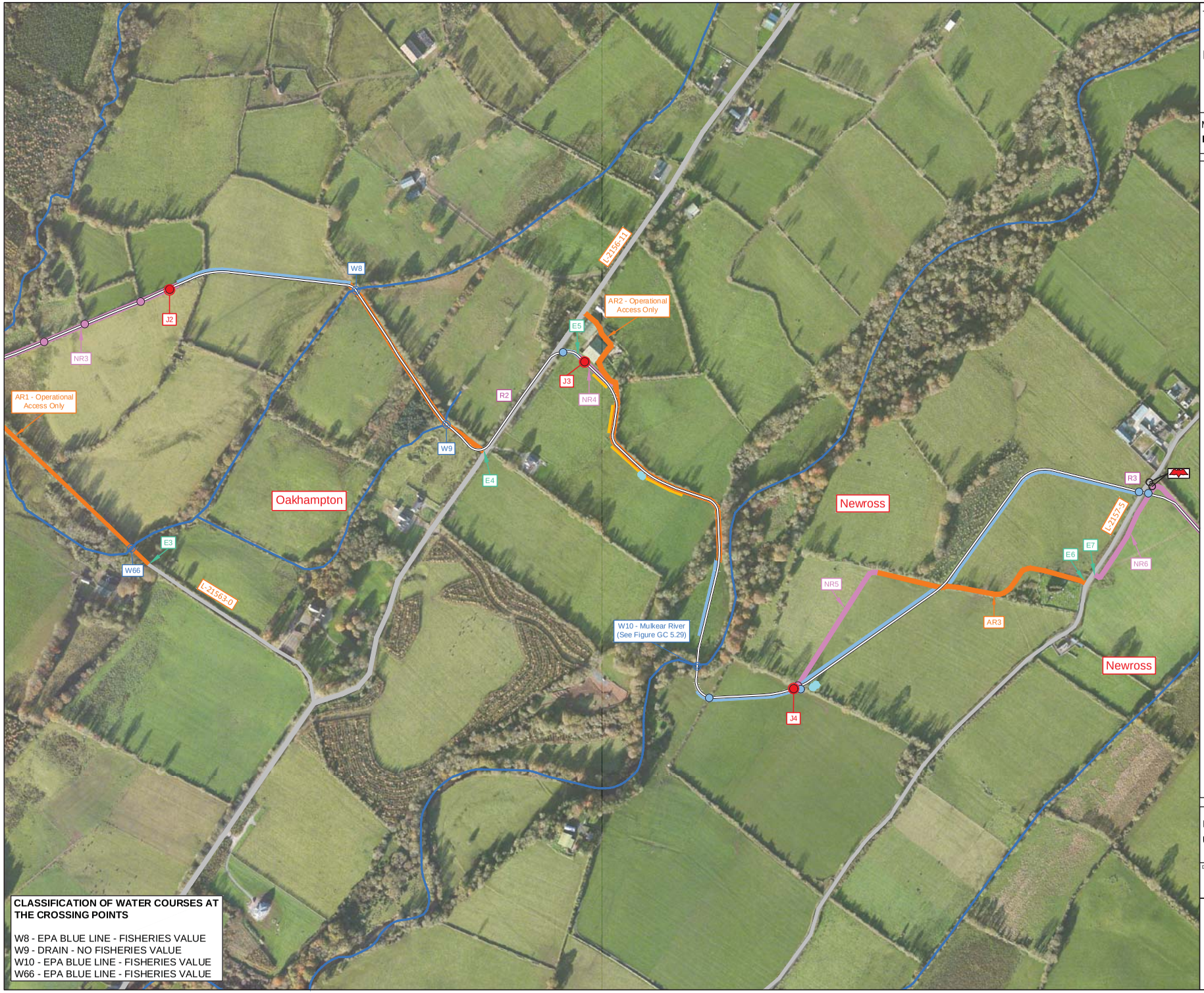

CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

W8 - EPA BLUE LINE - FISHERIES VALUE
W9 - DRAIN - NO FISHERIES VALUE
W10 - EPA BLUE LINE - FISHERIES VALUE
W66 - EPA BLUE LINE - FISHERIES VALUE

Title:
Figure GC 5.2

Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Map Number:
Map 2 of 15

Legend:

- Mountphilips - Upperchurch 110kV UGC
- New Permanent Access Roads
- Temporary Access Roads
- Existing Access Roads
- Permanent Berm
- Temporary hedge/tree removal & pruning
- Permanent hedge/tree removal
- Joint Bay Locations
- Grid Connection Road Crossings
- Grid Connection Water Crossings
- New Permanent Road ID
- Existing Access Road ID
- Bat Crossing Locations
- Temporary Storage Area
- Temporary Site Entrance (unless indicated permanent on map)
- Watercourse
- Public Road
- Public Road Number
- Townlands

N

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CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

W11 - EPA BLUE LINE - FISHERIES VALUE
W12 - EPA BLUE LINE - FISHERIES VALUE
W13 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE

Title:
Figure GC 5.2

Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Map Number:
Map 3 of 15

Legend:
- Mountphilips - Upperchurch 110kV UGC
- New Permanent Access Roads
- Temporary Access Roads
- Existing Access Roads
- Concealed Access Road (new permanent road)
- Permanent Berm
- Temporary hedge/tree removal & pruning
- Permanent hedge/tree removal
- Joint Bay Locations
- Grid Connection Road Crossings
- Grid Connection Water Crossings
- New Permanent Road ID
- Forestry Felling
- Bat Crossing Locations
- Temporary Storage Area
- Temporary Site Entrance (unless indicated permanent on map)
- Water Protection Measures
- Watercourse
- Public Road
- Public Road Number
- Townlands

N

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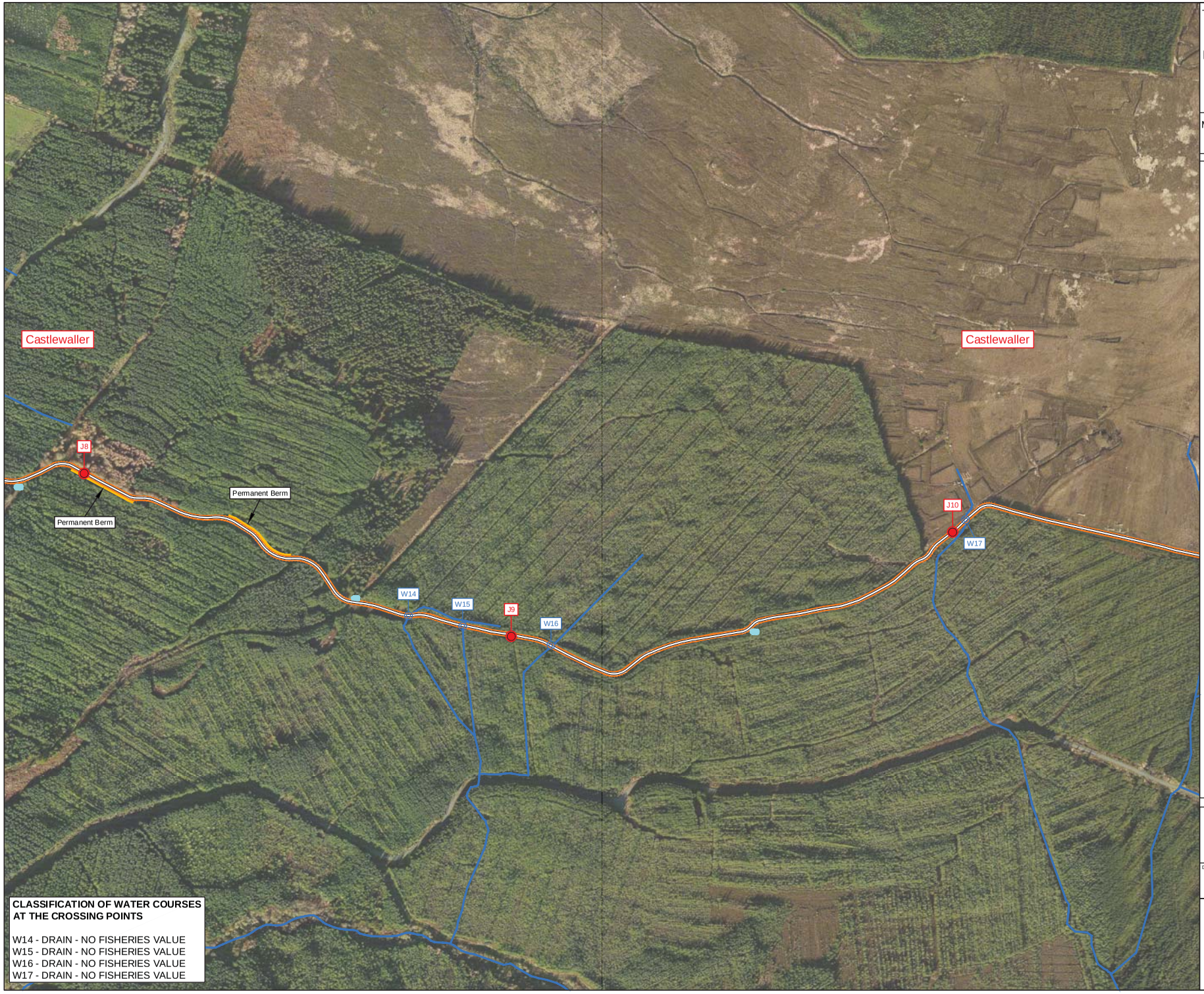

Title:
Figure GC 5.2

Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Map Number:
Map 4 of 15

Legend:

- Mountphilips - Upperchurch 110kV UGC
- Existing Access Roads
- Permanent Berm
- Joint Bay Locations
- Grid Connection Water Crossings
- Temporary Storage Area
- Watercourse
- Townlands

REFERENCE DOCUMENTS

N

CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

W14 - DRAIN - NO FISHERIES VALUE
W15 - DRAIN - NO FISHERIES VALUE
W16 - DRAIN - NO FISHERIES VALUE
W17 - DRAIN - NO FISHERIES VALUE

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UWF Grid Connection (GC)

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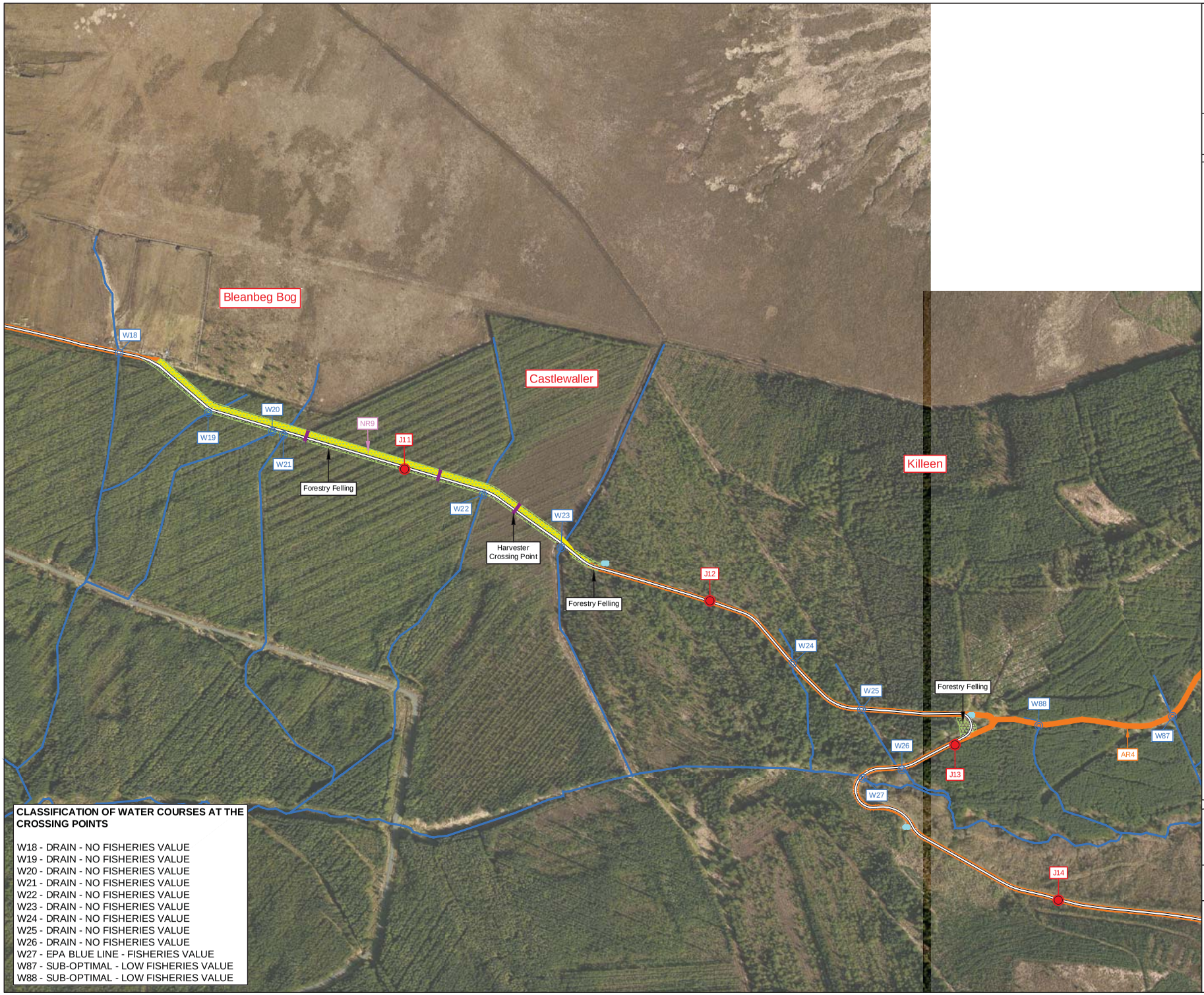

CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

W18 - DRAIN - NO FISHERIES VALUE
W19 - DRAIN - NO FISHERIES VALUE
W20 - DRAIN - NO FISHERIES VALUE
W21 - DRAIN - NO FISHERIES VALUE
W22 - DRAIN - NO FISHERIES VALUE
W23 - DRAIN - NO FISHERIES VALUE
W24 - DRAIN - NO FISHERIES VALUE
W25 - DRAIN - NO FISHERIES VALUE
W26 - DRAIN - NO FISHERIES VALUE
W27 - EPA BLUE LINE - FISHERIES VALUE
W87 - SUB-OPTIMAL - LOW FISHERIES VALUE
W88 - SUB-OPTIMAL - LOW FISHERIES VALUE

Title:
Figure GC 5.2

Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Map Number:
Map 5 of 15

Legend:

- Mountphilips - Upperchurch 110kV UGC
- New Permanent Access Roads
- Temporary Access Roads
- Existing Access Roads
- Concealed Access Road (new permanent road)
- Joint Bay Locations
- Grid Connection Water Crossings
- New Permanent Road ID
- Forestry Felling
- Existing Access Road ID
- Temporary Storage Area
- Harvester Crossing Point
- Watercourse
- Townlands

REFERENCE DOCUMENTS

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UWF Grid Connection (GC)

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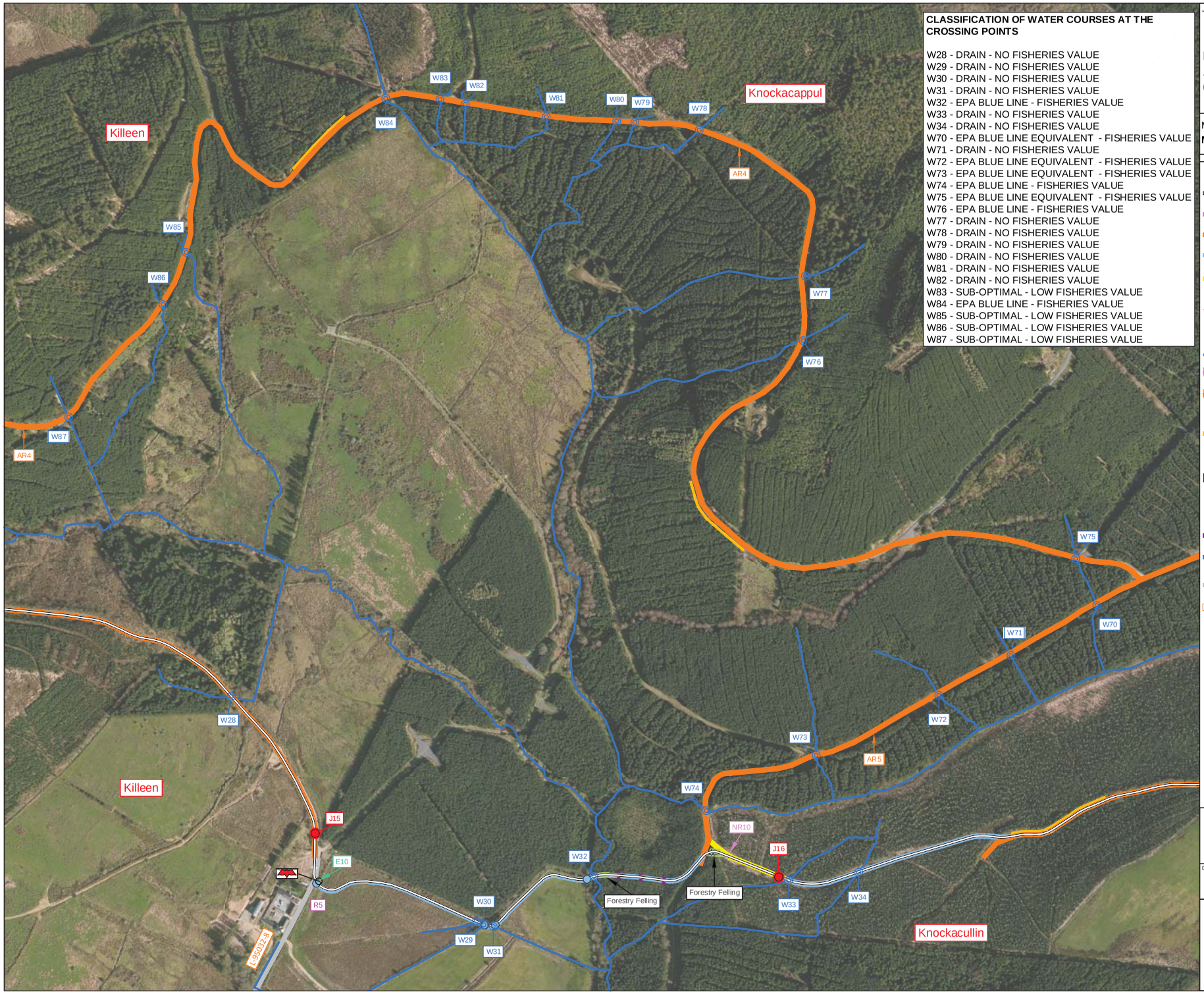

CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

W28 - DRAIN - NO FISHERIES VALUE
W29 - DRAIN - NO FISHERIES VALUE
W30 - DRAIN - NO FISHERIES VALUE
W31 - DRAIN - NO FISHERIES VALUE
W32 - EPA BLUE LINE - FISHERIES VALUE
W33 - DRAIN - NO FISHERIES VALUE
W34 - DRAIN - NO FISHERIES VALUE
W70 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W71 - DRAIN - NO FISHERIES VALUE
W72 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W73 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W74 - EPA BLUE LINE - FISHERIES VALUE
W75 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W76 - EPA BLUE LINE - FISHERIES VALUE
W77 - DRAIN - NO FISHERIES VALUE
W78 - DRAIN - NO FISHERIES VALUE
W79 - DRAIN - NO FISHERIES VALUE
W80 - DRAIN - NO FISHERIES VALUE
W81 - DRAIN - NO FISHERIES VALUE
W82 - DRAIN - NO FISHERIES VALUE
W83 - SUB-OPTIMAL - LOW FISHERIES VALUE
W84 - EPA BLUE LINE - FISHERIES VALUE
W85 - SUB-OPTIMAL - LOW FISHERIES VALUE
W86 - SUB-OPTIMAL - LOW FISHERIES VALUE
W87 - SUB-OPTIMAL - LOW FISHERIES VALUE

Title:
Figure GC 5.2

Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Map Number:
Map 6 of 15

Legend:

- Mountphilips - Upperchurch 110kV UGC
- New Permanent Access Roads
- Existing Access Roads
- Temporary Access Roads
- Concealed Access Road (new permanent road)
- Joint Bay Locations
- Grid Connection Road Crossings
- Grid Connection Water Crossings
- New Permanent Road ID
- Existing Access Road ID
- Temporary hedge/tree removal & pruning
- Permanent Berm
- Forestry Felling
- Bat Crossing Locations
- Temporary Site Entrance (unless indicated permanent on map)
- Harvester Crossing Point
- Watercourse
- Public Road
- Public Road Number
- Townlands

N

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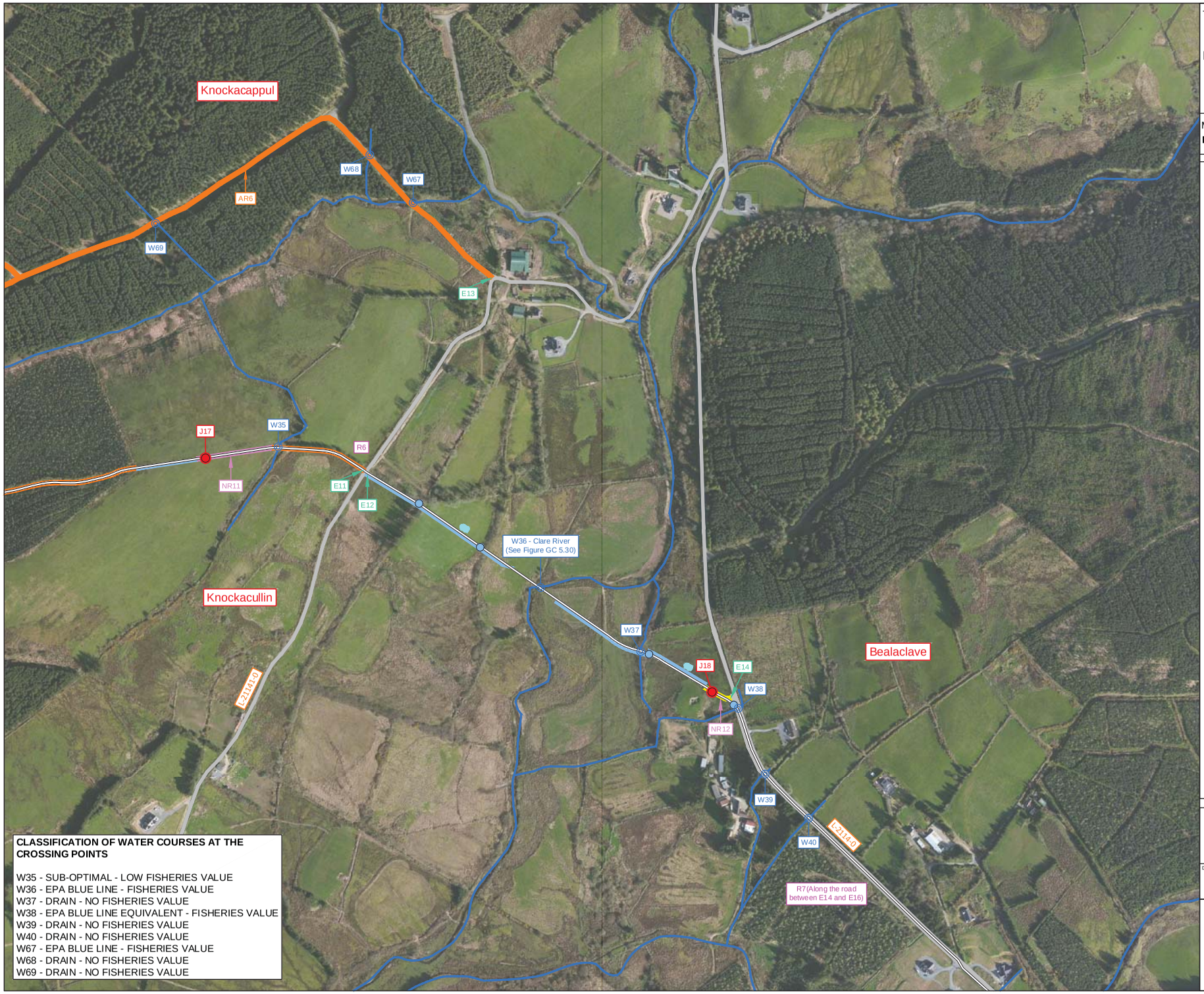

CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

W35 - SUB-OPTIMAL - LOW FISHERIES VALUE
W36 - EPA BLUE LINE - FISHERIES VALUE
W37 - DRAIN - NO FISHERIES VALUE
W38 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W39 - DRAIN - NO FISHERIES VALUE
W40 - DRAIN - NO FISHERIES VALUE
W67 - EPA BLUE LINE - FISHERIES VALUE
W68 - DRAIN - NO FISHERIES VALUE
W69 - DRAIN - NO FISHERIES VALUE

Title:

Figure GC 5.2

Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Map Number:
Map 7 of 15

Legend:

- Mountphilips - Upperchurch 110kV UGC
- New Permanent Access Roads
- Temporary Access Roads
- Existing Access Roads
- Concealed Access Road (new permanent road)
- Temporary hedge/tree removal & pruning
- Joint Bay Locations
- Grid Connection Road Crossings
- Grid Connection Water Crossings
- New Permanent Road ID
- Existing Access Road ID
- Temporary Site Entrance (unless indicated permanent on map)
- Temporary Storage Area
- Watercourse
- Public Road
- Public Road Number
- Townlands

N

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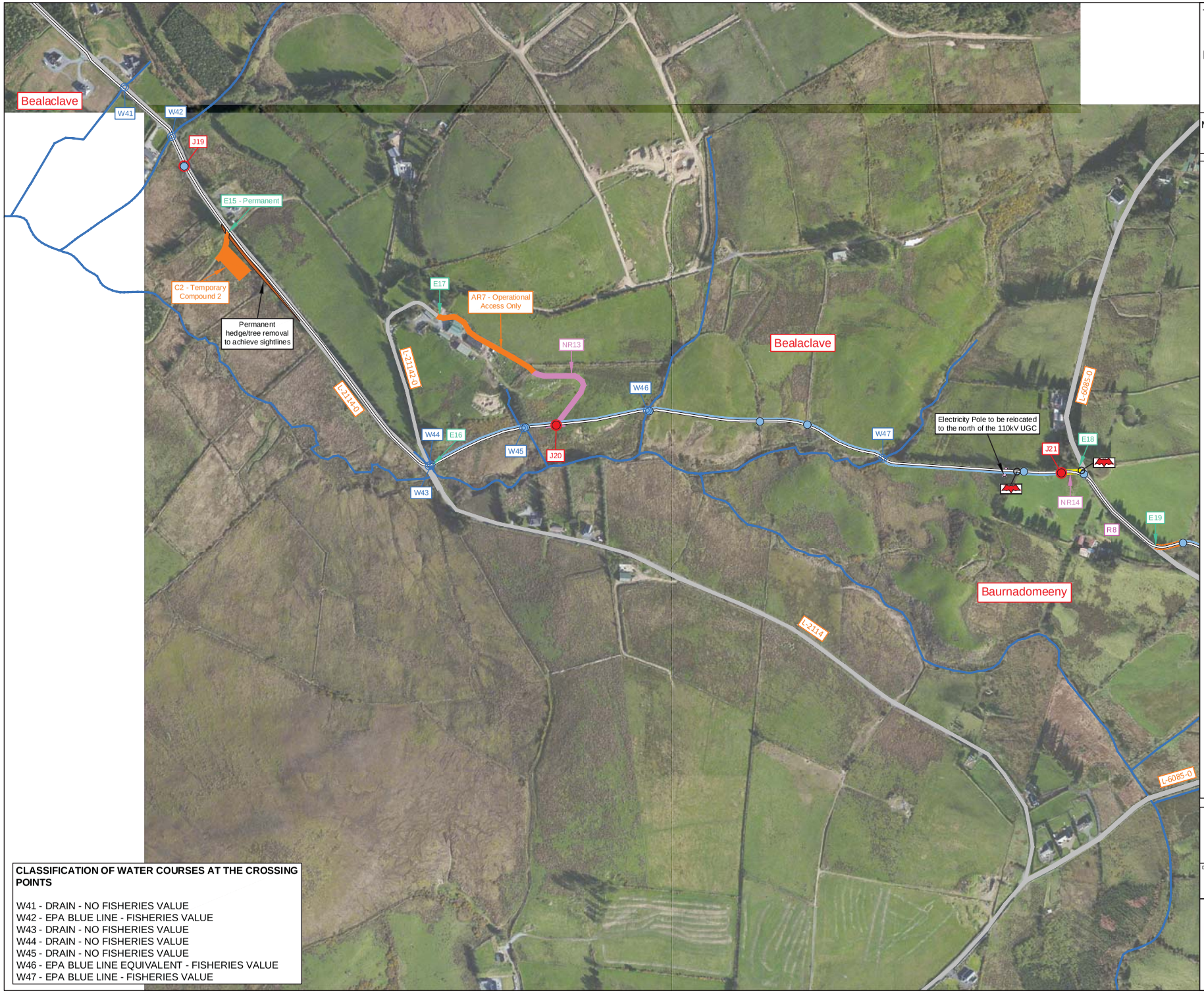

CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

W41 - DRAIN - NO FISHERIES VALUE
W42 - EPA BLUE LINE - FISHERIES VALUE
W43 - DRAIN - NO FISHERIES VALUE
W44 - DRAIN - NO FISHERIES VALUE
W45 - DRAIN - NO FISHERIES VALUE
W46 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W47 - EPA BLUE LINE - FISHERIES VALUE

Title:
Figure GC 5.2

Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Map Number:
Map 8 of 15

Legend:
- Mountphilips - Upperchurch 110kV UGC
- New Permanent Access Roads
- Temporary Access Roads
- Existing Access Roads
- Concealed Access Road (new permanent road)
- Temporary hedge/tree removal & pruning
- Permanent hedge/tree removal
- Joint Bay Locations
- Grid Connection Road Crossings
- Grid Connection Water Crossings
- New Permanent Road ID
- Existing Access Road ID
- Temporary Compound
- Temporary Site Entrance (unless indicated permanent on map)
- Bat Crossing Locations
- Watercourse
- Public Road
- Public Road Number
- Townlands

N

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CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

W48 - EPA BLUE LINE - FISHERIES VALUE
W49 - SUB-OPTIMAL - LOW FISHERIES VALUE
W90 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE

Title:
Figure GC 5.2

Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Map Number:
Map 9 of 15

Legend:

- Mountphilips - Upperchurch 110kV UGC
- New Permanent Access Roads
- Temporary Access Roads
- Existing Access Roads
- Concealed Access Road (new permanent road)
- Temporary hedge/tree removal & pruning
- Permanent hedge/tree removal
- Joint Bay Locations
- Grid Connection Road Crossings
- Grid Connection Water Crossings
- New Permanent Road ID
- Existing Access Road ID
- Forestry Felling
- Temporary Site Entrance (unless indicated permanent on map)
- Temporary Storage Area
- Watercourse
- Public Road
- Public Road Number
- Townlands

N

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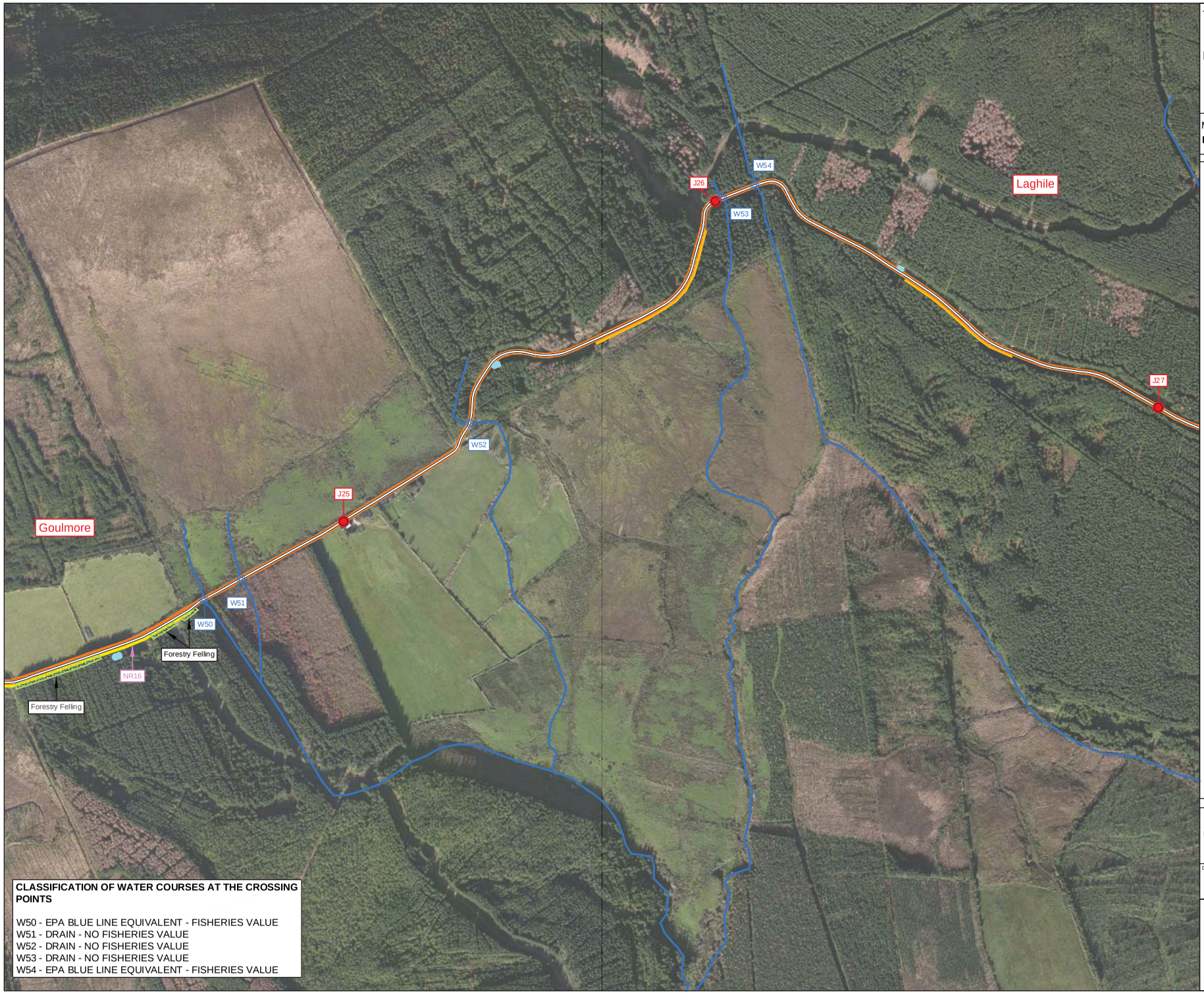

Title:
Figure GC 5.2

Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Map Number:
Map 10 of 15

Legend:

- Mountphilips - Upperchurch 110kV UGC
- New Permanent Access Roads
- Existing Access Roads
- Concealed Access Road (new permanent road)
- Permanent Berm
- Joint Bay Locations
- Grid Connection Water Crossings
- New Permanent Road ID
- Forestry Felling
- Temporary Storage Area
- Watercourse
- Public Road
- Public Road Number
- Townlands

N

REFERENCE DOCUMENTS

CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

W50 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W51 - DRAIN - NO FISHERIES VALUE
W52 - DRAIN - NO FISHERIES VALUE
W53 - DRAIN - NO FISHERIES VALUE
W54 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE

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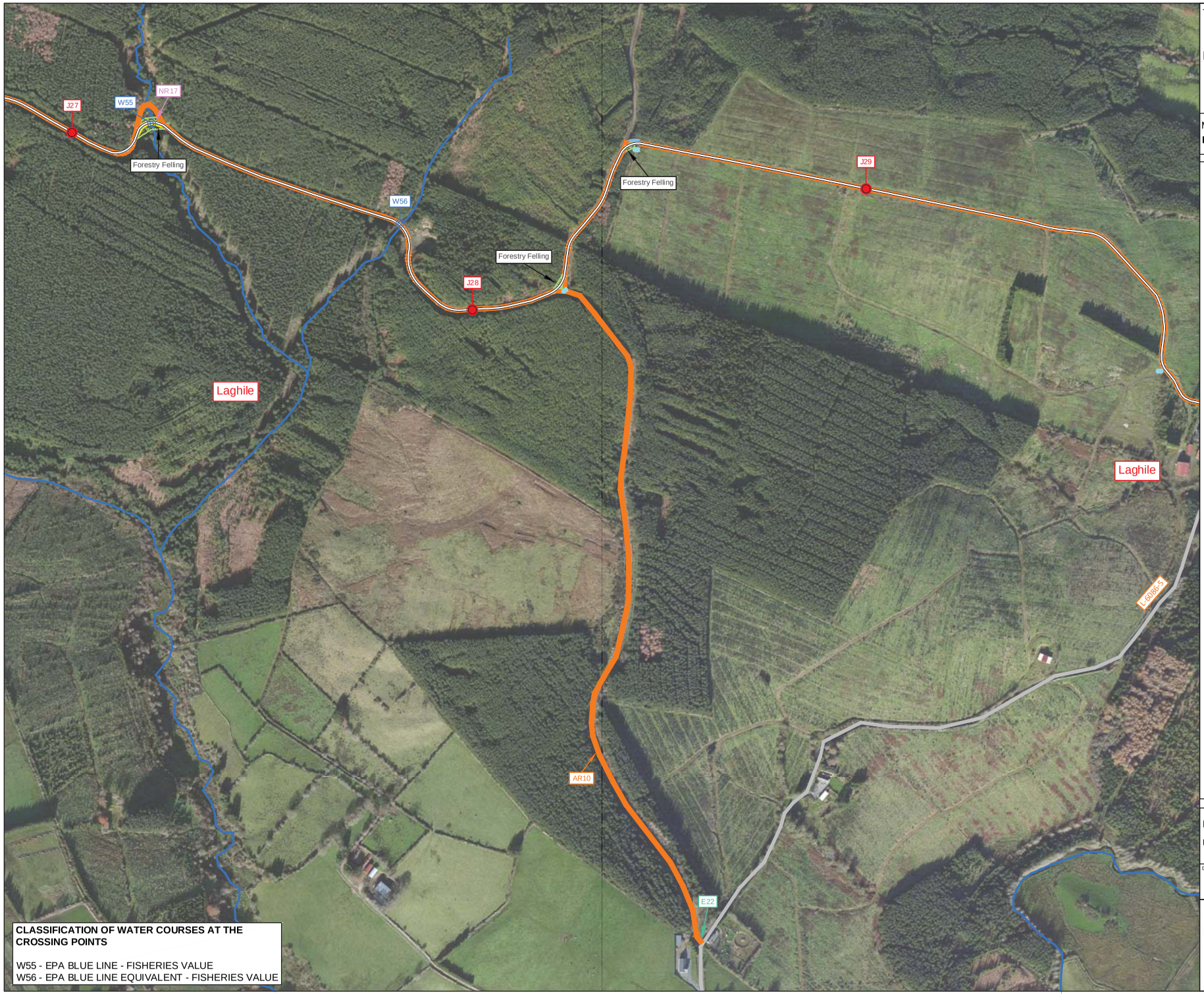

Title:

Figure GC 5.2

Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Map Number:

Map 11 of 15

Legend:

- Mountphilips - Upperchurch 110kV UGC
- New Permanent Access Roads
- Existing Access Roads
- Temporary Access Roads
- Concealed Access Road (new permanent road)
- Joint Bay Locations
- Grid Connection Water Crossings
- New Permanent Road ID
- Existing Access Road ID
- Forestry Felling
- Temporary Site Entrance (unless indicated permanent on map)
- Temporary Storage Area
- Watercourse
- Public Road
- Public Road Number
- Townlands

N

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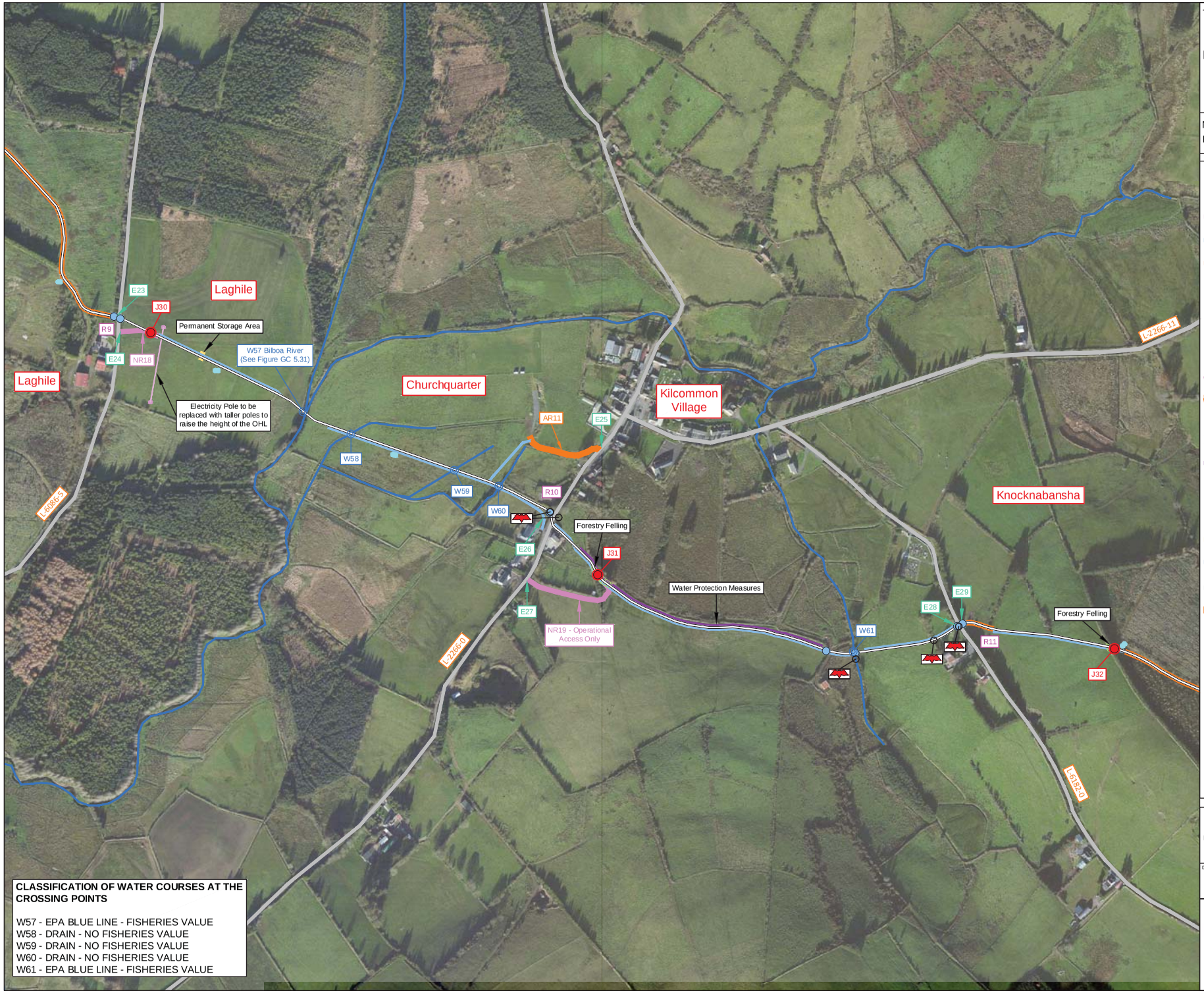

Title:
Figure GC 5.2

Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Map Number:
Map 12 of 15

Legend:
- Mountphilips - Upperchurch 110kV UGC
- New Permanent Access Roads
- Temporary Access Roads
- Existing Access Roads
- Temporary hedge/tree removal & pruning
- Joint Bay Locations
- Grid Connection Road Crossings
- Grid Connection Water Crossings
- New Permanent Road ID
- Existing Access Road ID
- Forestry Felling
- Bat Crossing Locations
- Water Protection Measure
- Temporary Site Entrance (unless indicated permanent on map)
- Temporary Storage Area
- Permanent Storage Area
- Watercourse
- Public Road
- Public Road Number
- Townlands

N

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Figure GC 5.2

Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Map Number:

Map 13 of 15

Legend:

- Mountphilips - Upperchurch 110kV UGC
- New Permanent Access Roads
- Temporary Access Roads
- Existing Access Roads
- Concealed Access Road (new permanent road)
- Temporary hedge/tree removal & pruning
- Joint Bay Locations
- Grid Connection Road Crossings
- Grid Connection Water Crossings
- New Permanent Road ID
- Existing Access Road ID
- Forestry Felling
- Bat Crossing Locations
- Water Protection Measure
- Temporary Site Entrance (unless indicated permanent on map)
- Temporary Storage Area
- Permanent Berm
- Watercourse
- Public Road
- Public Road Number
- Townlands

N

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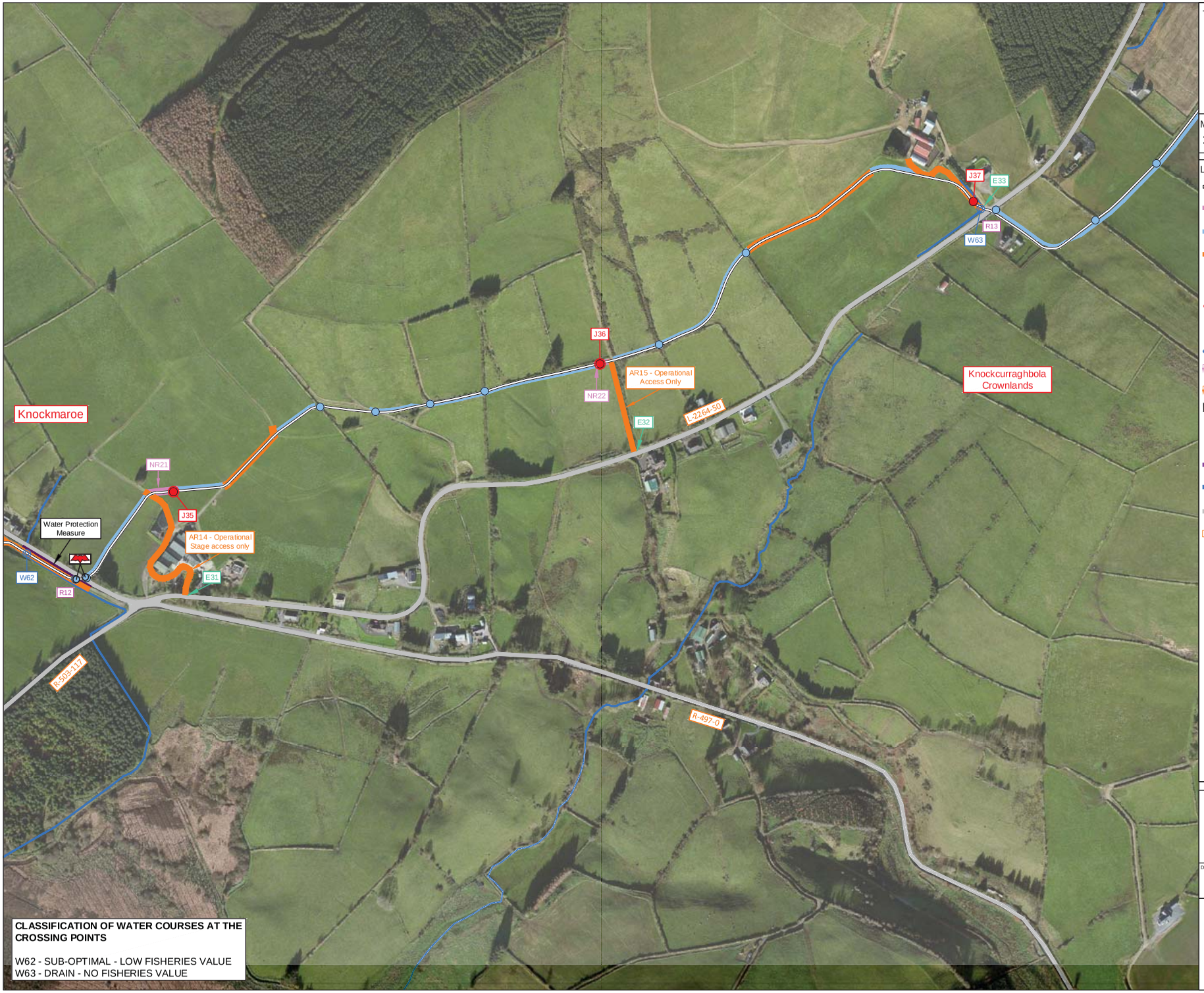

Title:

Figure GC 5.2

Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Map Number:

14 of 15

Legend:

- Mountphilips - Upperchurch 110kV UGC
- New Permanent Access Roads
- Temporary Access Roads
- Existing Access Roads
- Temporary hedge/tree removal & pruning
- Joint Bay Locations
- Grid Connection Road Crossings
- Grid Connection Water Crossings
- New Permanent Road ID
- Existing Access Road ID
- Bat Crossing Locations
- Temporary Site Entrance (unless indicated permanent on map)
- Water Protection Measure
- Watercourse
- Public Road
- Public Road Number
- Townlands

Project:

UWF Grid Connection (GC)

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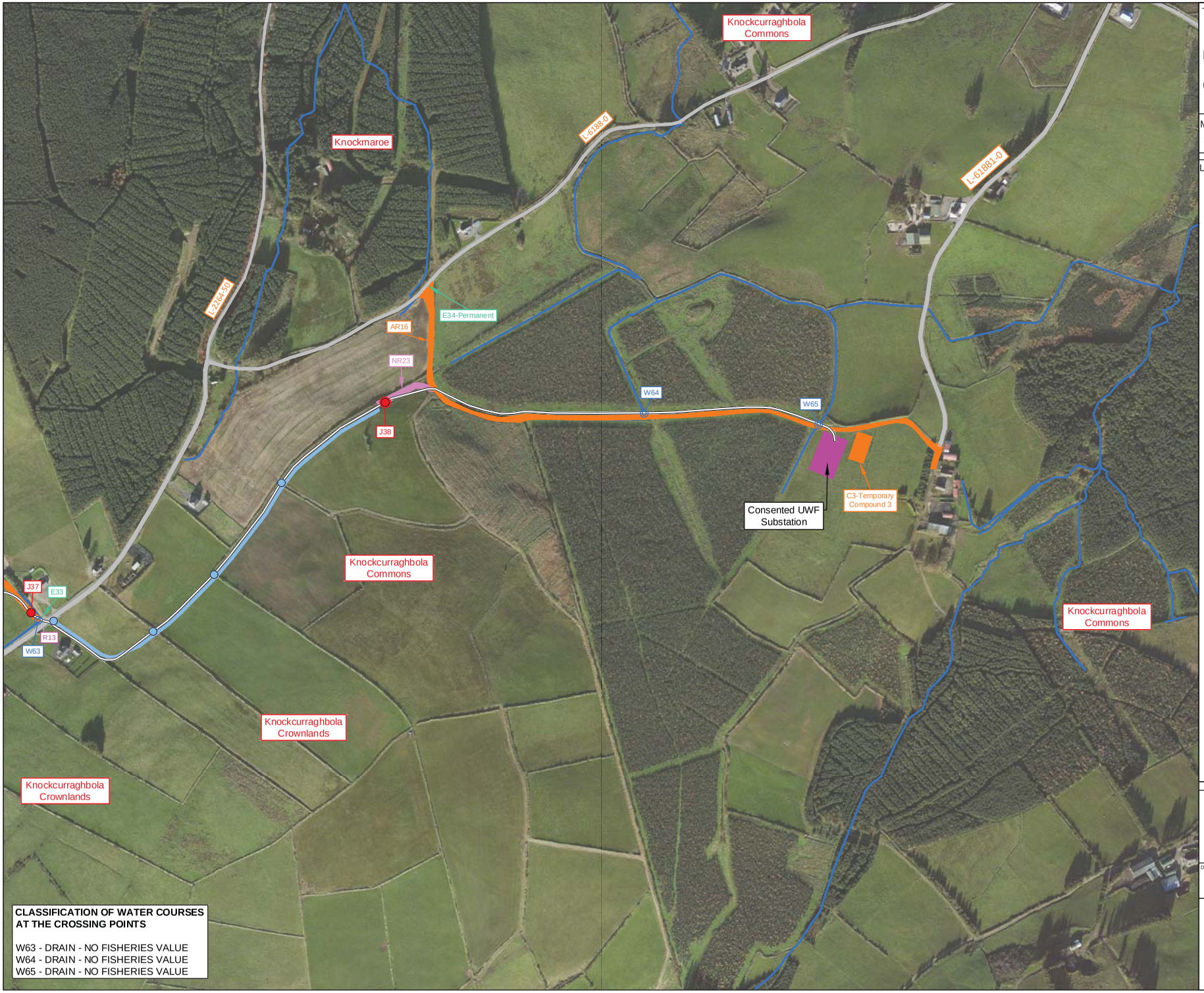

Title:

Figure GC 5.2

Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Map Number:

15 of 15

Legend:

- Mountphilips - Upperchurch 110kV UGC
- New Permanent Access Roads
- Temporary Access Roads
- Existing Access Roads
- Temporary hedge/tree removal & pruning
- Joint Bay Locations
- Grid Connection Road Crossings
- Grid Connection Water Crossings
- New Permanent Road ID
- Existing Access Road ID
- Temporary Site Entrance (unless indicated permanent on map)
- Temporary Compound
- Watercourse
- Public Road
- Public Road Number
- Townlands

N

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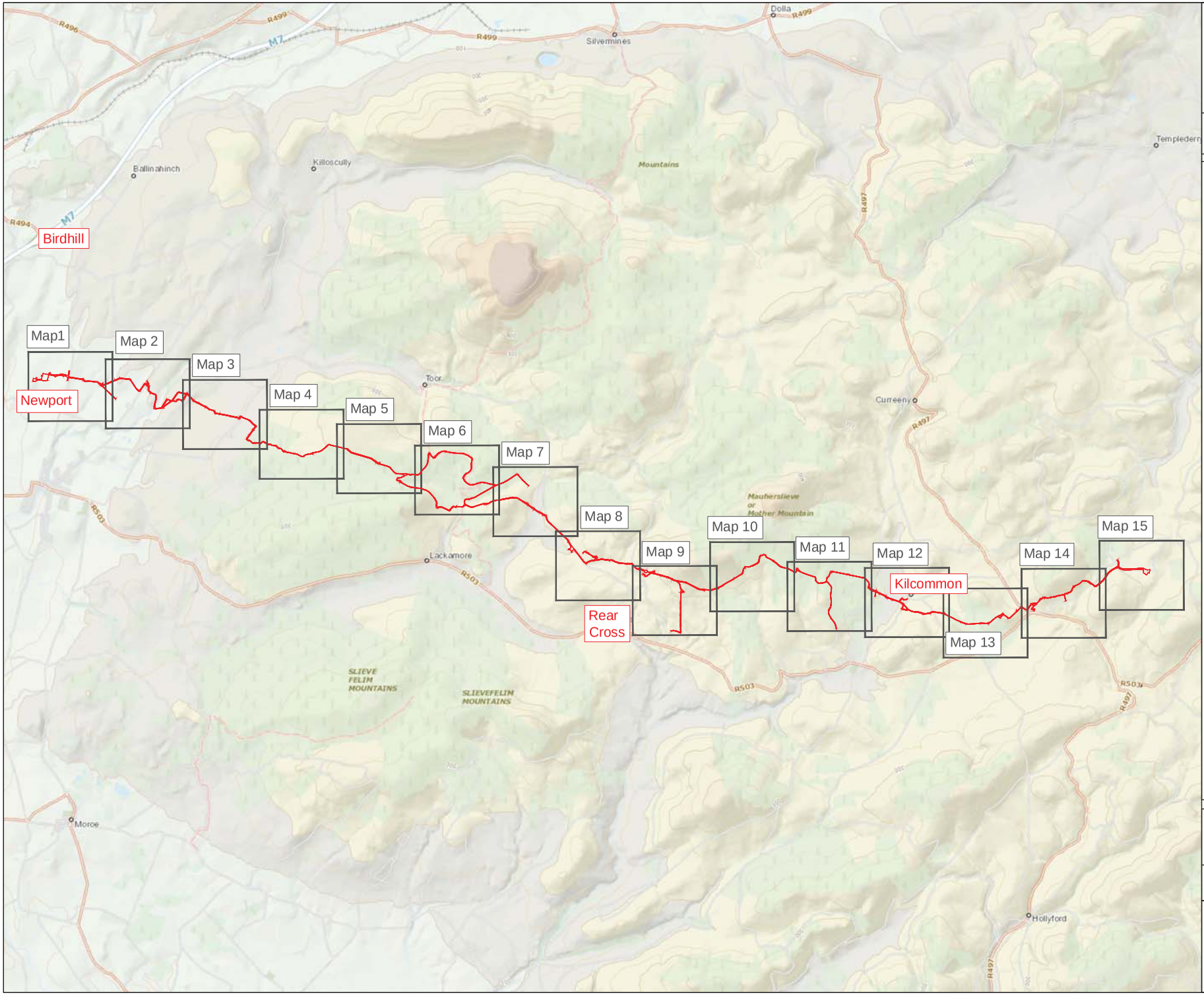

Title:

Figure GC 5.3

UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Map Number:

Overview Map

Legend:

- Construction Works Area Boundary
- Rear Cross Townlands
- Map 1 Map 1 of 15

N

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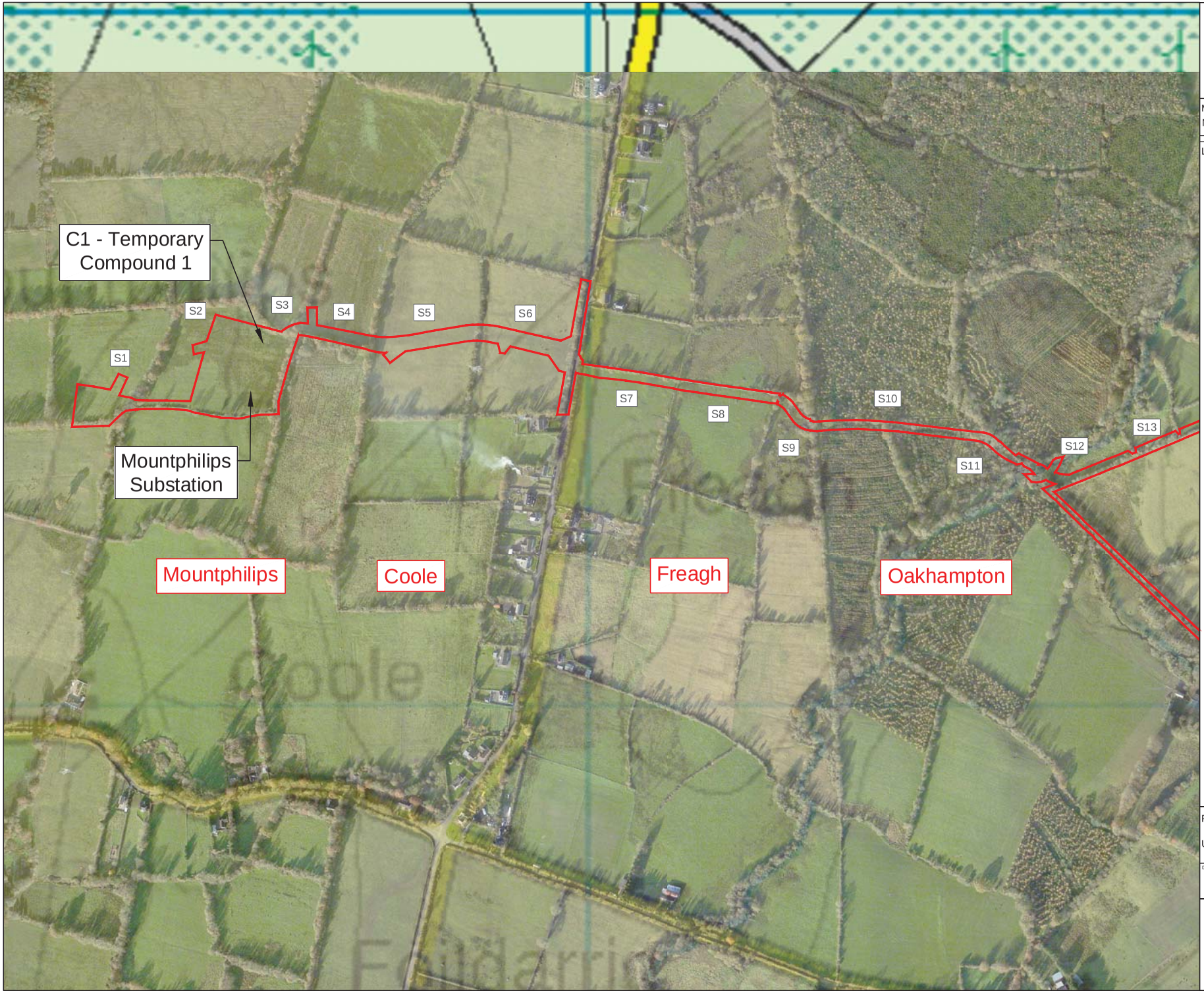

Title:

Figure GC 5.3

UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Map Number:
Map 1 of 15

Legend:

- Construction Works Area Boundary
- Coole Townlands
- S16 Section Numbers (S1 - S102)

N

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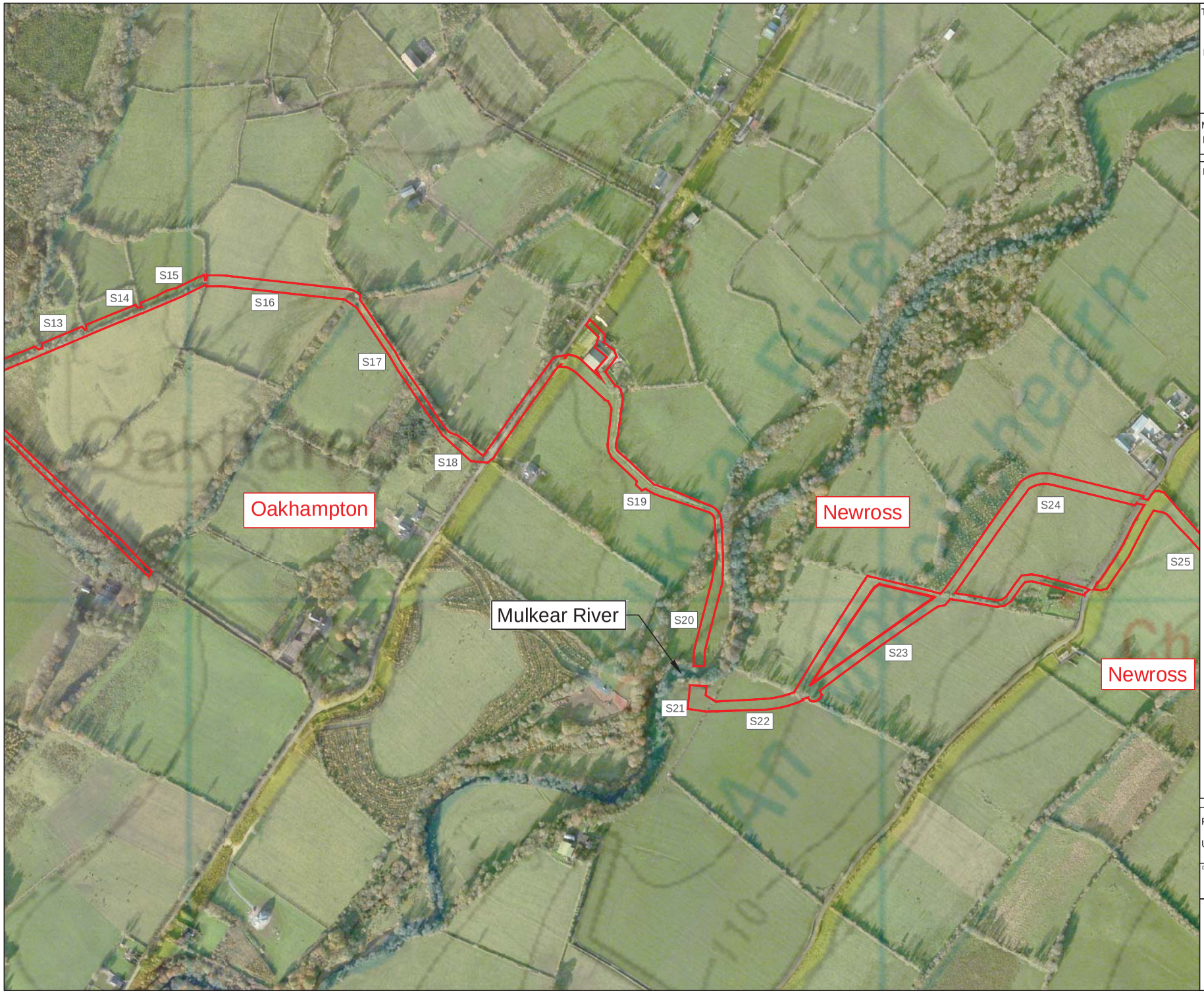

Title:

Figure GC 5.3

UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Map Number:
Map 2 of 15

Legend:

- Construction Works Area Boundary
- Coole Townlands
- S16 Section Numbers (S1 - S102)

N

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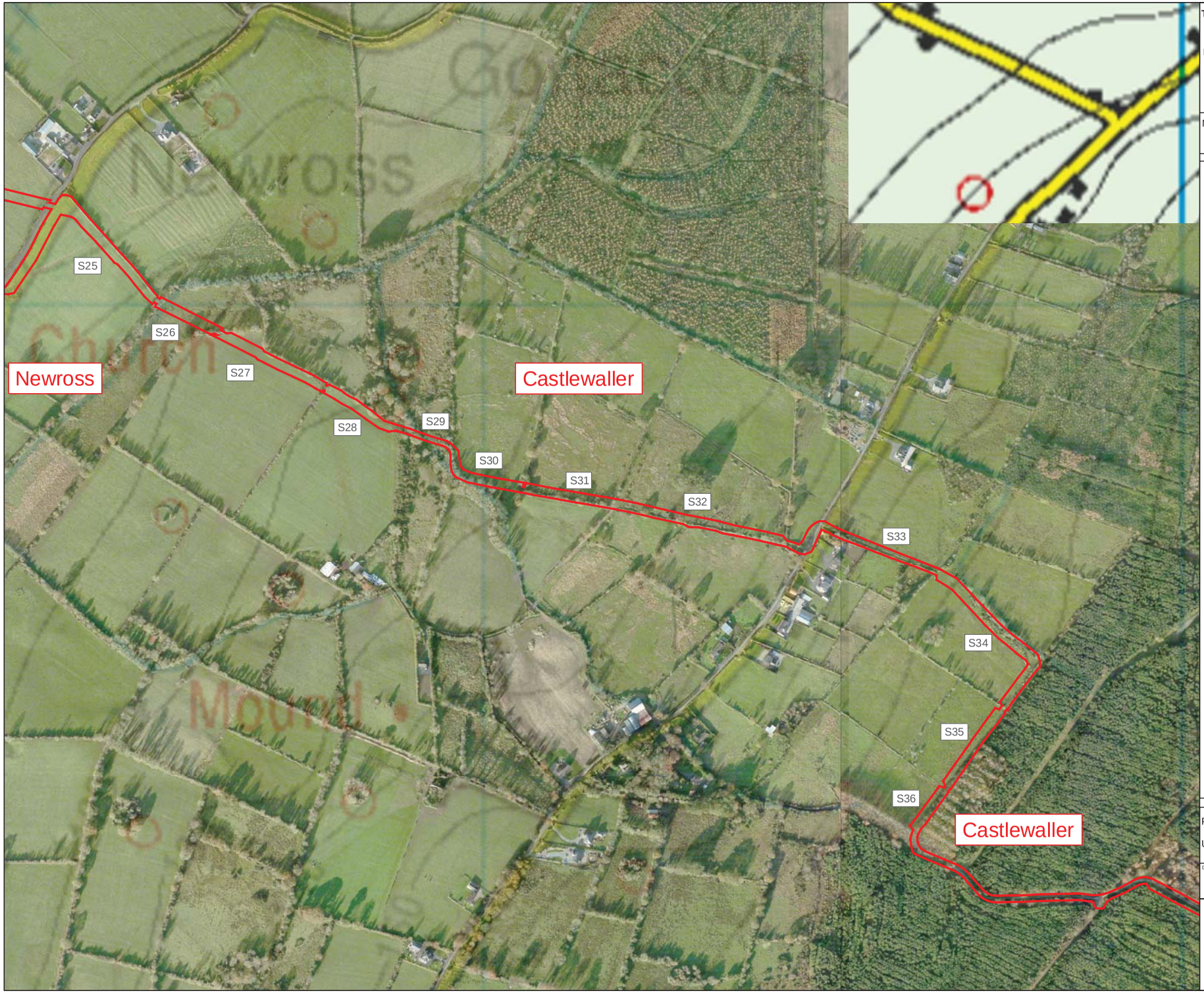

Title:

Figure GC 5.3

UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Map Number:
Map 3 of 15

Legend:

- Construction Works Area Boundary
- Coole Townlands
- S16 Section Numbers (S1 - S102)

N

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Title:

Figure GC 5.3

UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Map Number:
Map 4 of 15

Legend:

- Construction Works Area Boundary
- Coole Townlands
- S16 Section Numbers (S1 - S102)

N

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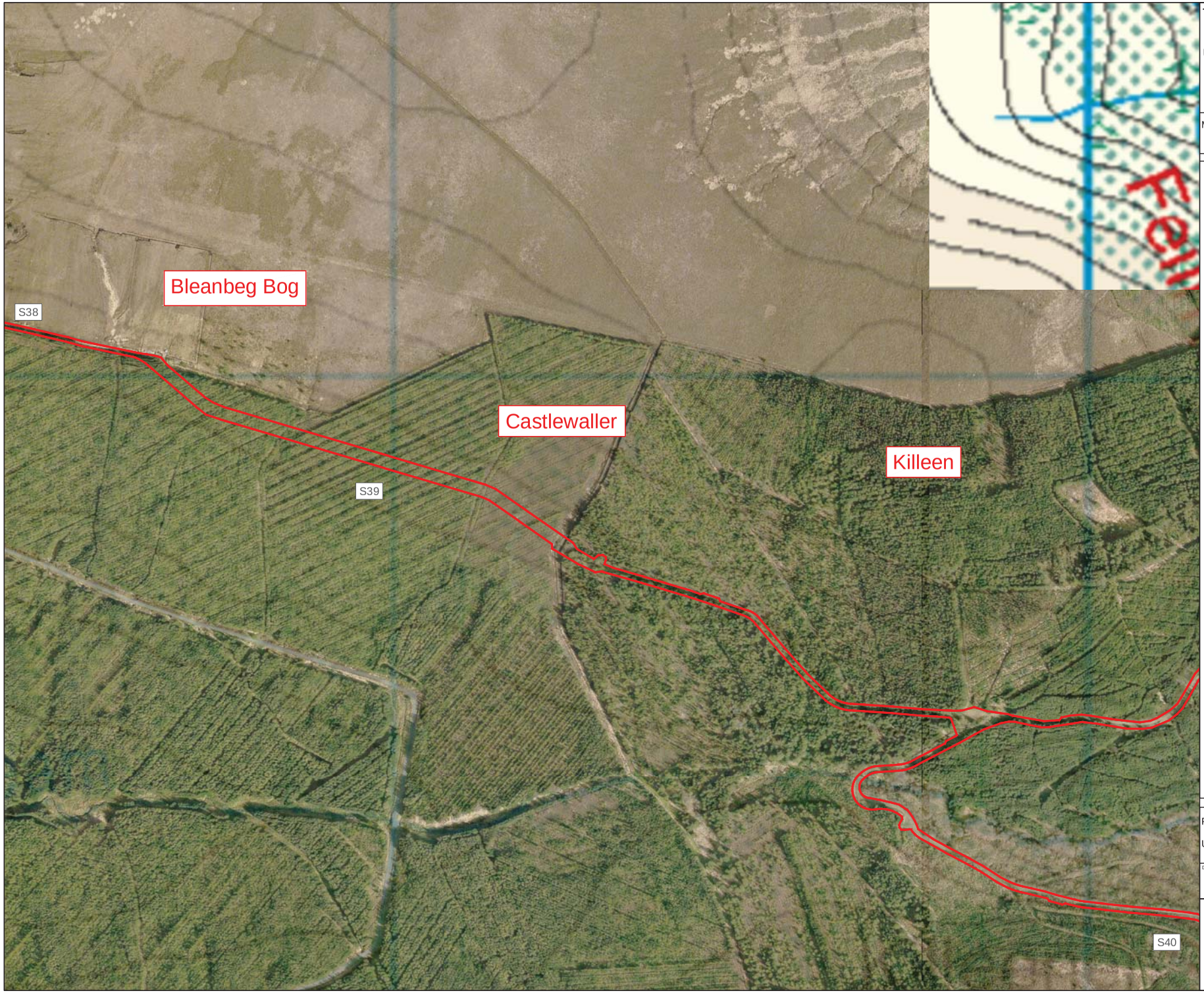

Title:
Figure GC 5.3

UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Map Number:
Map 5 of 15

Legend:

- Construction Works Area Boundary
- Coole Townlands
- S16 Section Numbers (S1 - S102)

N

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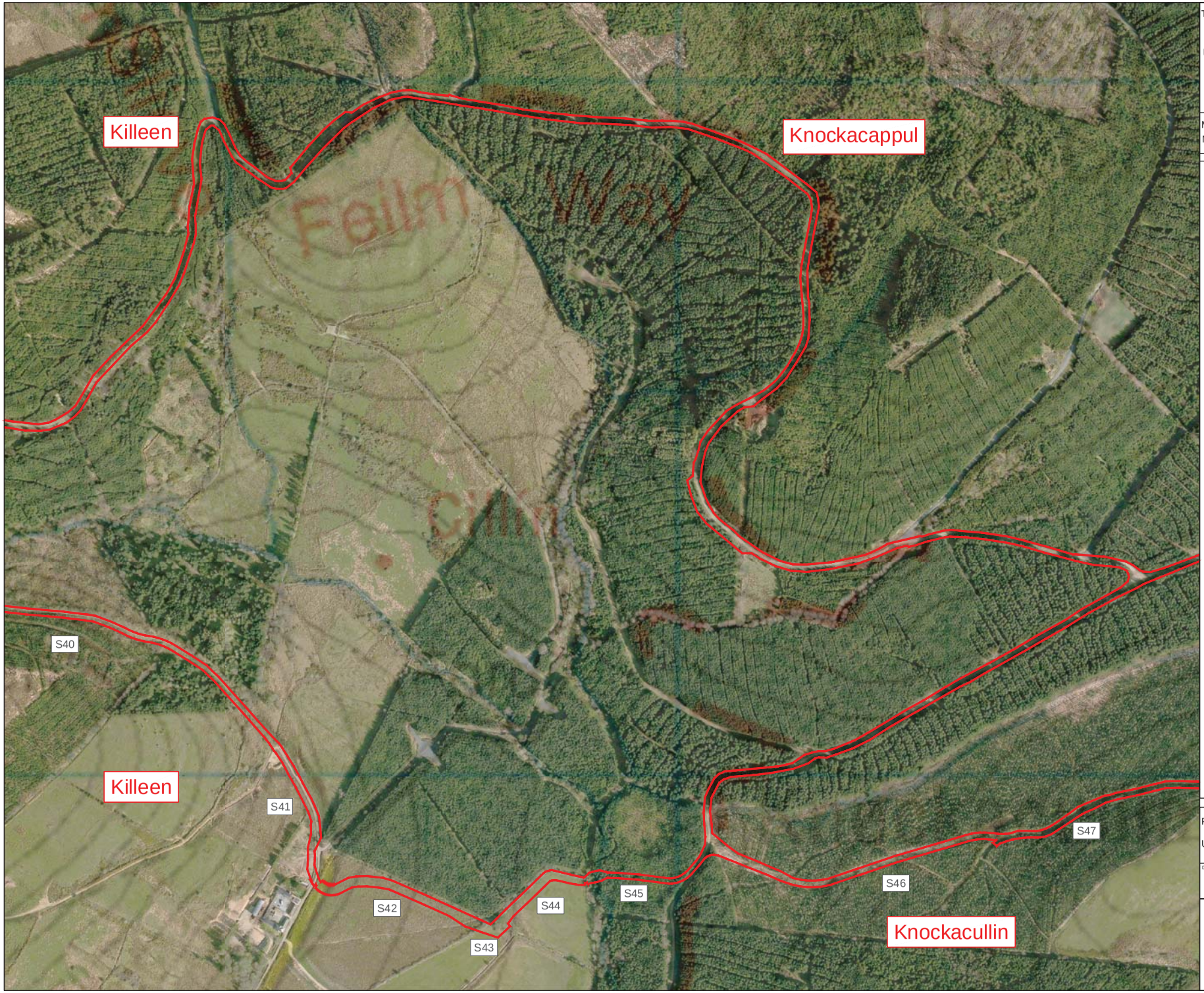

Title:

Figure GC 5.3

UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Map Number:
Map 6 of 15

Legend:

- Construction Works Area Boundary
- Coole Townlands
- S16 Section Numbers (S1 - S102)

N

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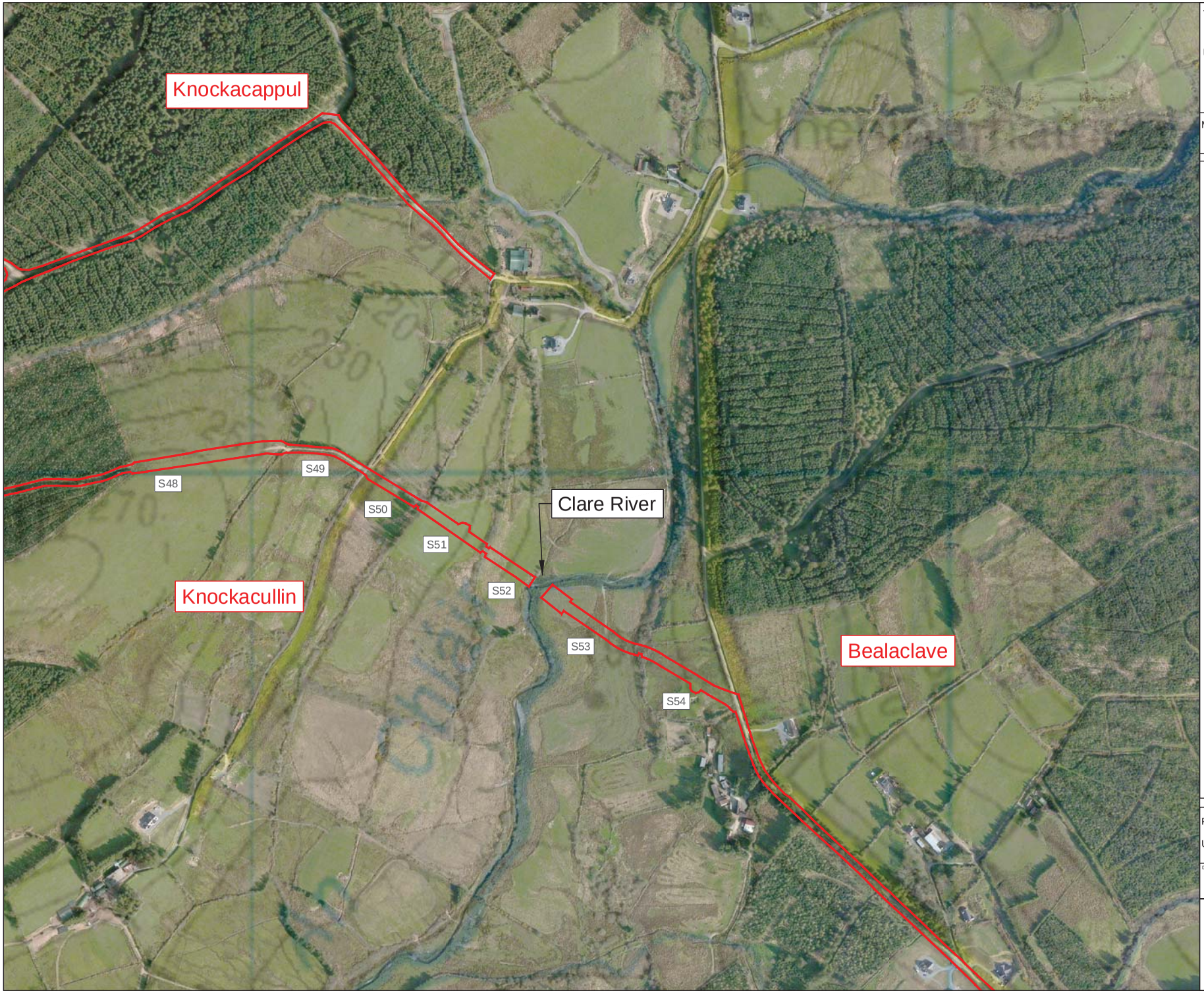

Title:

Figure GC 5.3

UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Map Number:
Map 7 of 15

Legend:

- Construction Works Area Boundary
- Coole — Townlands
- S16 — Section Numbers (S1 - S102)

N

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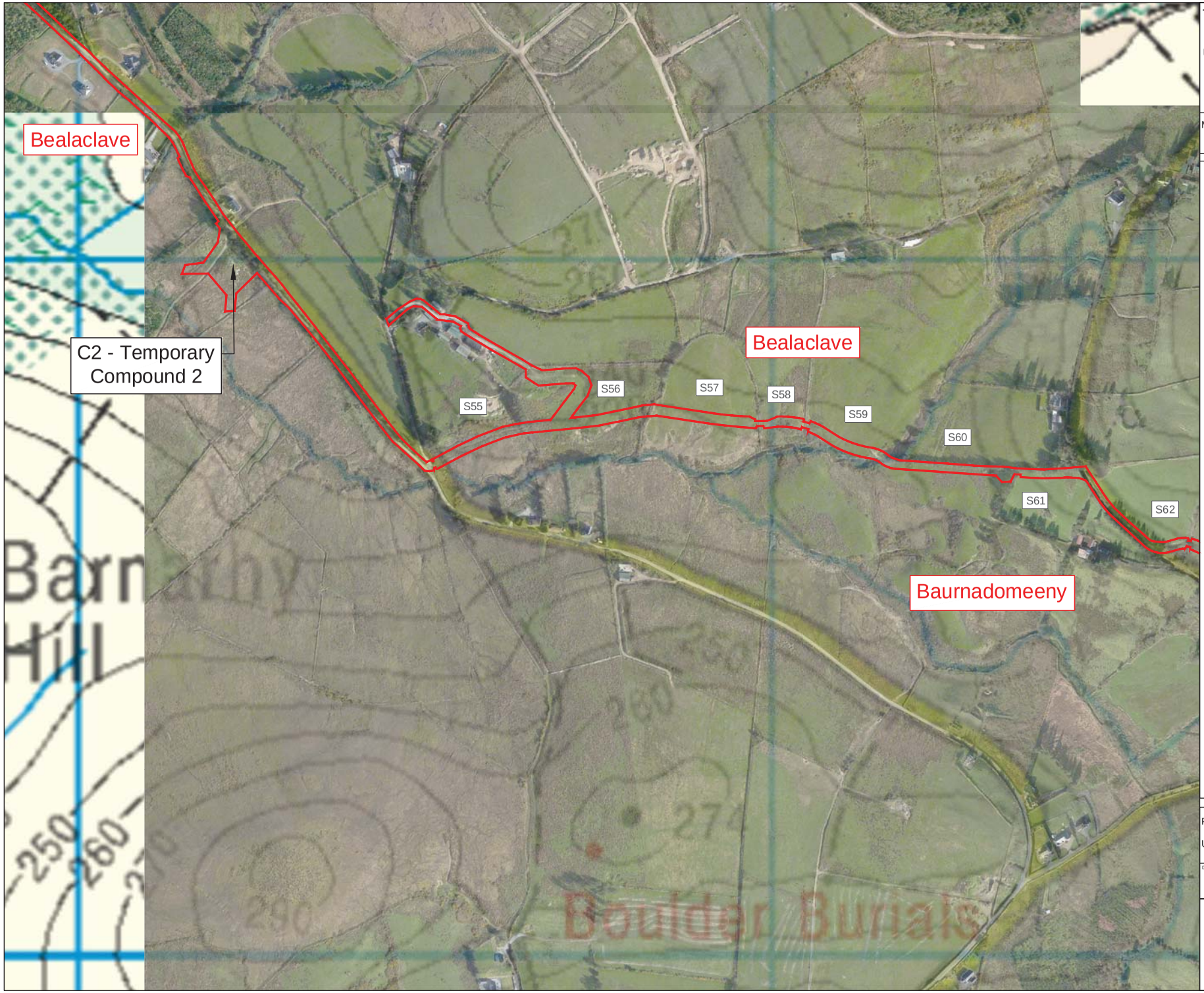

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Figure GC 5.3

UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Map Number:
Map 8 of 15

Legend:

- Construction Works Area Boundary
- Townlands
- Section Numbers (S1 - S102)

N

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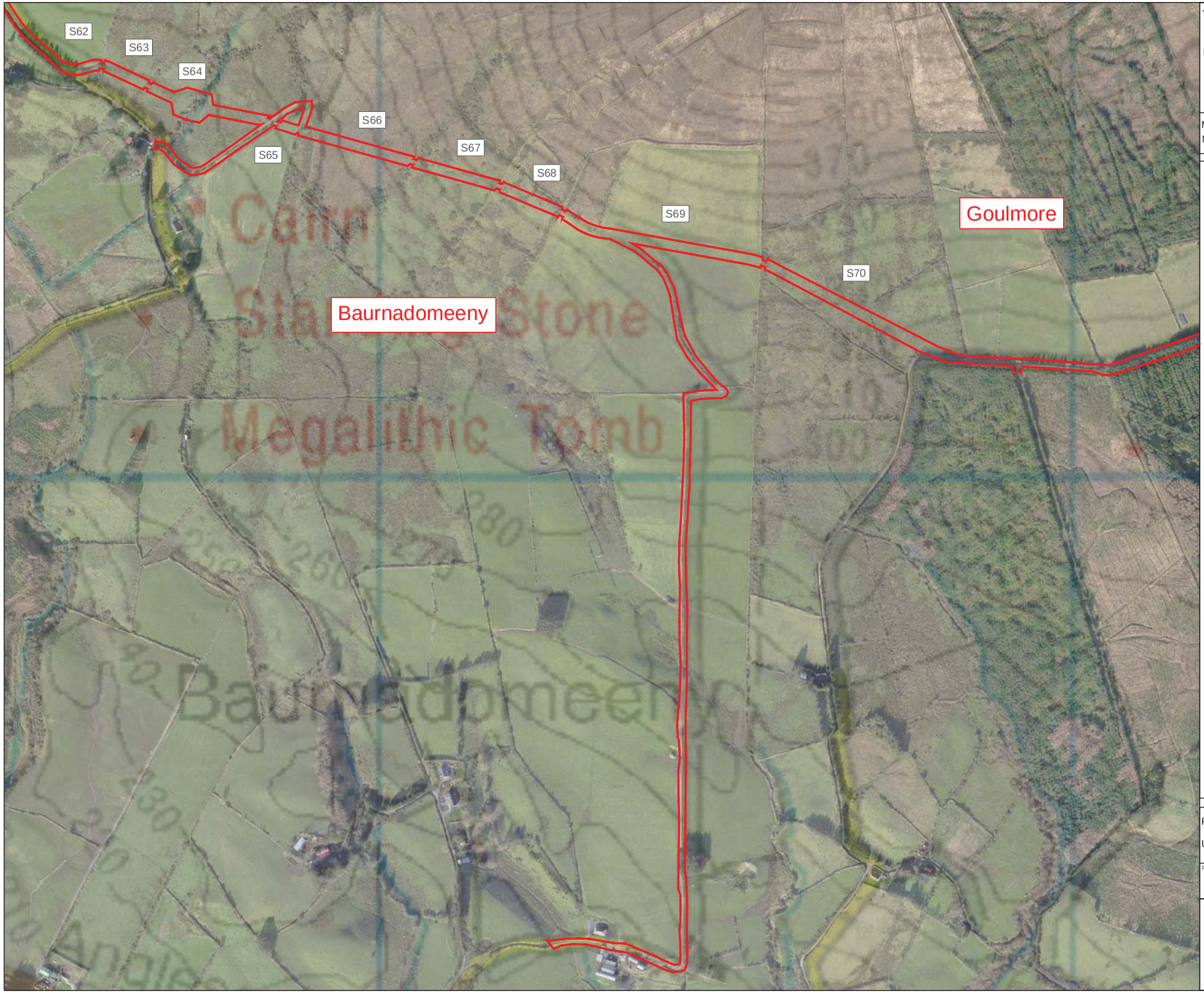

Title:

Figure GC 5.3

UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Map Number:
Map 9 of 15

Legend:

- Construction Works Area Boundary
- Coole — Townlands
- S16 — Section Numbers (S1 - S102)

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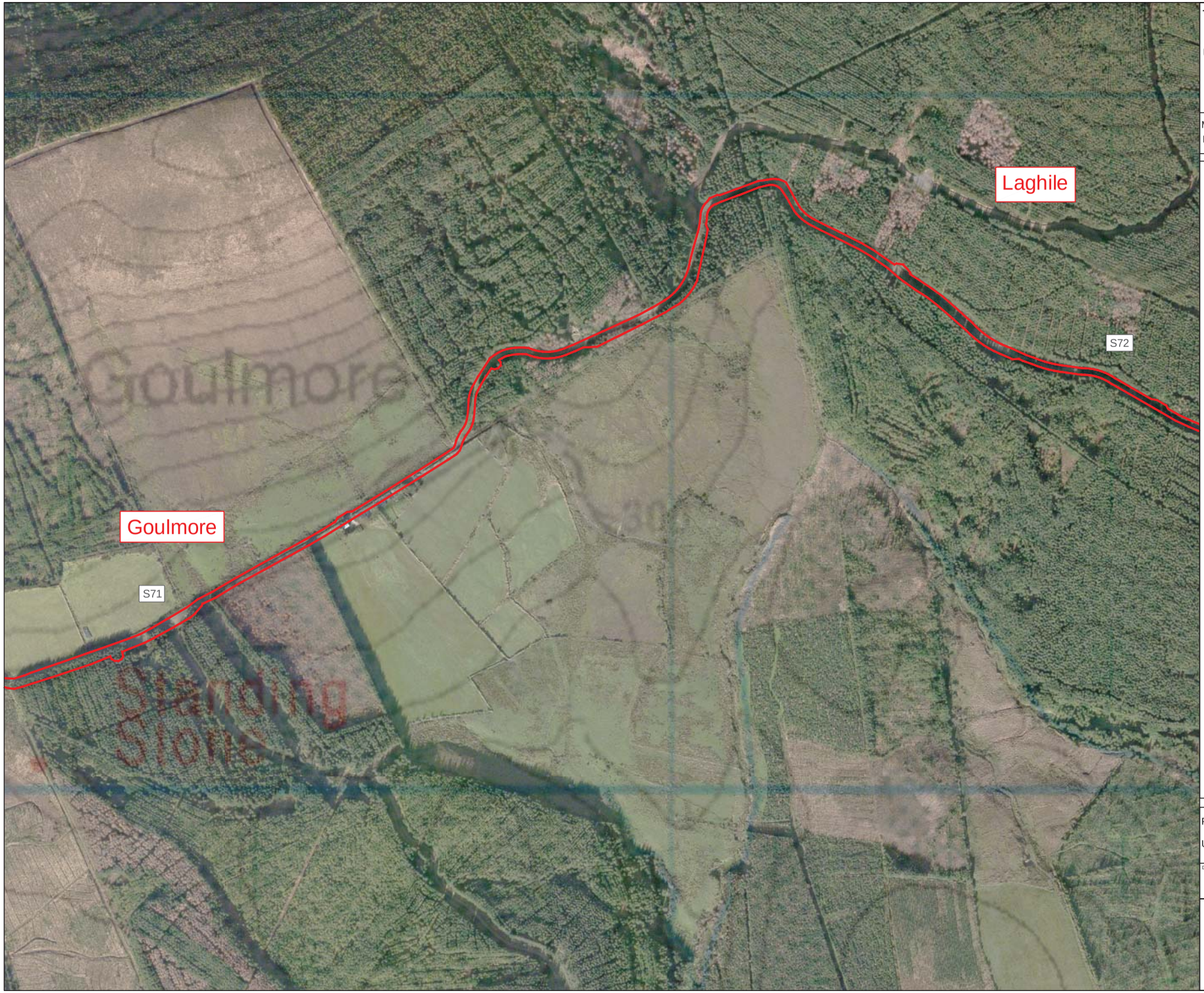

Title:

Figure GC 5.3

UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Map Number:
Map 10 of 15

Legend:

- Construction Works Area Boundary
- Coole — Townlands
- S16 — Section Numbers (S1 - S102)

N

REFERENCE DOCUMENTS

Project:

UWF Grid Connection (GC)

Drawn by:	Checked by:	Date:	Sheet Size:
AB	JB	14-Feb-18	A3

Aoife Butler
Ecopower Developments Ltd
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Purcellsinch Business Pak, Kilkenny
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MOB: +353 83 8805644

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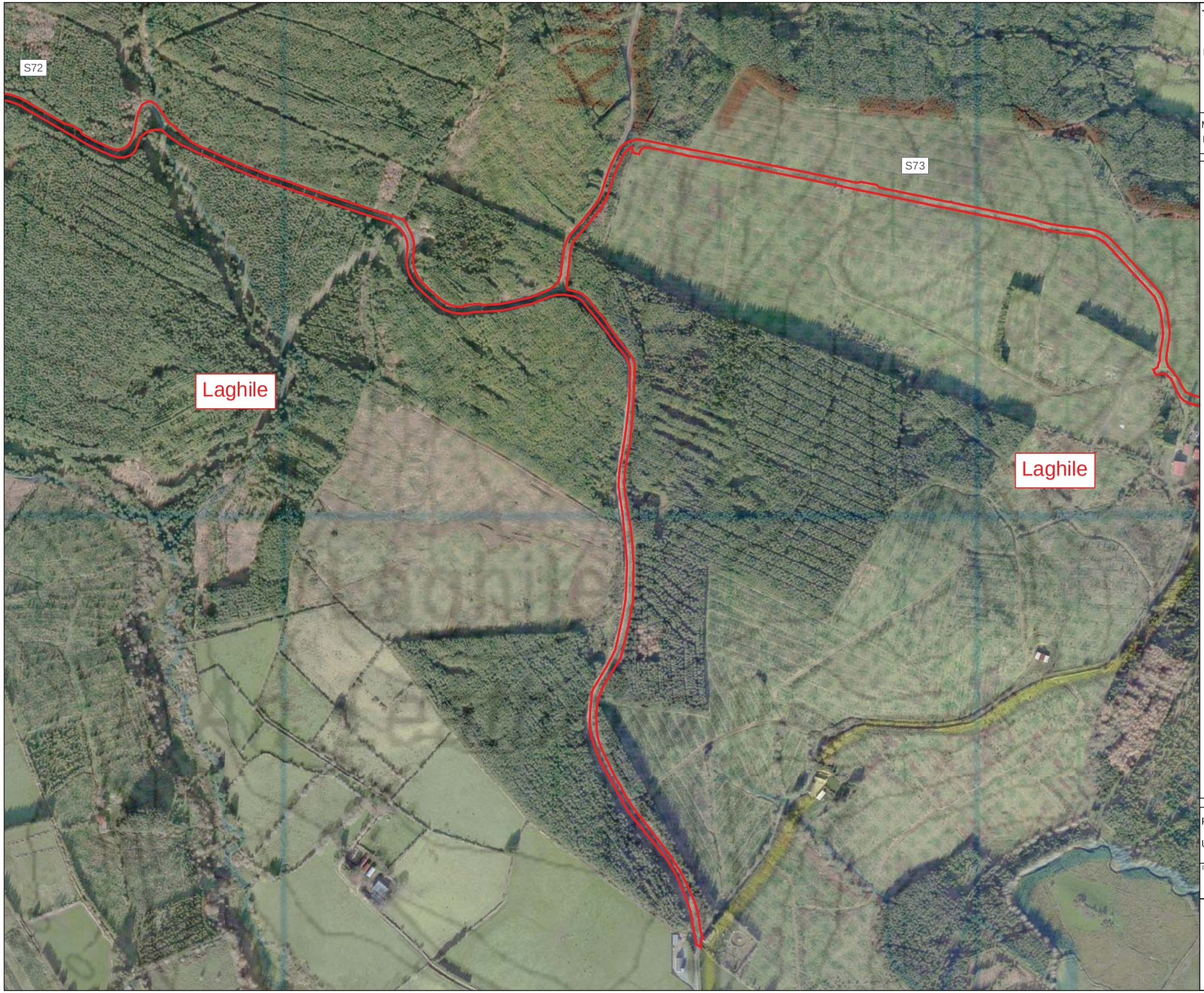

Title:

Figure GC 5.3

UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Map Number:
Map 11 of 15

Legend:

- Construction Works Area Boundary
- Coole Townlands
- S16 Section Numbers (S1 - S102)

N

REFERENCE DOCUMENTS

Project:

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MOB: +353 83 8805644

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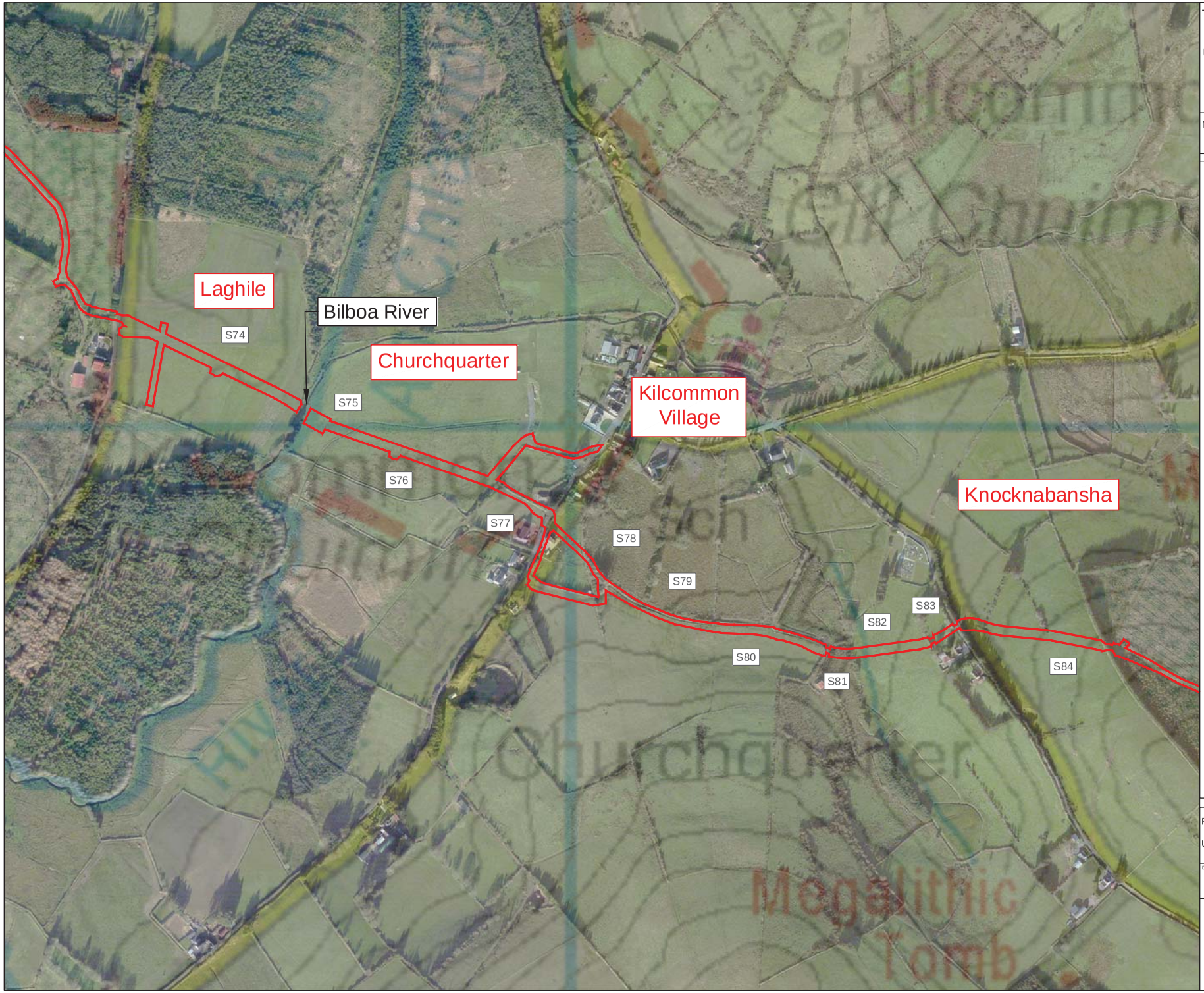

Title:

Figure GC 5.3

UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Map Number:
Map 12 of 15

Legend:

- Construction Works Area Boundary
- Coole Townlands
- S16 Section Numbers (S1 - S102)

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MOB: +353 83 8805644

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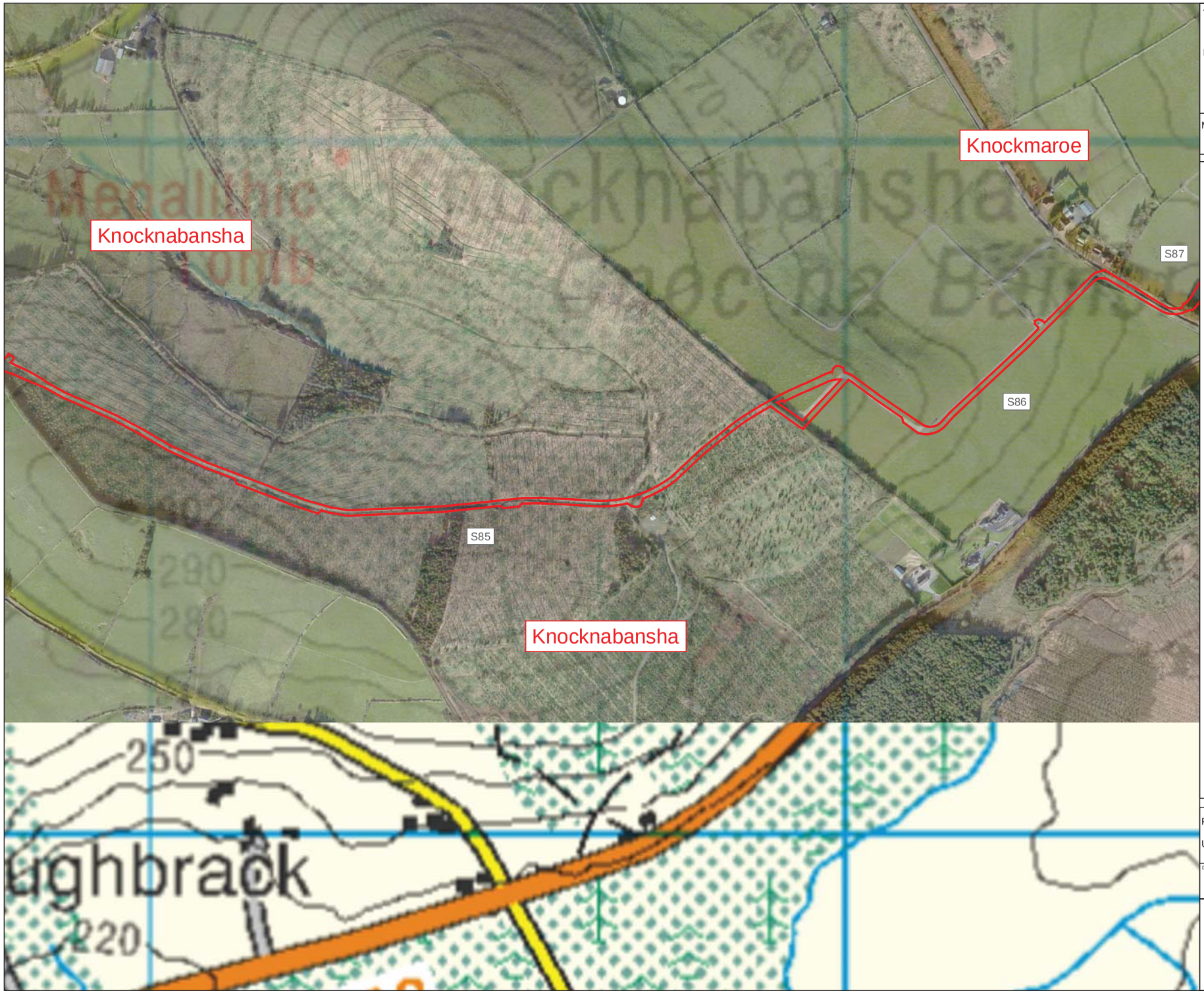

Title:

Figure GC 5.3

UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Map Number:
Map 13 of 15

Legend:

- Construction Works Area Boundary
- Coole Townlands
- S16 Section Numbers (S1 - S102)

N

REFERENCE DOCUMENTS

Project:

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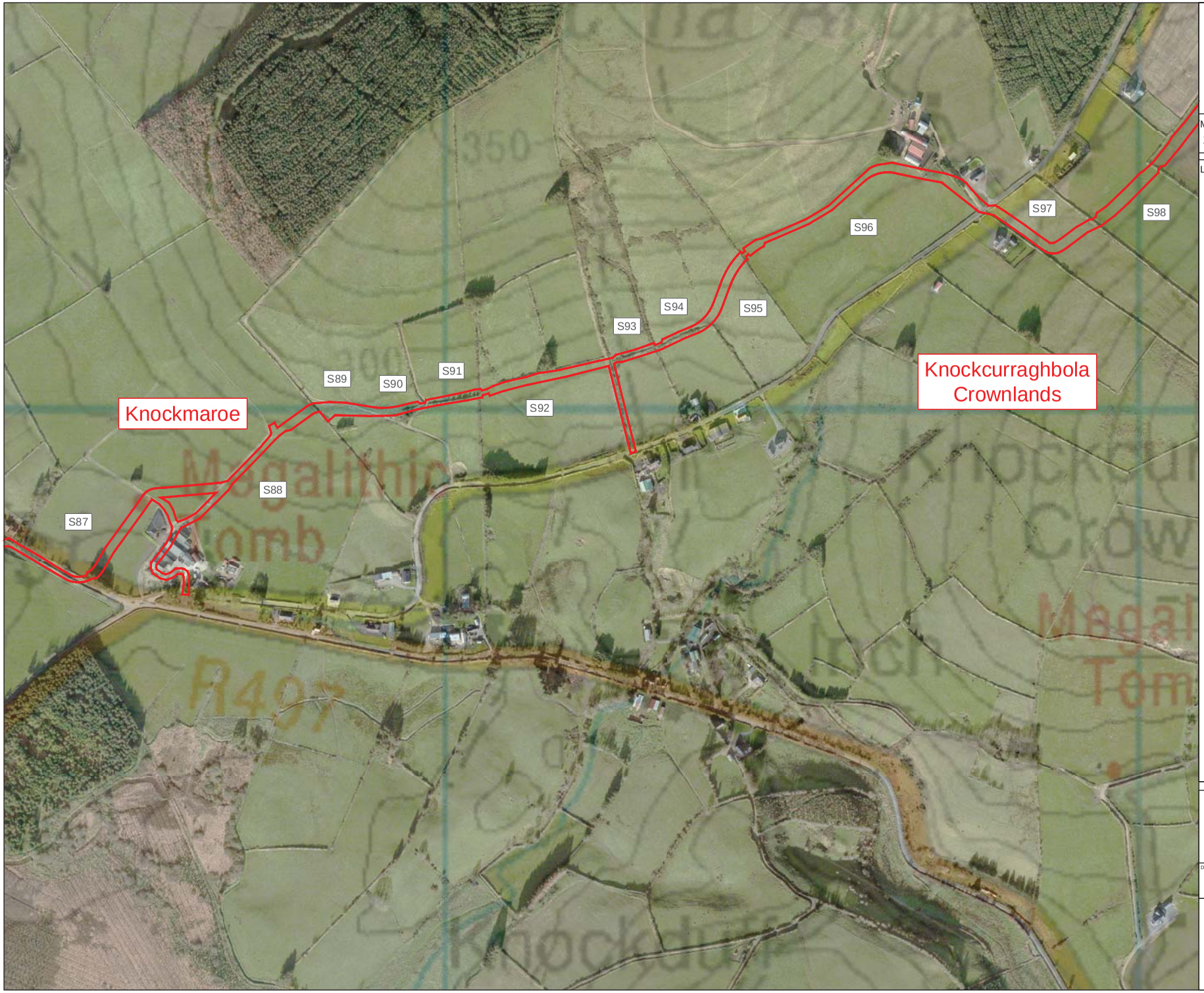

Title:

Figure GC 5.3

UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Map Number:
14 of 15

Legend:

- Construction Works Area Boundary
- Coole Townlands
- S16 Section Numbers (S1 - S102)

Project:

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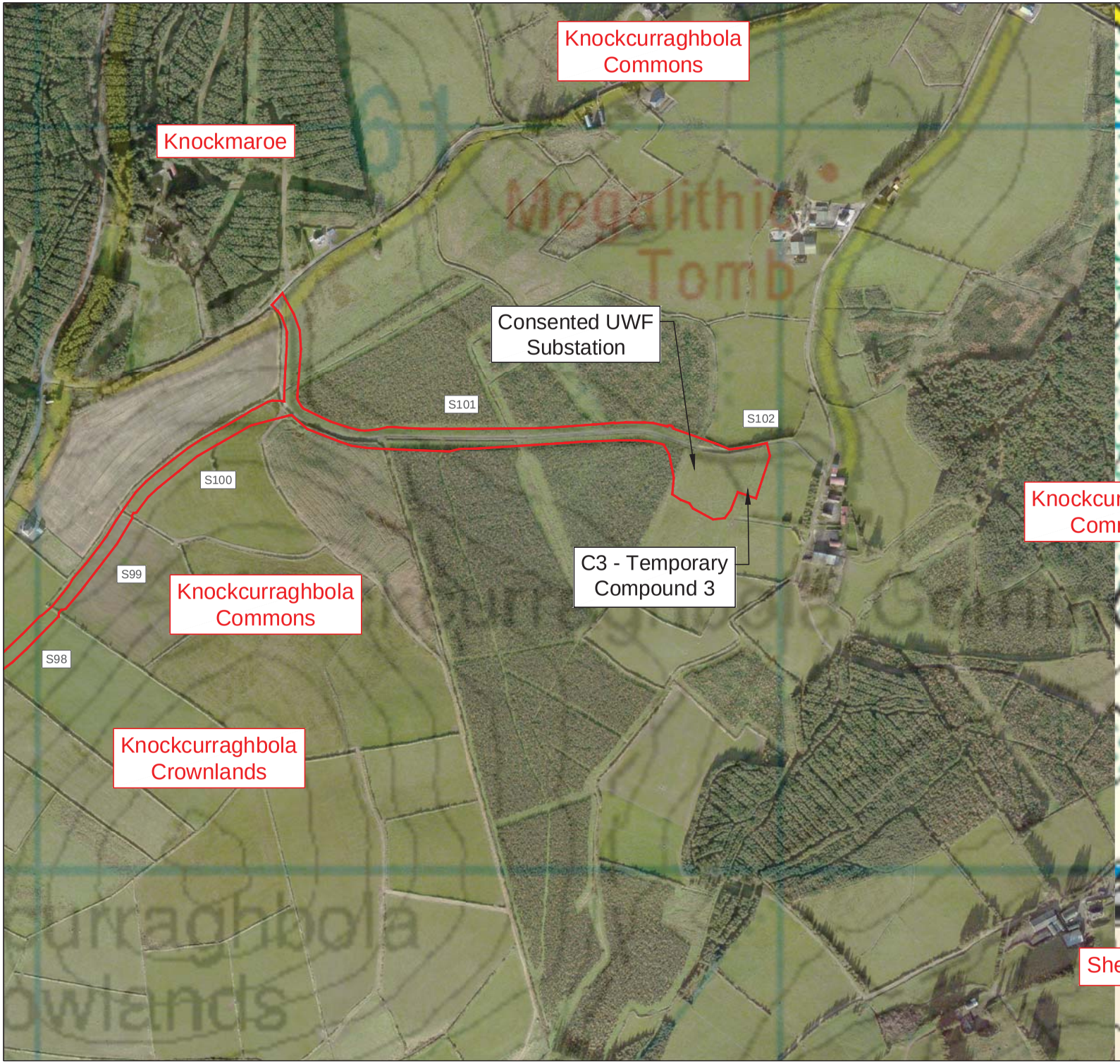

Title:

Figure GC 5.3

UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Map Number:
15 of 15

Legend:

- Construction Works Area Boundary
- Coole Townlands
- S16 Section Numbers (S1 - S102)

N

REFERENCE DOCUMENTS

Project:

UWF Grid Connection (GC)

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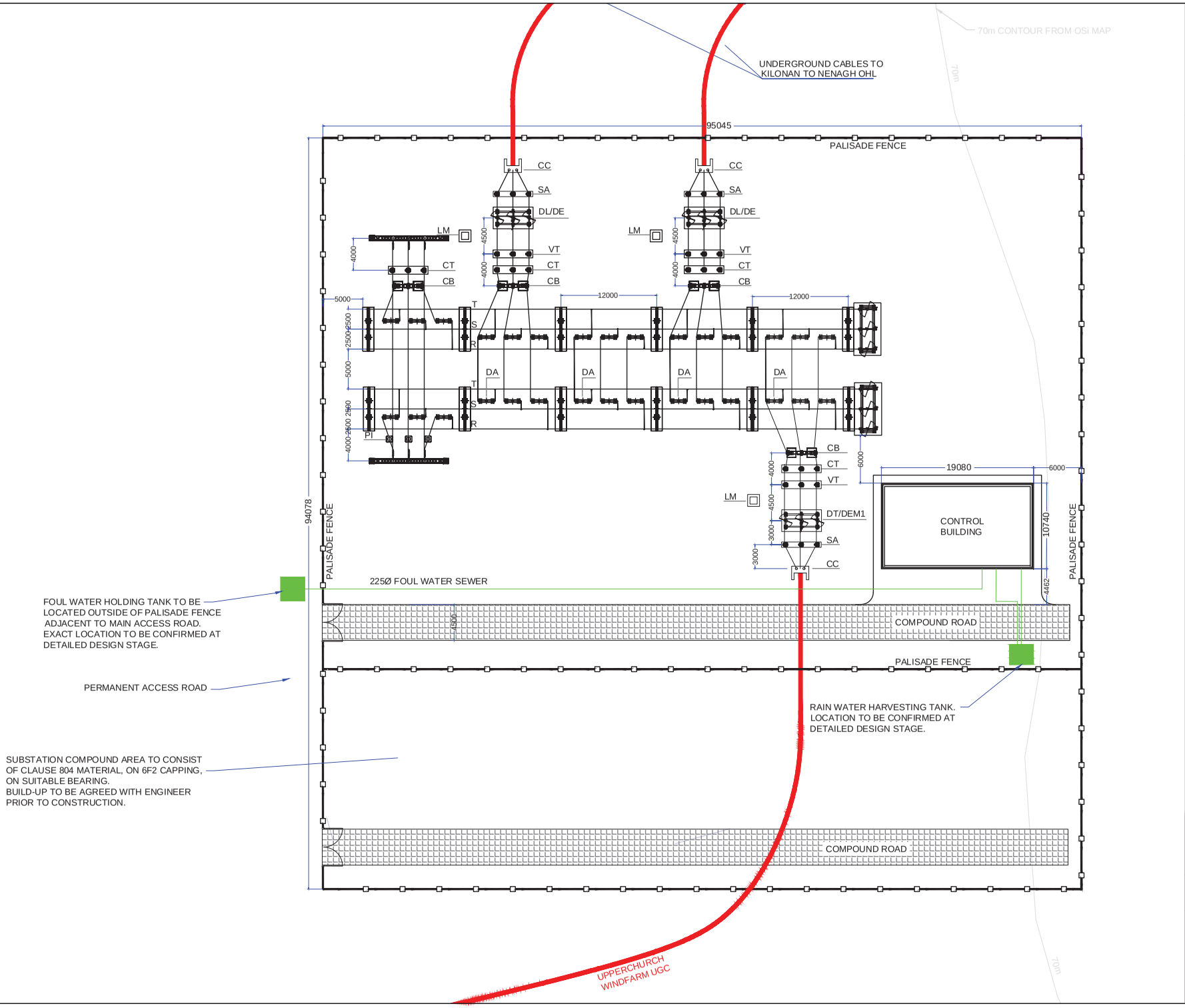

Title:

Figure GC 5.4

Plan of the Mountphilips Substation Compound

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

	Description
CC	Cable Chair.
SA	Surge Arrester.
DL/DE	Line / Earth Disconnect.
DT/DEM1	Trafo / Earth Disconnect.
VT	Voltage Transformer.
CT	Current Transformer.
CB	Circuit Breaker.
DA	Busbar Disconnect.
PI	Post Insulator.
LM	Lighting Mast.

1. Layout and Arrangements of Substation Building and Electrical Equipment is shown indicatively and for illustration purposes only.
2. Dimensions shown are as per current Eirgrid Specifications at the time of submission. Dimensions or Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications.
3. Final Specifications of Buildings and Electrical Equipment is to be as per Eirgrid and ESB Specifications.
4. The Elevation of the Compound will be depicted by localized Topography such that Cut/Fill Earthworks associated with the construction of the Compound are balanced.

REFERENCE DOCUMENTS

Designed in conjunction with

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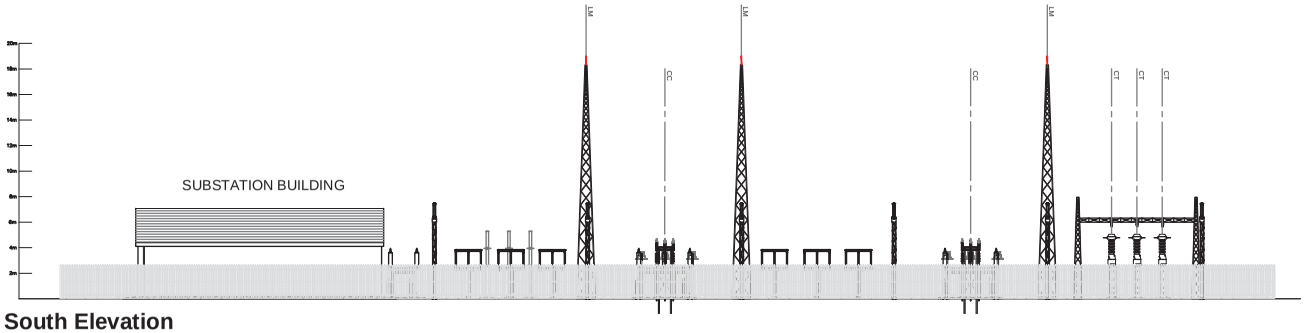
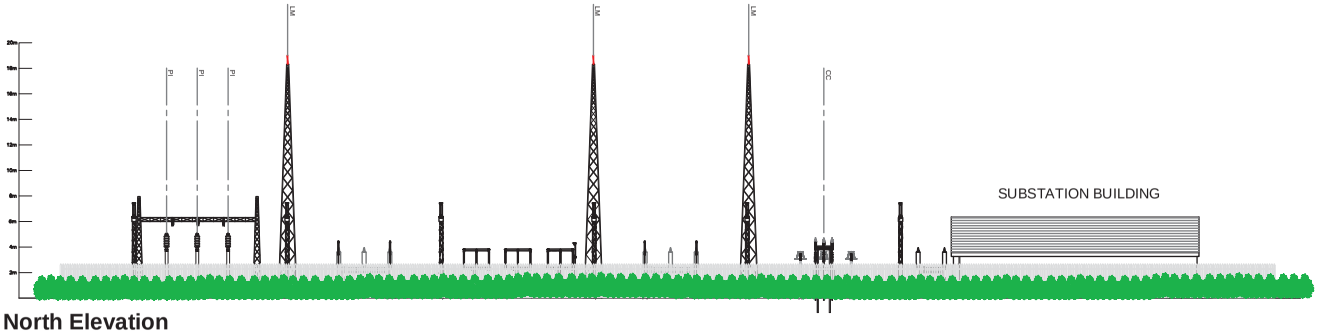
Mobile - +353 (0)87-6531458

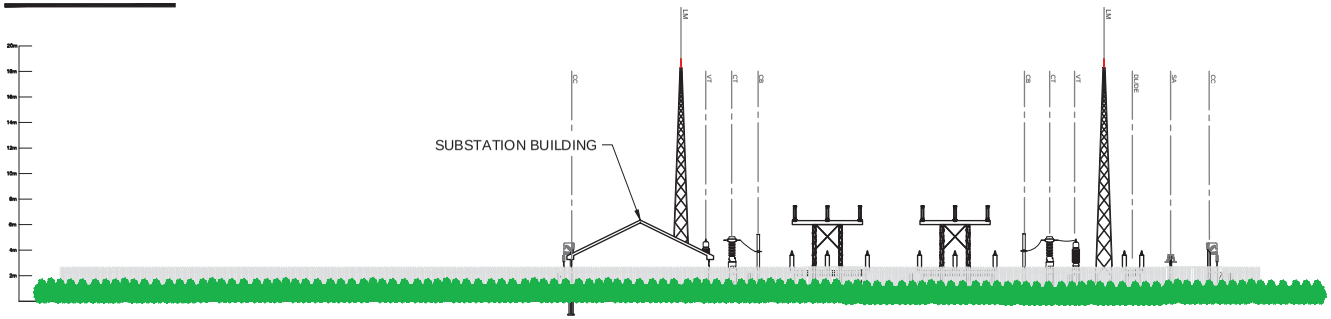
ECOPOWER



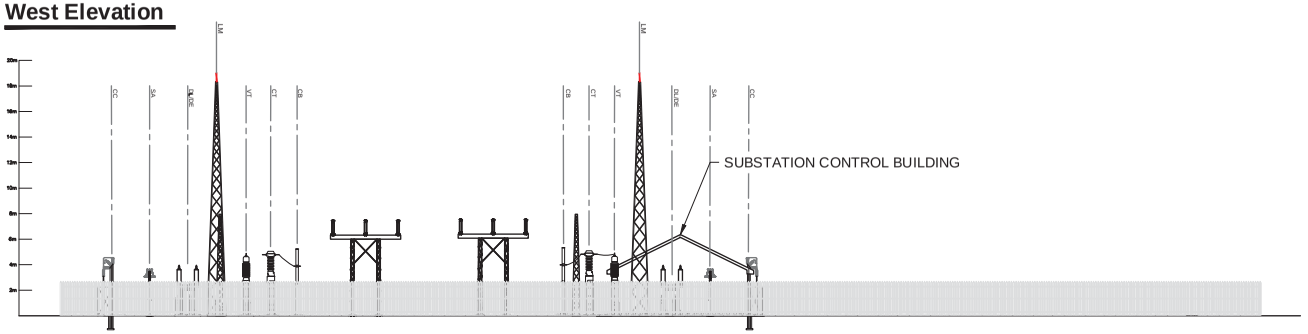
South Elevation



North Elevation



West Elevation



East Elevation

Title:

Figure GC 5.5

Elevation of the Mountphilips Substation Compound

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

	Description
CC	Cable Chair.
SA	Surge Arrester.
DL/DE	Line / Earth Disconnect.
DT/DEM1	Trafo / Earth Disconnect.
VT	Voltage Transformer.
CT	Current Transformer.
CB	Circuit Breaker.
DA	Busbar Disconnect.
PI	Post Insulator.
LM	Lighting Mast.

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4. The Elevation of the Compound will be depicted by localized Topography such that Cut/Fill Earthworks associated with the construction of the Compound are balanced.

REFERENCE DOCUMENTS

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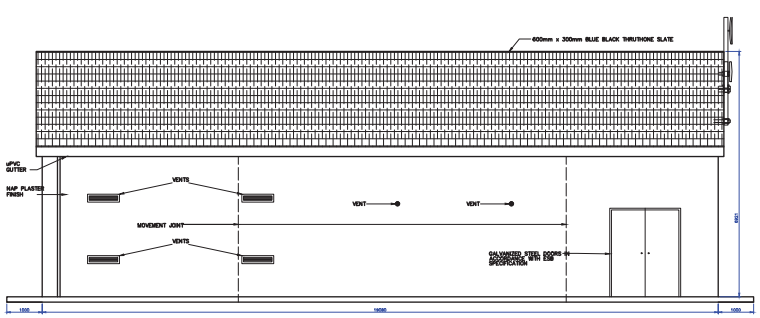
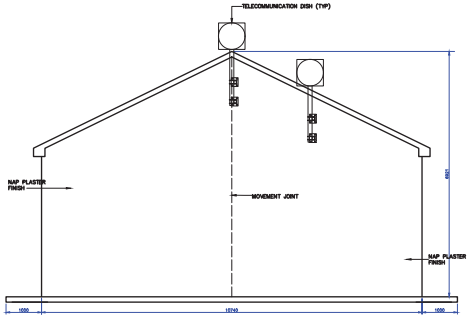
Mobile - +353 (0)87-6531458

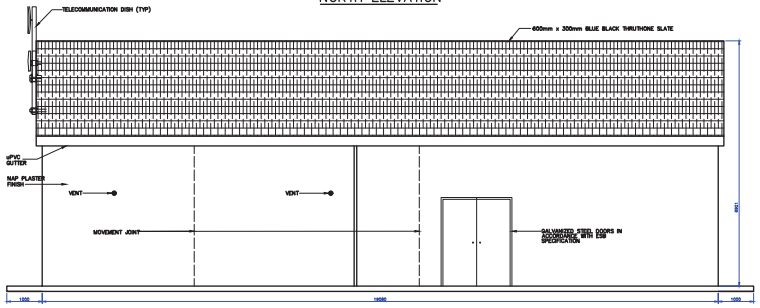
ECOPOWER



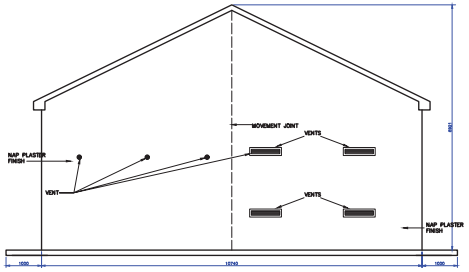
NORTH ELEVATION



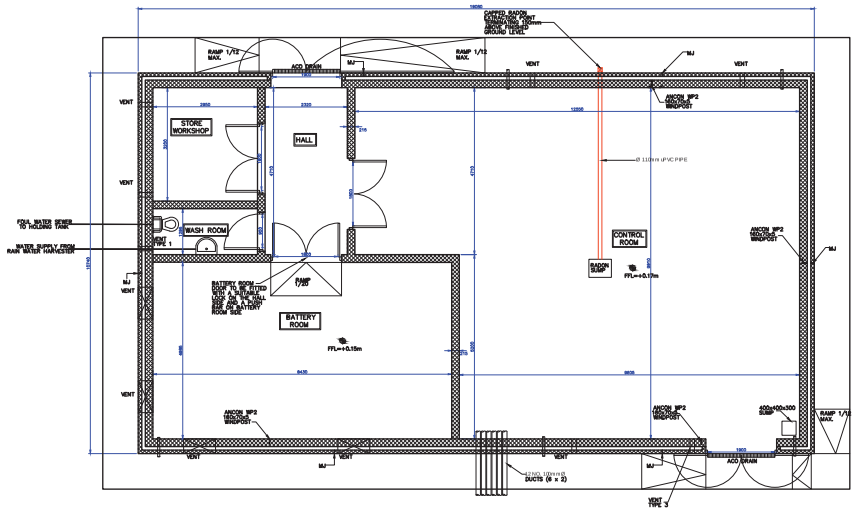
WEST ELEVATION



SOUTH ELEVATION



EAST ELEVATION



PLAN VIEW
SCALE 1:50

REFERENCE DOCUMENTS

Title:

Figure GC 5.6

Plan and Elevation of the Control Building at Mountphilips Substation

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

1. Layout and Arrangements of Substation Building and Electrical Equipment is shown indicatively and for illustration purposes only.
2. Dimensions shown are as per current Eirgrid Specifications at the time of submission. Dimensions and Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications.
3. Final Specifications of Buildings and Electrical Equipment is to be as per Eirgrid and ESB Specifications.
4. The Elevation of the Compound will be depicted by localized Topography such that Cut/Fill Earthworks associated with the construction of the Compound are balanced.

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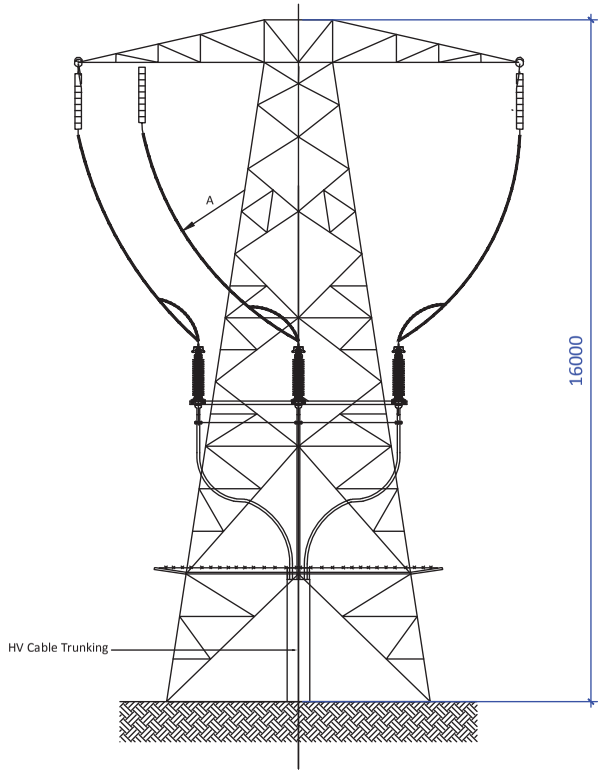
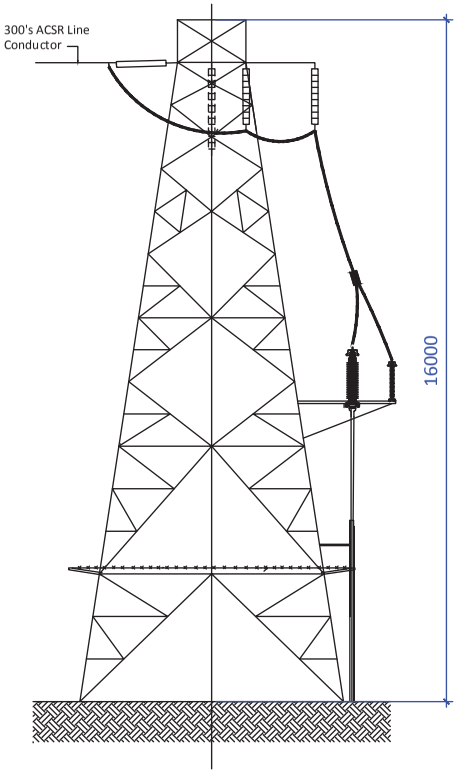
Landline - 056-7750140 (Ext 204)
Mobile - +353 (0)87-6531458

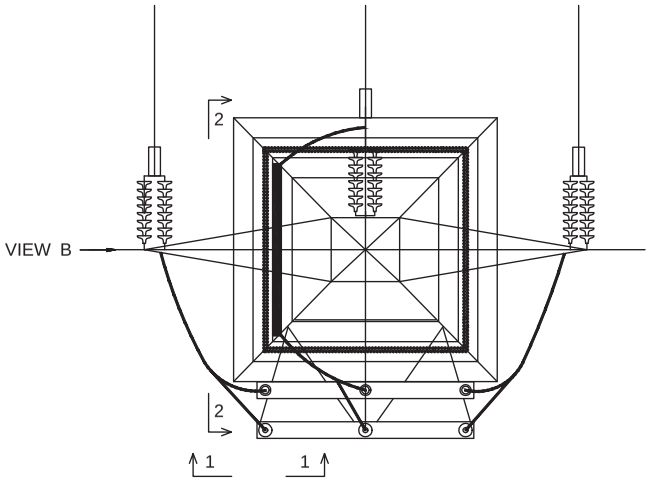
ECOPOWER



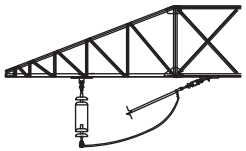
FRONT ELEVATION
(Rear Platform Removed for Clarity)



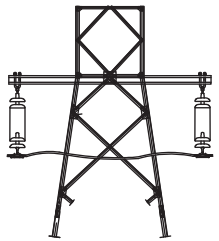
SIDE ELEVATION



PLAN VIEW



SECTION 1-1



SECTION 2-2

Title:

Figure GC 5.7

Plan and Elevation of the End Masts at Mountphilips Substation

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only
Dimensions in millimeters

1. Layout and Arrangements of Substation Building and Electrical Equipment is shown indicatively and for illustration purposes only.
2. Dimensions shown are as per current Eirgrid Specifications at the time of submission. Dimensions and Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications.
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4. The Elevation of the Compound will be depicted by localized Topography such that Cut/Fill Earthworks associated with the construction of the Compound are balanced.

Designed in conjunction with

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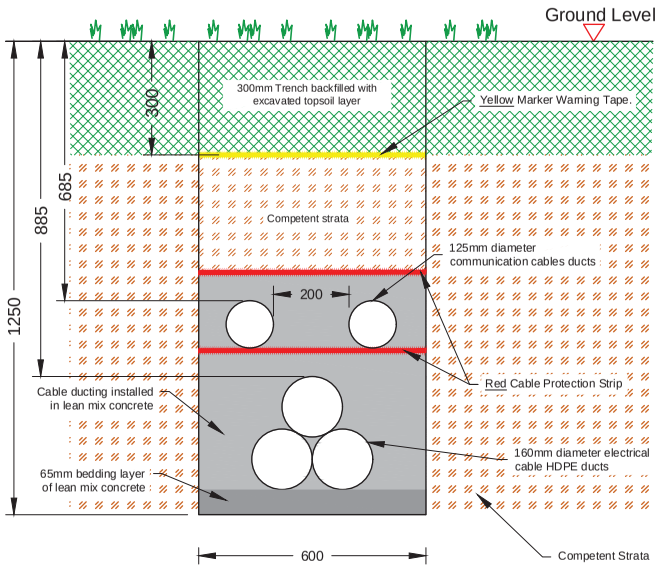
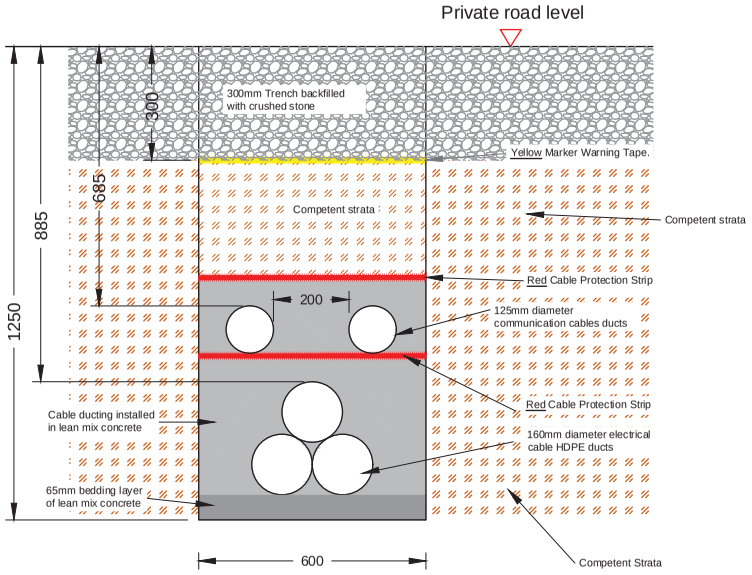
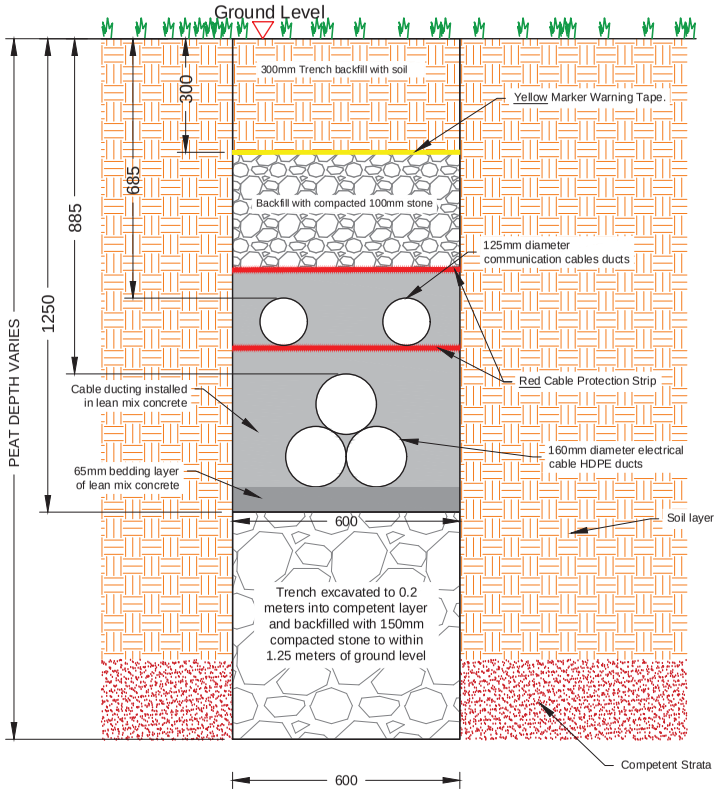


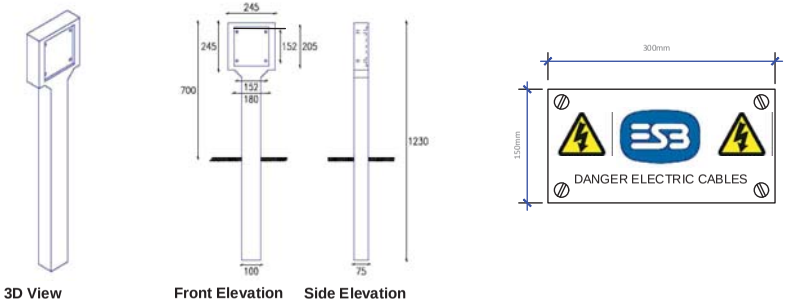
110kV CABLES TRENCH - TYPICAL SECTION THROUGH AGRICULTURAL LANDS



110kV CABLES TRENCH - TYPICAL SECTION THROUGH EXISTING PRIVATE ROADS



110kV CABLES TRENCH -TYPICAL CROSS SECTION THROUGH PEATLAND - SECTION NUMBER S39



3D View | Front Elevation | Side Elevation

TYPICAL MARKER POST AND MARKER PLATE DIMENSIONS

Title:

Figure GC 5.8

Cross Sections of Mountphilips - Upperchurch 110kV Underground Cables Trench

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications

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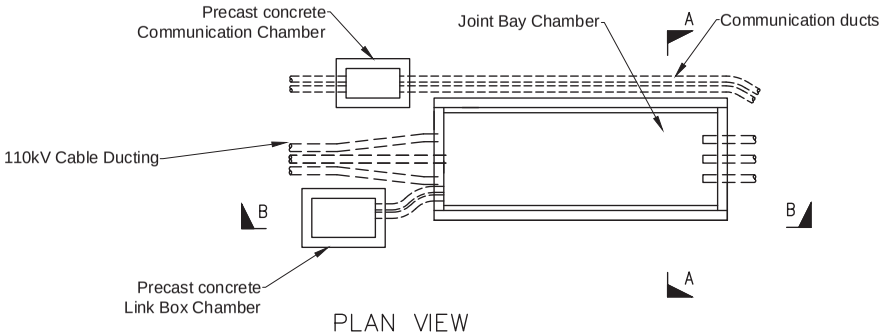
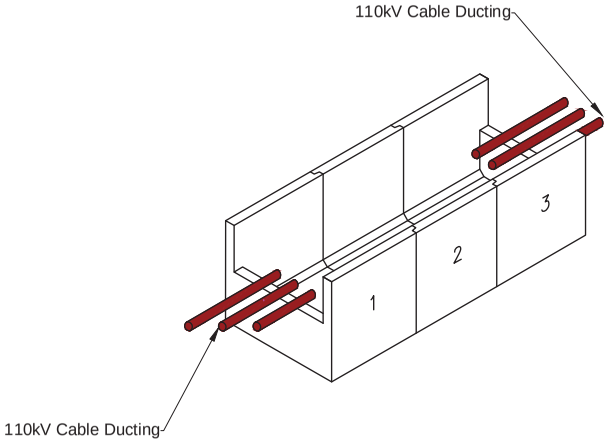
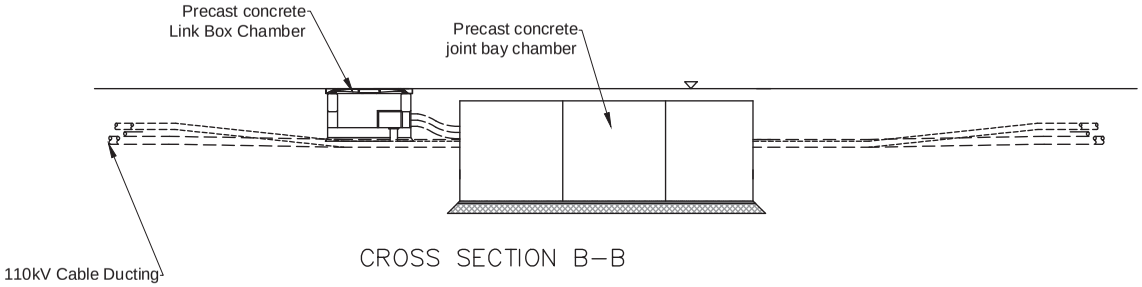


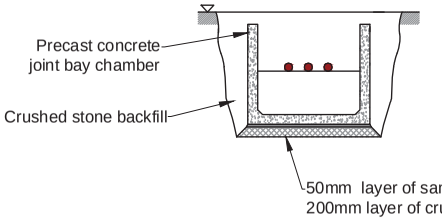
PLAN VIEW



ISOMETRIC VIEW



CROSS SECTION B–B



CROSS SECTION A–A

Title:

Figure GC 5.9

Views of 110kV UGC Joint Bays

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications

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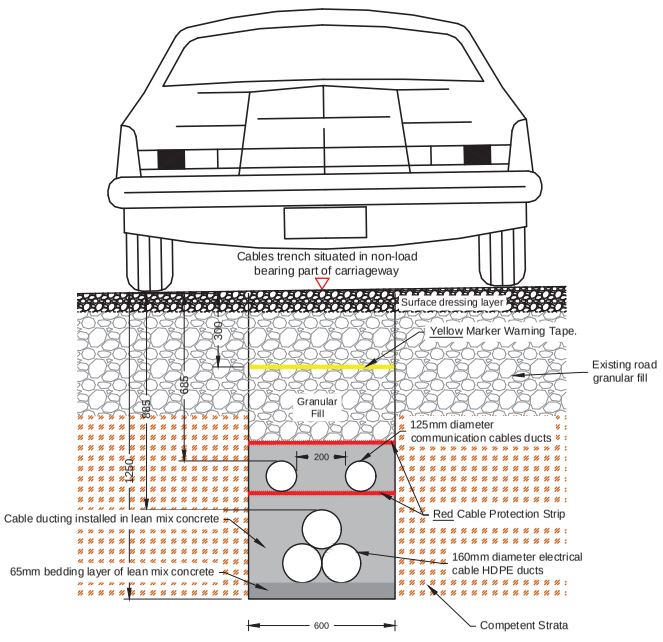
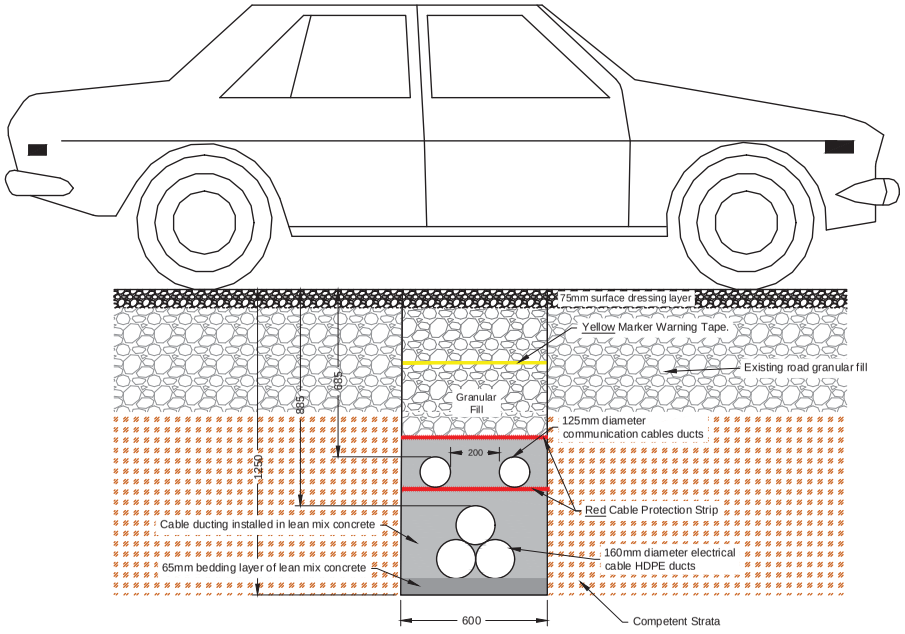
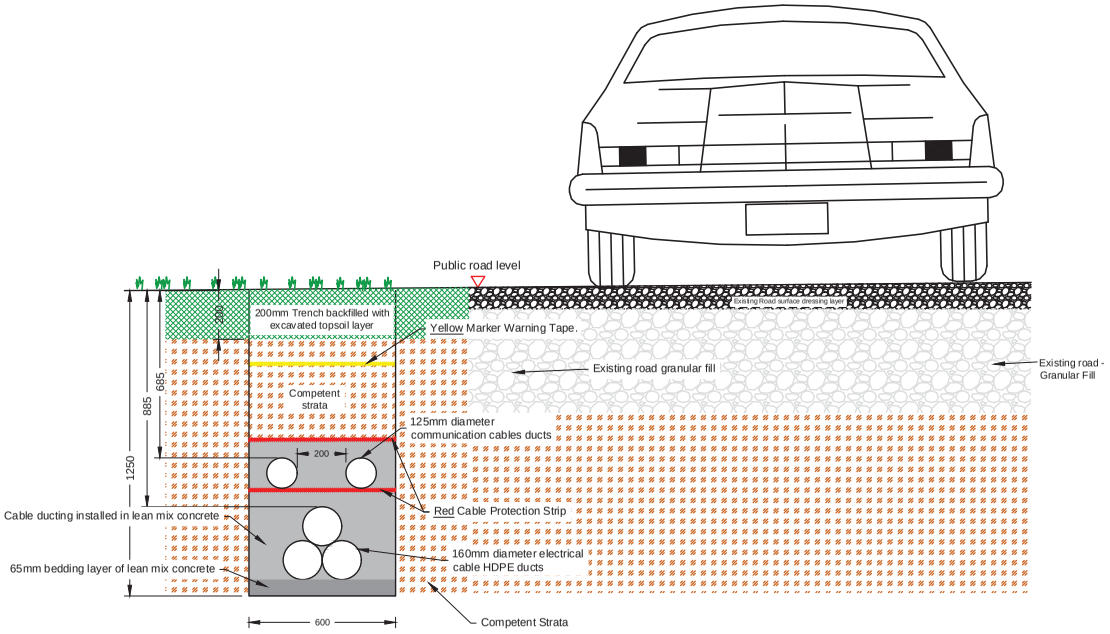


TYPICAL SECTION OF 110kV CABLES TRENCH ALONG PUBLIC ROADS



TYPICAL SECTION OF 110kV CABLES TRENCH CROSSING PUBLIC ROADS



TYPICAL SECTION OF 110kV CABLES TRENCH SITUATED IN VERGE OF PUBLIC ROAD

Title:

Figure GC 5.10

Cross Sections 110kV UGC in Public Road Pavements or Verges

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications

All road works will be subject to a Road Opening License application to Tipperary County Council and will be carried out in accordance with the Tii Guidelines on the Opening, Backfilling and Reinstatement of Openings in Public Roads.

REFERENCE DOCUMENTS

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Mobile - +353 (0)87-6531458

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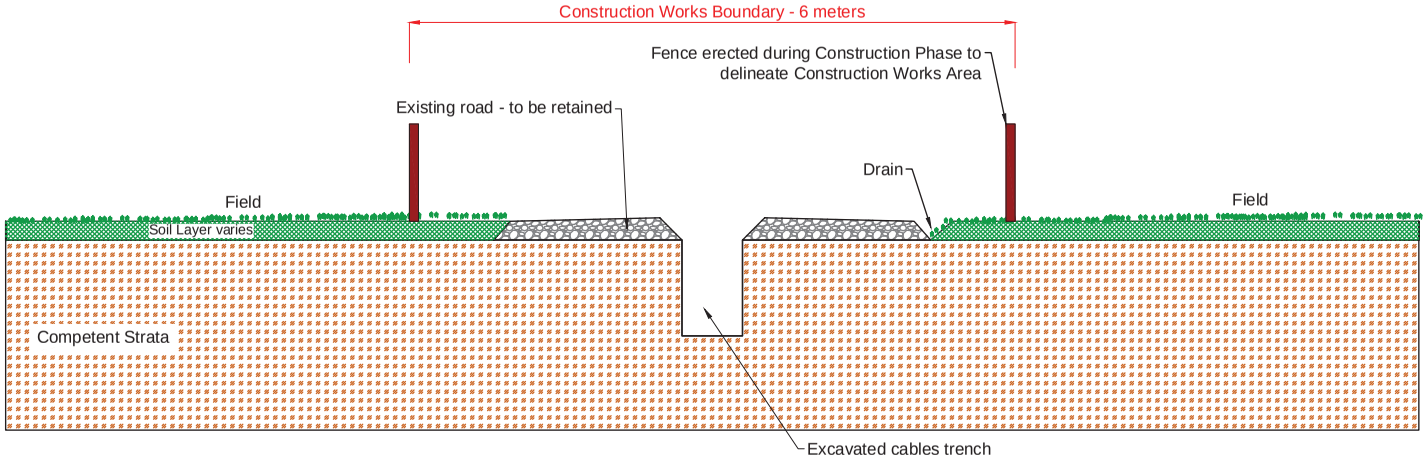
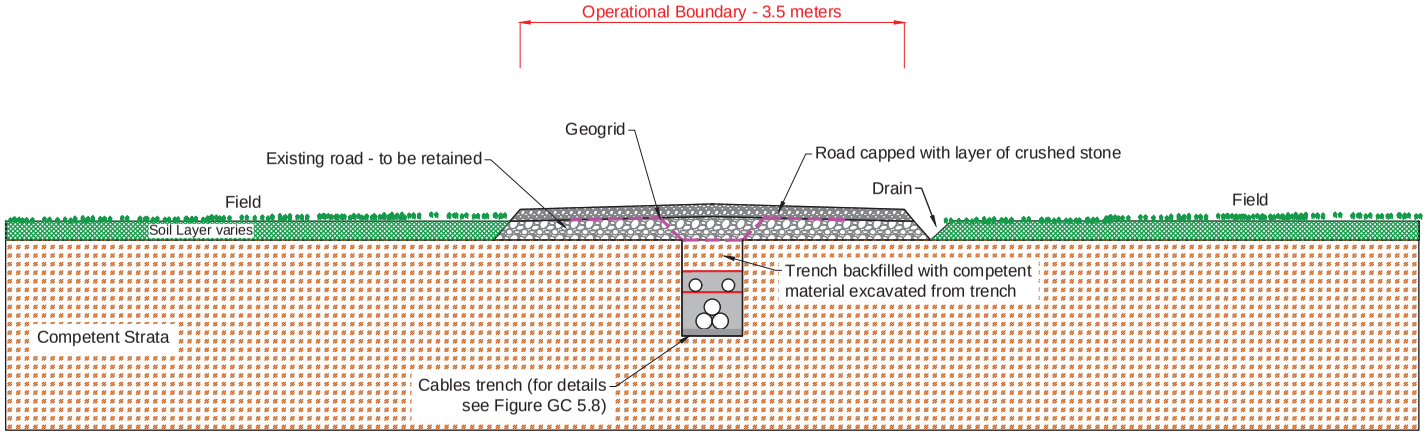


Cross Section of Upgraded Existing Farm Roads and Cables Trench - Construction Phase



Cross Section of Upgraded Existing Farm Roads and Cables Trench - Operational Phase

Title:

Figure GC 5.11

Cross Sections of 110kV UGC in Existing Farm Roads (Upgraded)

Map Number:

N/A

Note :
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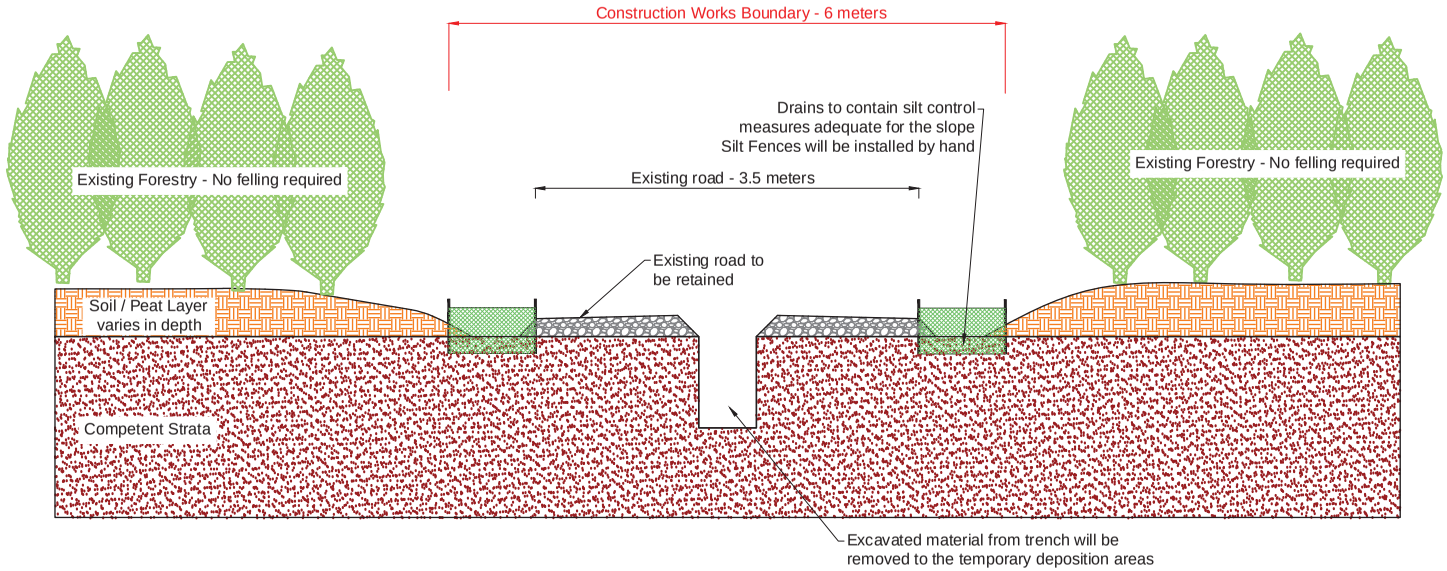
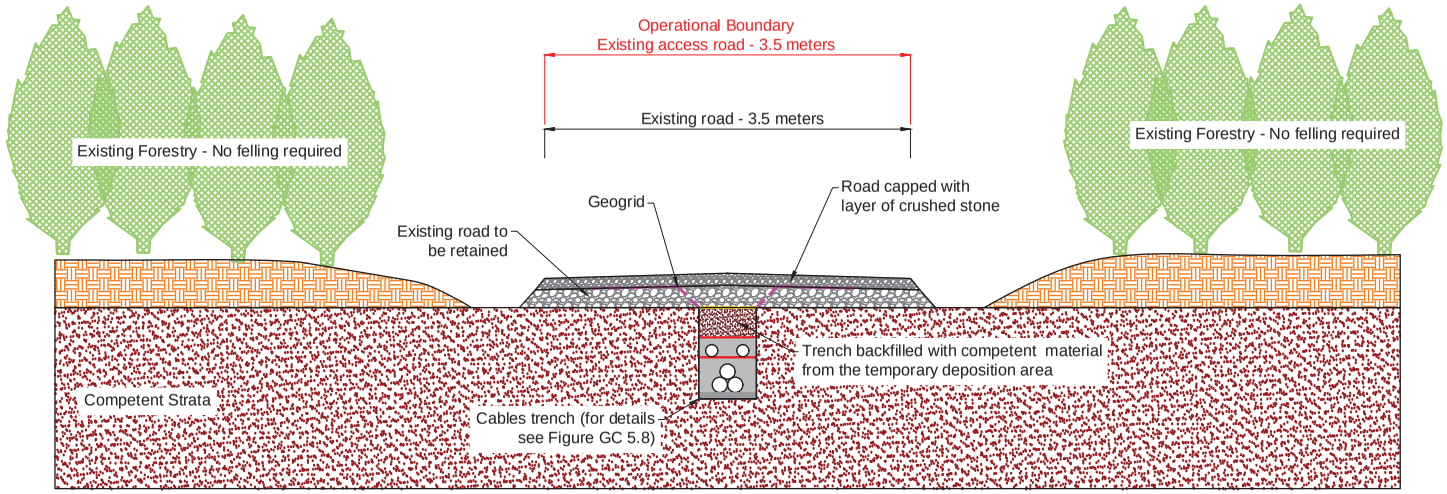


Cross Section of Upgraded Existing Forestry Roads and Cables Trench - Construction Phase



Cross Section of Upgraded Existing Forestry Roads and Cables Trench - Operational Phase

Title:

Figure GC 5.12

Cross Section of 110kV UGC in Existing Forestry Roads (Upgraded)

Map Number:

N/A

Note :
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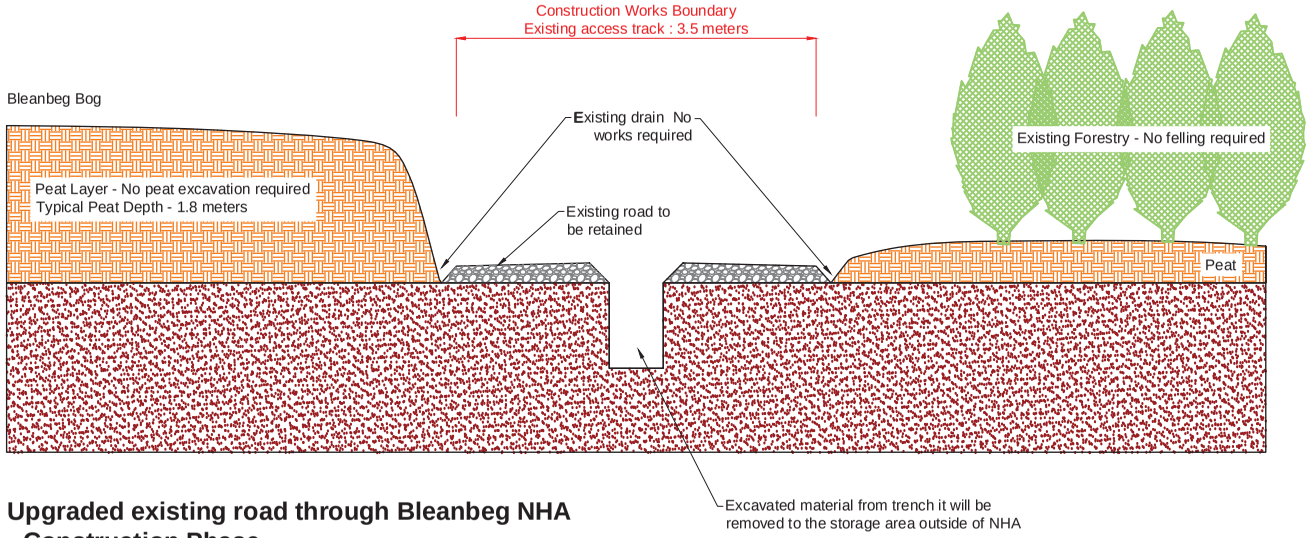
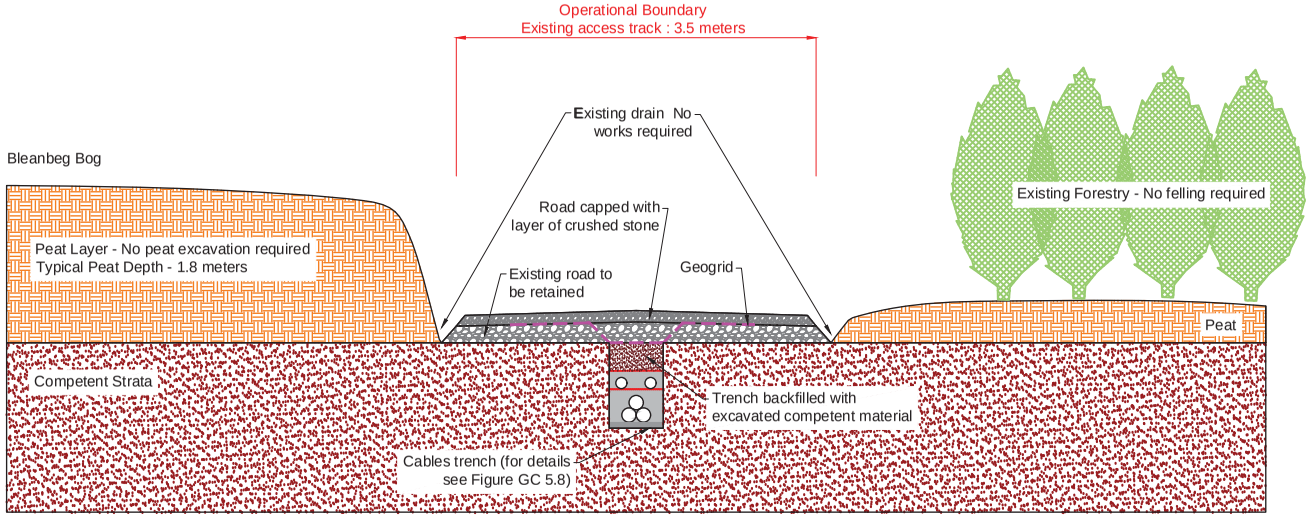


Upgraded existing road through Bleanbeg NHA - Construction Phase



Upgraded existing road through Bleanbeg NHA - Operational Phase

Title:

Figure GC 5.13

Cross Section of 110kV UGC in Existing Forestry Road through Bleanbeg Bog NHA

Map Number:

N/A

Note :
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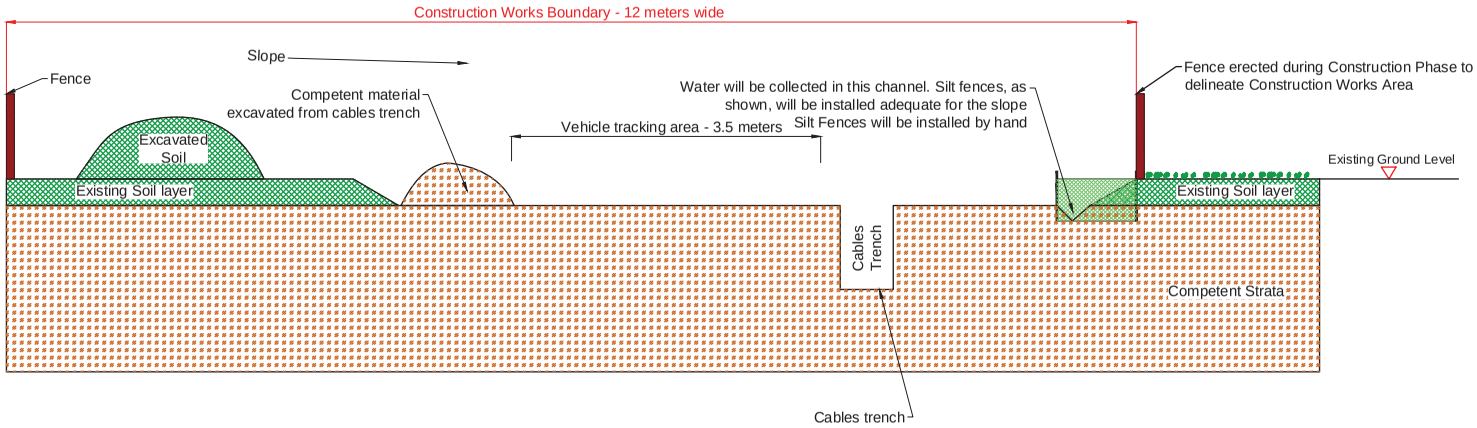
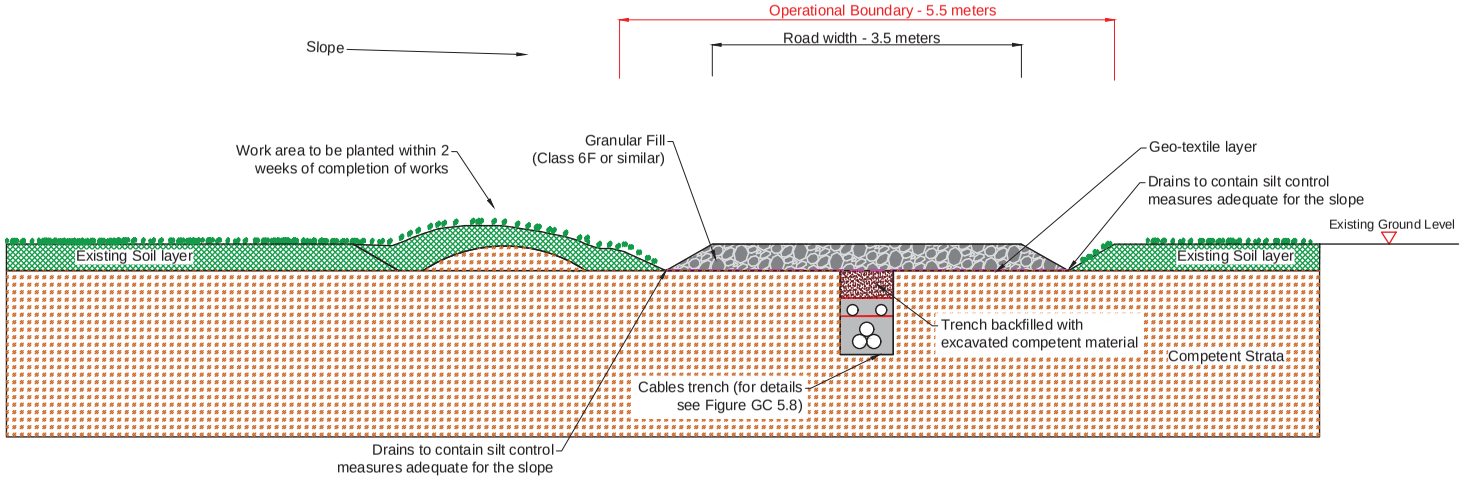


New Permanent Access Roads through Agricultural Lands outside of SPA - Construction Phase



New Permanent Access Roads through Agricultural Lands outside of SPA- Operational Phase

Title:

Figure GC 5.14

Cross Section of New Permanent Access Roads outside Slievefelim to Silvermines SPA

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

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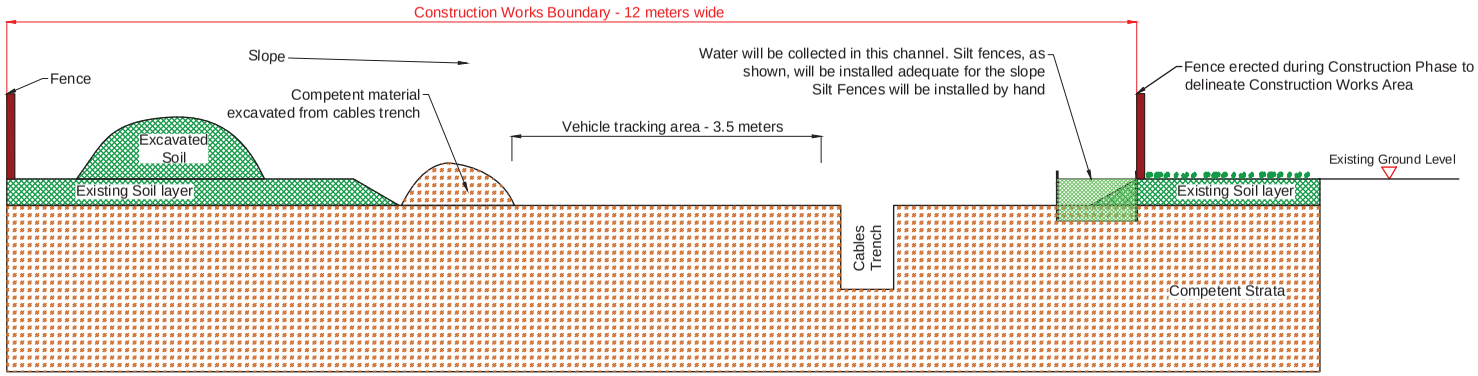
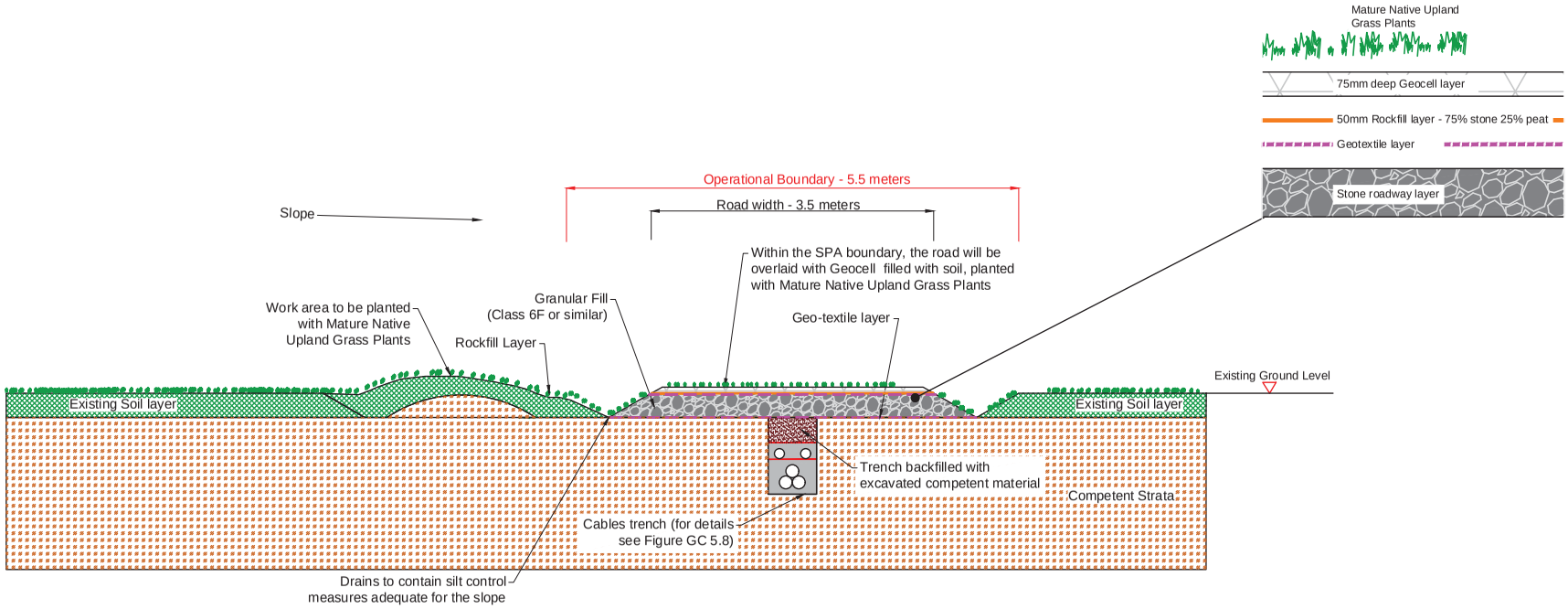


New Permanent Access Roads through Agricultural Lands inside of SPA - Construction Phase



New Permanent Access Roads through Agricultural Lands inside of SPA - Operational Phase

Title:

Figure GC 5.15

Cross Section of New Permanent Concealed Access Roads inside Slievefelim to Silvermines SPA

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications

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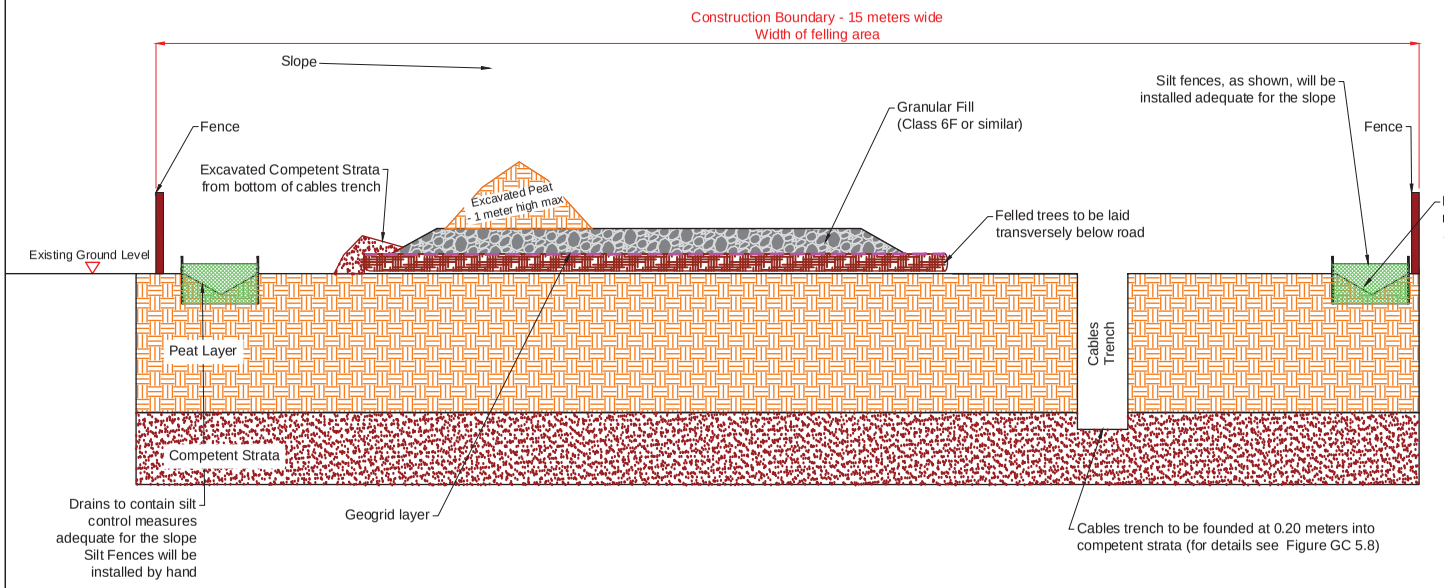
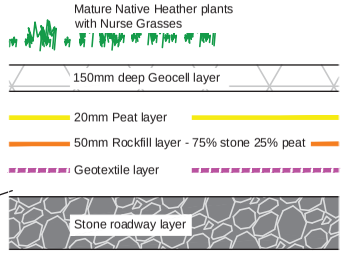
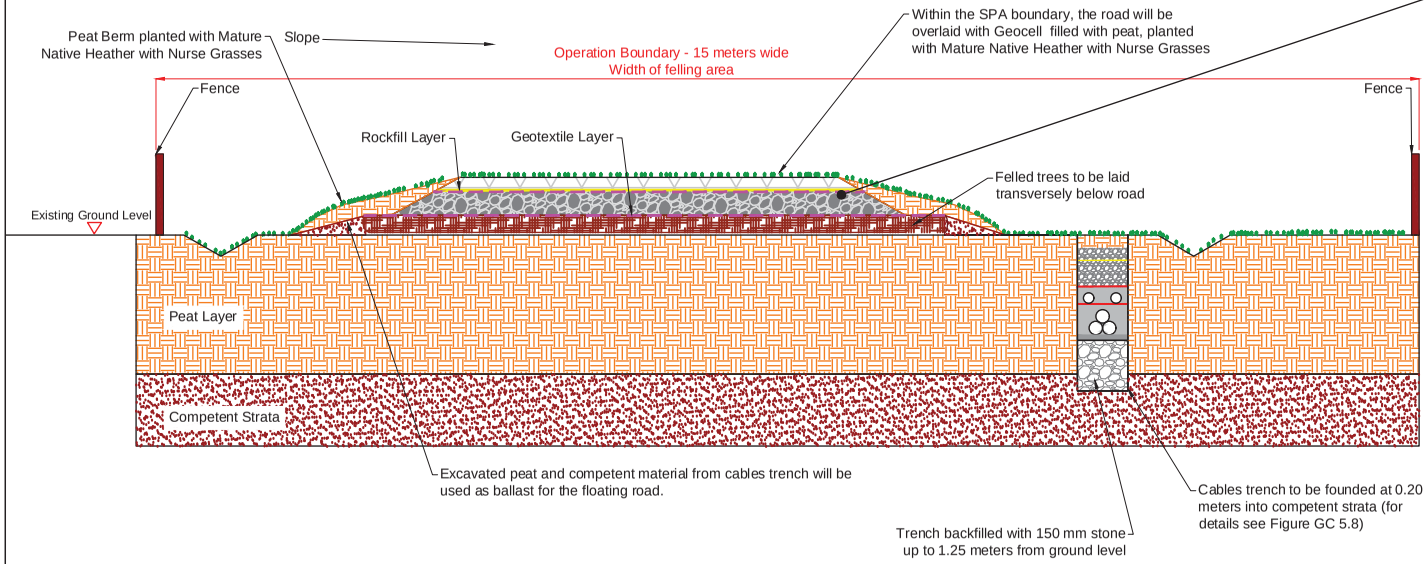


New permanent concealed floating access road through Castlewaller - Construction Phase





New permanent concealed floating access road through Castlewaller - Operational Phase

Title:

Figure GC 5.16

Cross Sections of New Permanent Concealed Floating Access Roads through Castlewaller (inside the SPA)

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

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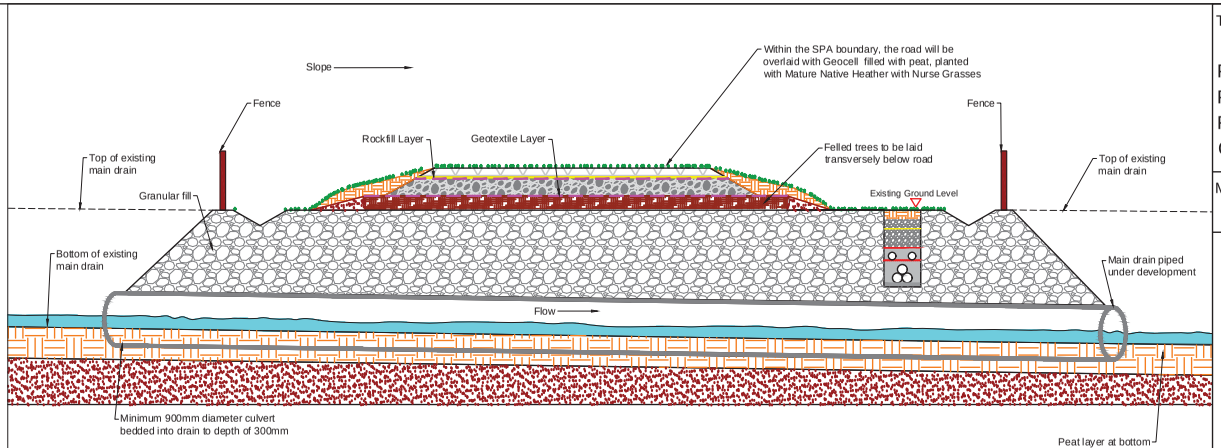
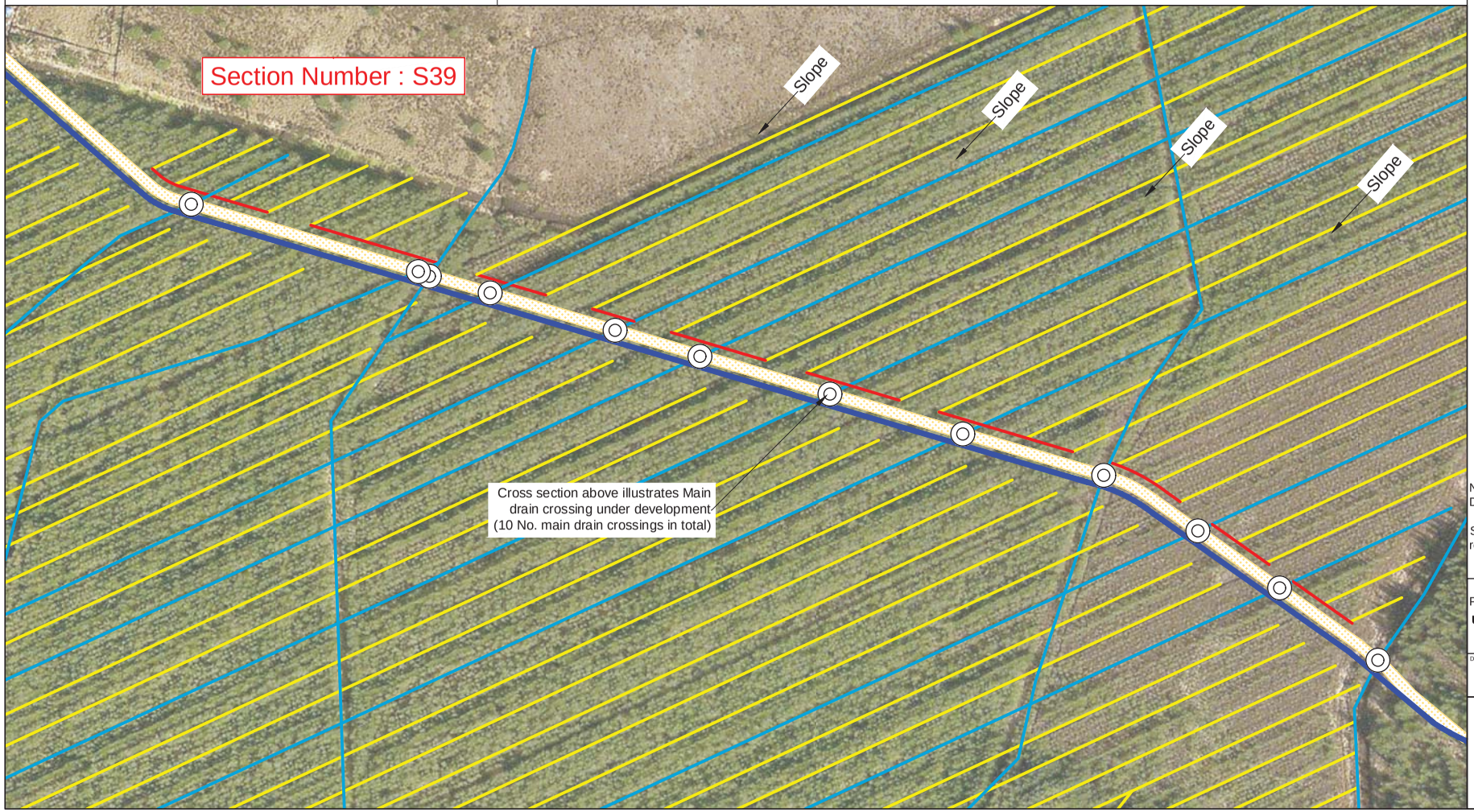
Description of the works:

Minor drains will be connected to the culverted main drains upslope of the works by excavating **interceptor drains** parallel to the works so water flows from the **minor drains** into the **main drains** then under the floating road and grid connection works area. This will prevent any ponding of water upslope of the works and avoid water coming into contact with any sediment from the works.



Cross section of main drains piped under road and cables trench through Section No. S39



Title:

Figure GC 5.16.1

Plan and cross section views of the New Permanent Concealed Floating Access Road and existing drains through Castlewaller (Section Number S39)

Map Number:

N/A

- UGC Grid Connection
- Existing Minor drains
- Existing Main drain
- Interceptor drain
- New Permanent Concealed Access Road
- Main drains piped under development, 12 in total

  See Cross Section above for details

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Notes:
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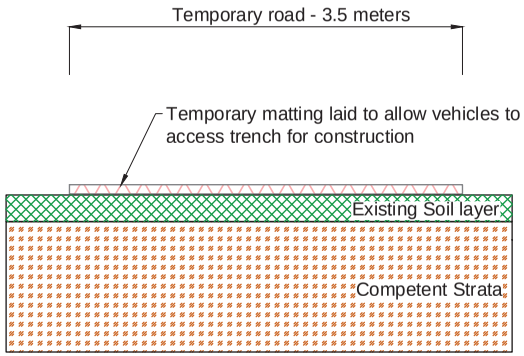
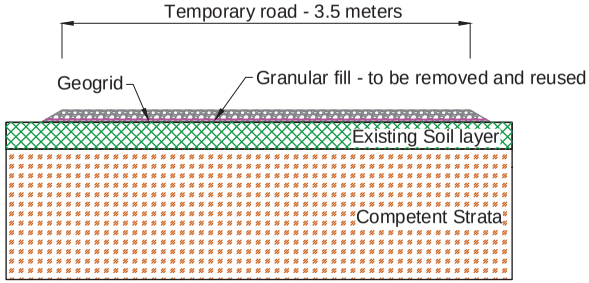
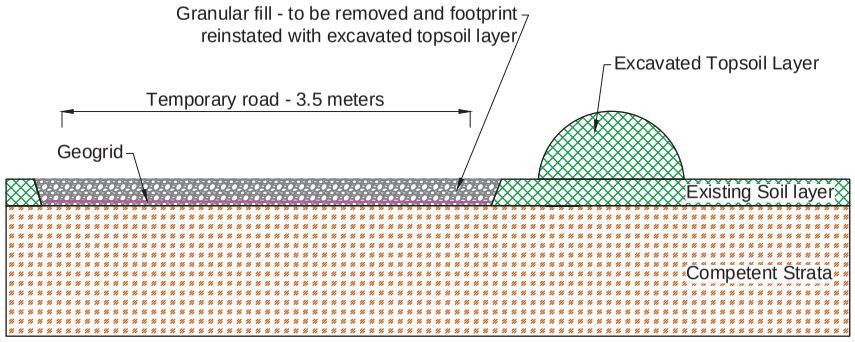


Cross Section of temporary access road - Matting



Cross Section of temporary access road - Floating road



Cross Section of temporary access road - Excavate and fill

Title:

Figure GC 5.17

Cross Section of Temporary Access Road Types (3 types)

Map Number:

N/A

Note :
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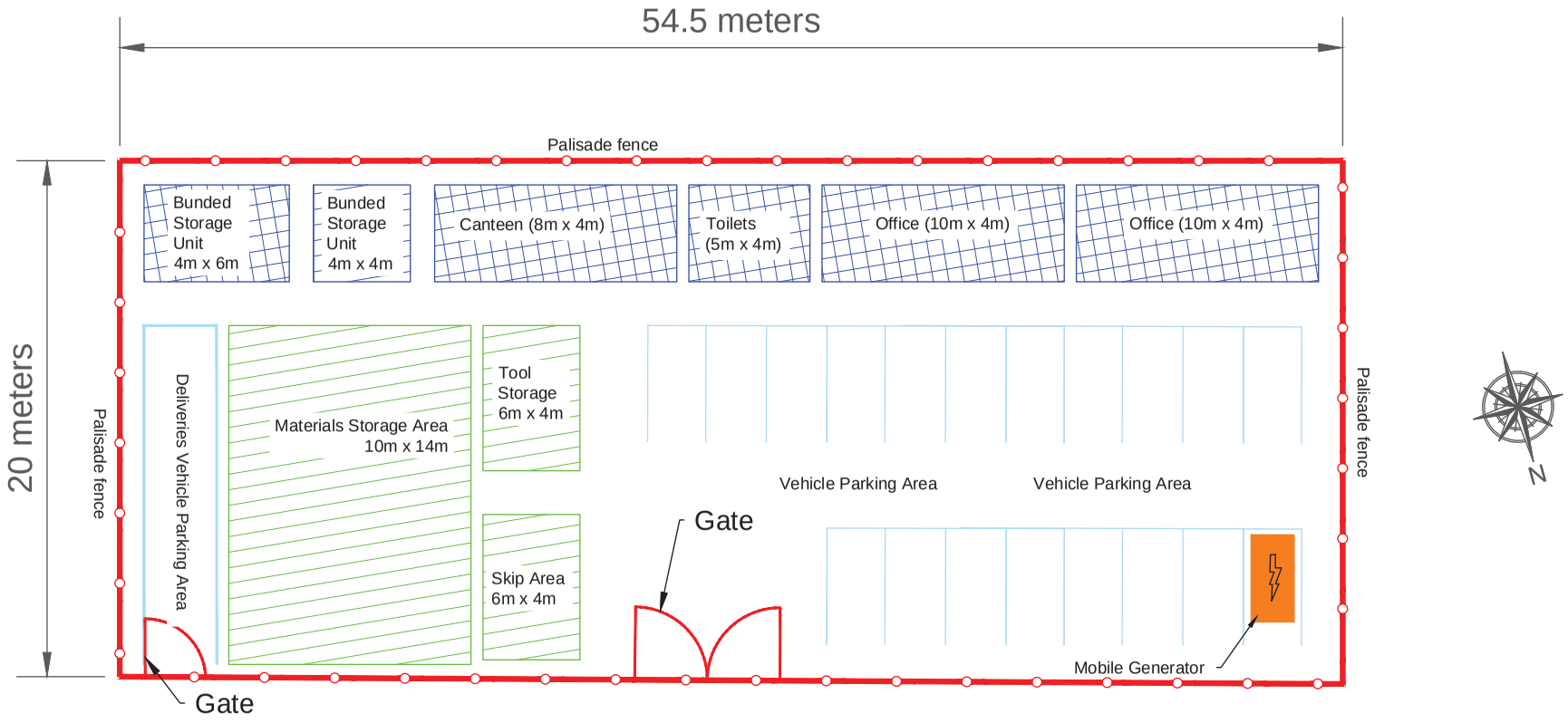
Temporary Compound C1 - Mountphilips Substation Compound



Title:

Figure GC 5.18

Plan View of Temporary Compound C1 (Mountphilips)

Map Number:

N/A

Notes:

Drainage can be seen on Figure GC 5.4 - Plan of the Mountphilips Substation Compound

Drawings not to scale. For illustration purposes only

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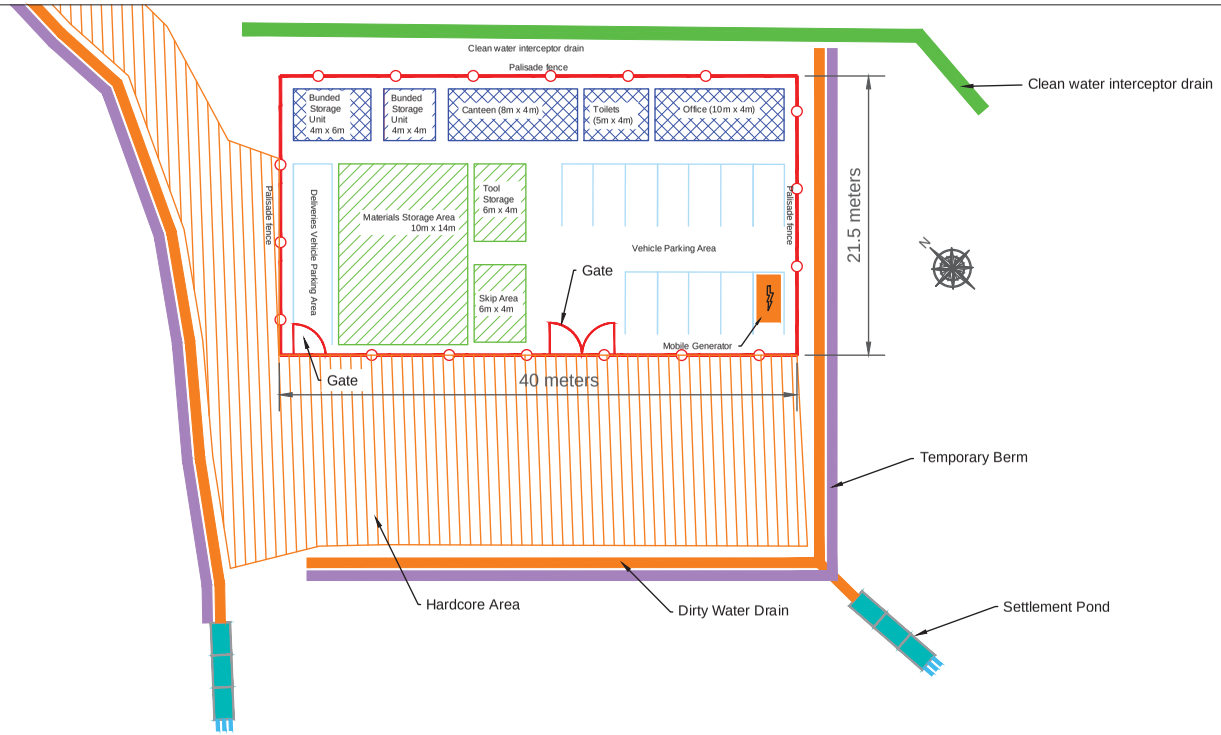
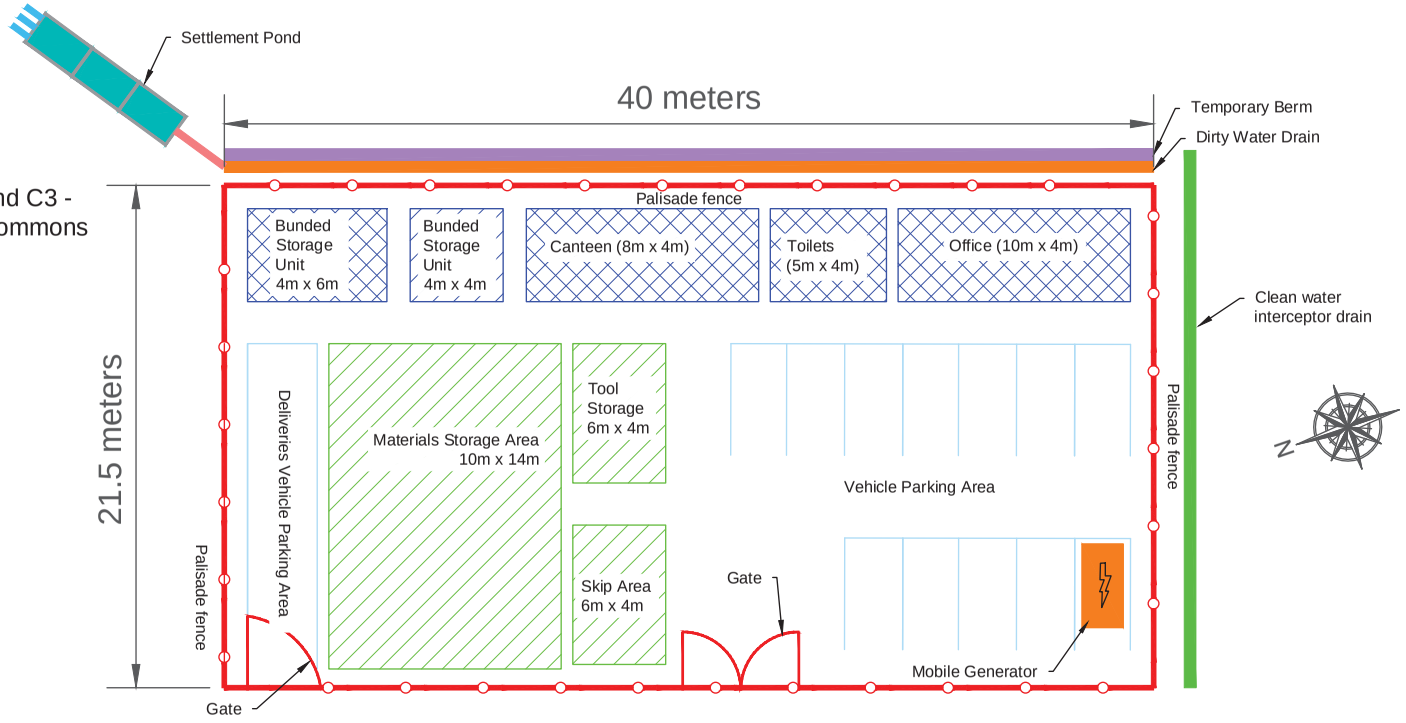
Temporary Compound C2 - Bealaclave



Temporary Compound C3 - Knockcurraghbola Commons



Title:

Figure GC 5.19

Plan Views of Temporary Compounds C2 (Bealaclave) & C3 (Knockcurraghbola Commons)

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

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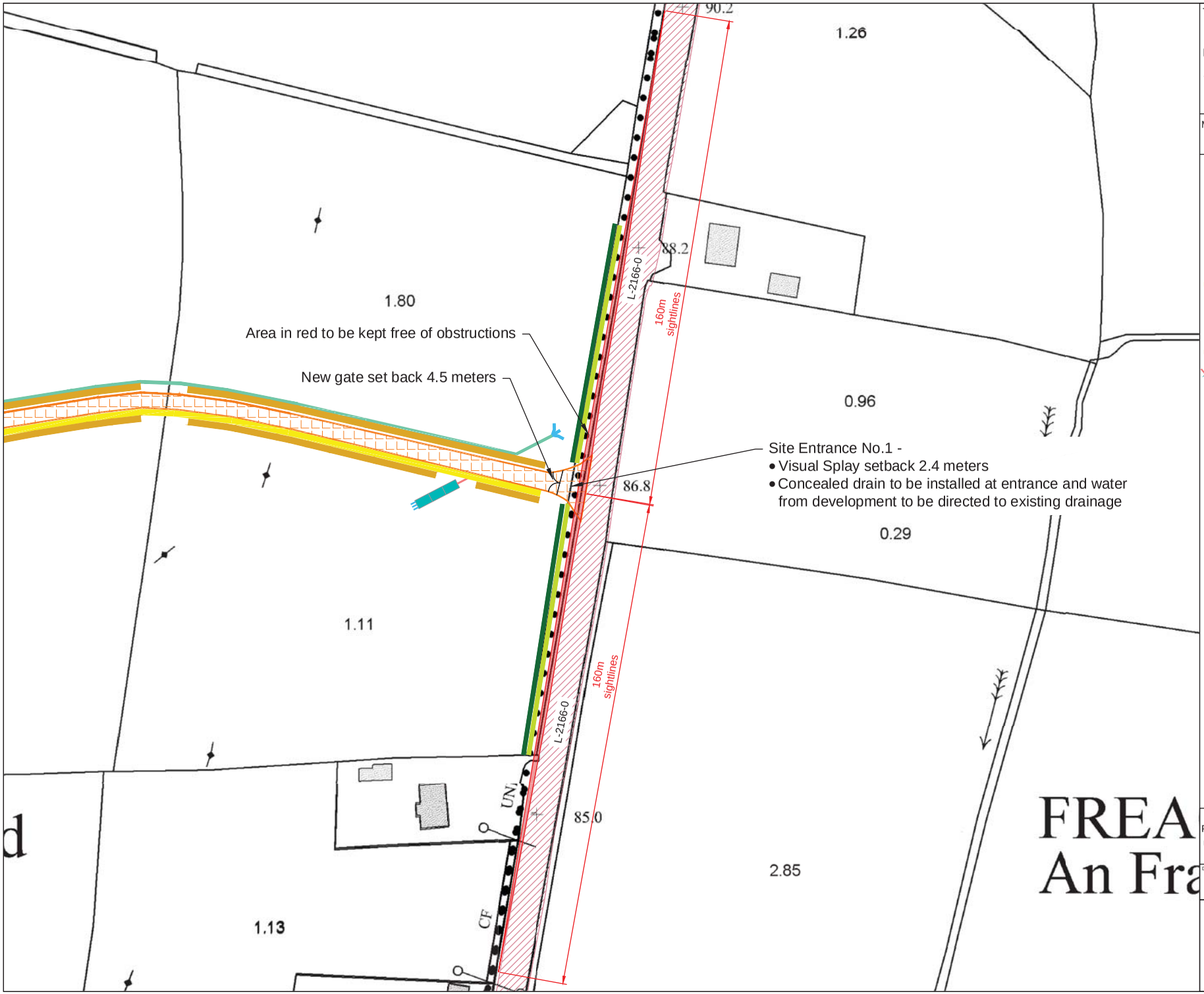

Title:

Figure GC 5.20

Plan View of Permanent Site Entrance E1 at Coole (Mountphilips Substation & Temporary Compound C1)

Map Number:

N/A

Legend:

- Hardcored site entrance and access road
- Public Roadway L-2166-0
- Visual Splay - to be kept free of obstructions
- Dirty water drain
- Clean water drain fitted with outflow weir
- Temporary Berm
- Settlement Pond
- Widening of field entrances - Partial removal/pruning of hedges and trees
- Replanting hedge and trees behind sight lines

N

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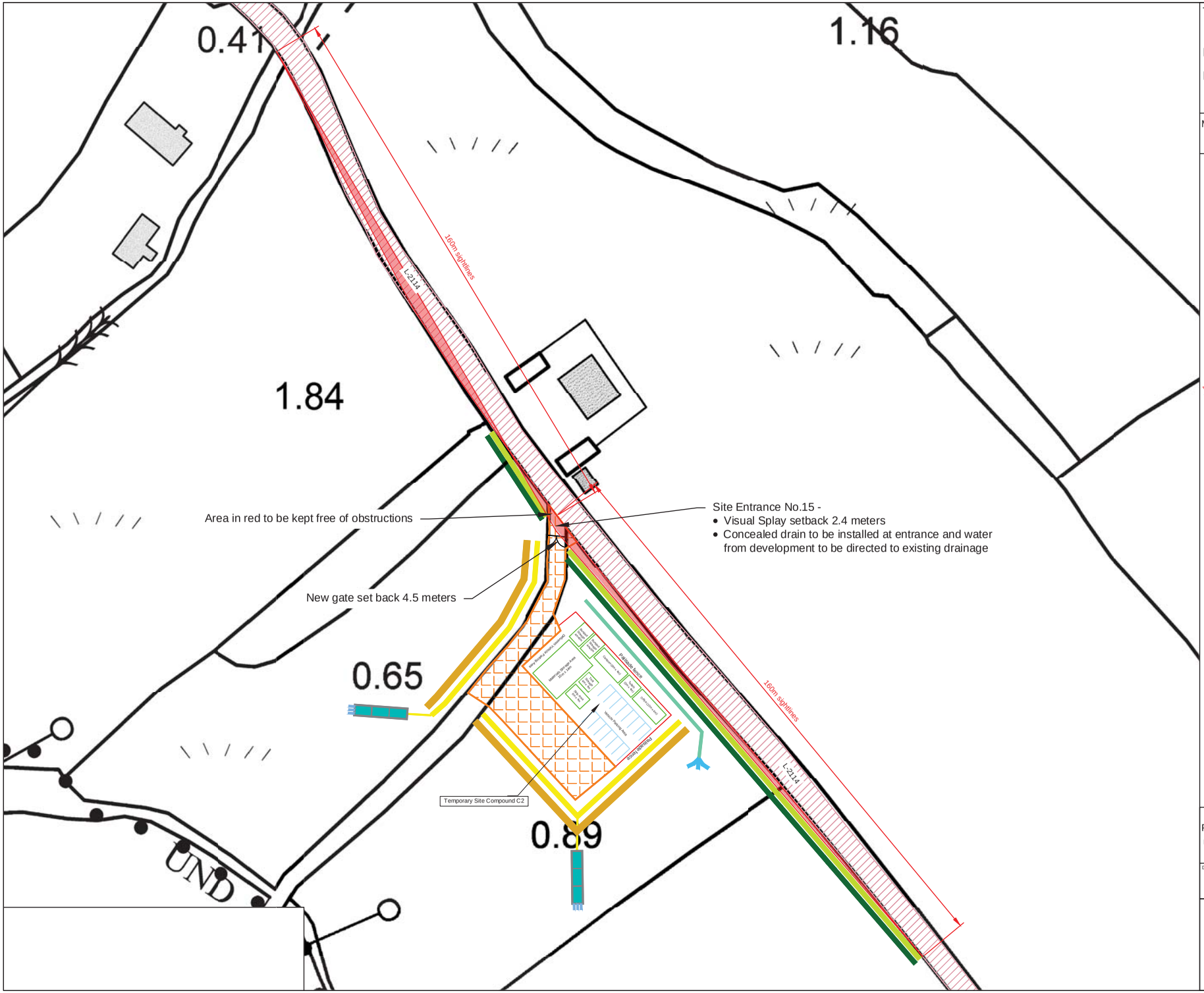

Title:

Figure GC 5.21

Plan View of Permanent Site Entrance E15 at Bealaclave (Temporary Compound C2)

Map Number:

N/A

Legend:

- Hardcored site entrance and access road
- Public Roadway L-2114
- Visual Splay - to be kept free of obstructions
- Dirty water drain
- Temporary Berm
- Clean water drain fitted with outflow weir
- Settlement Pond
- Widening of field entrances - Partial removal/pruning of hedges and trees
- Replanting hedge and trees behind sight lines

N

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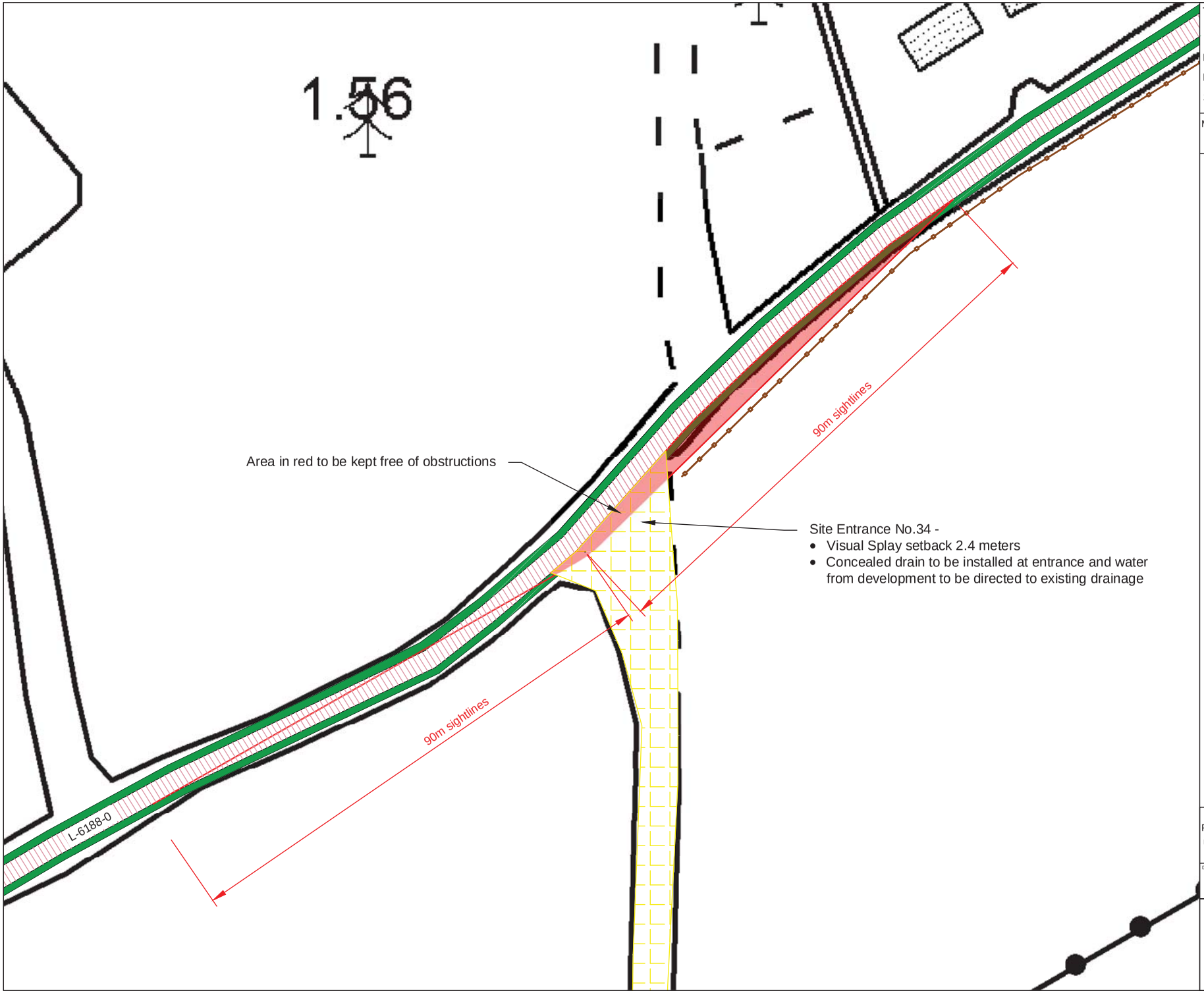

Title:

Figure GC 5.22

Plan View of Permanent Site Entrance E34 at Knockcurraghbola Commons (Consented Substation & Temporary Compound C3)

Map Number:

N/A

Legend:

- Existing road
- Public Roadway L-6188-0
- Visual Splay - to be kept free of obstructions
- Roadside Verge
- Fence to be move back outside of visual splay

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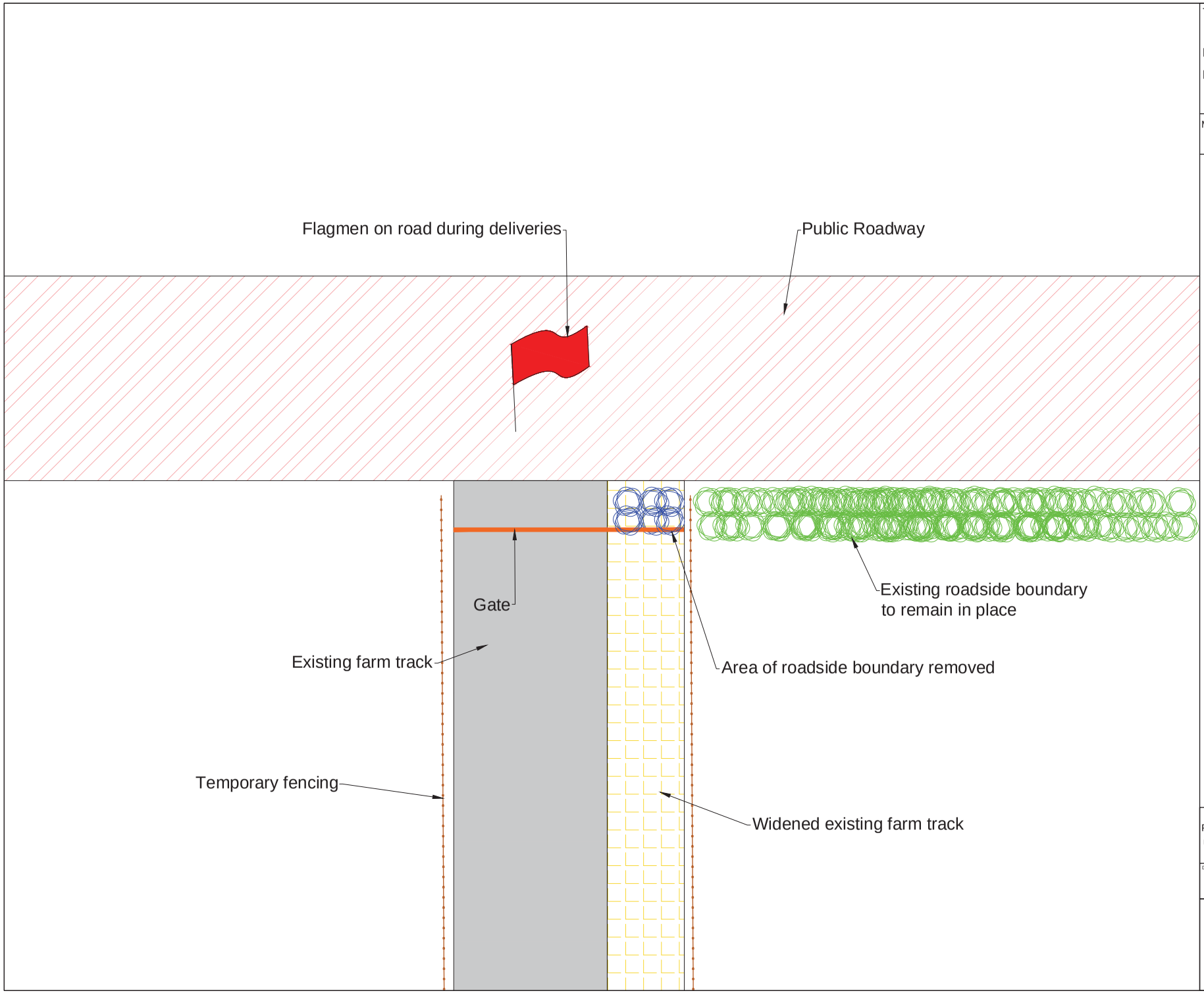

Title:

Figure GC 5.23

Plan View of Typical Temporary Site Entrance

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

REFERENCE DOCUMENTS

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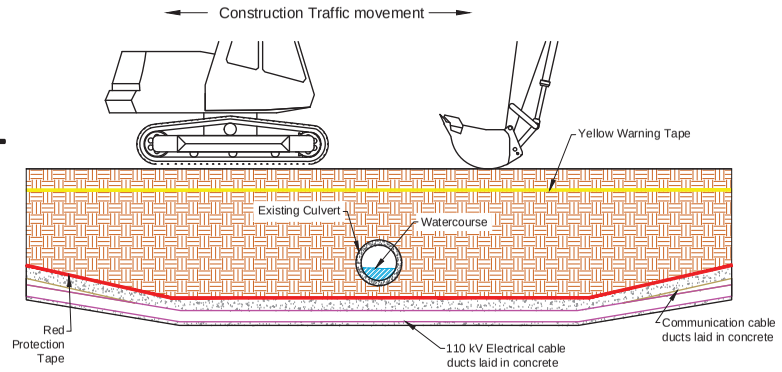
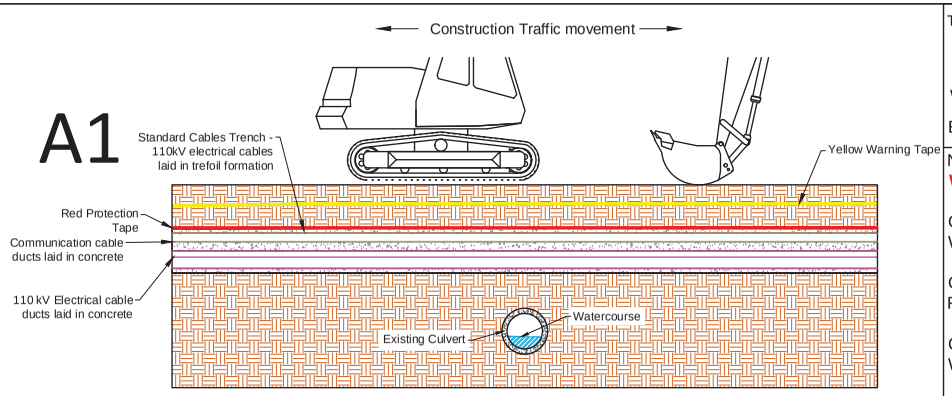
A1



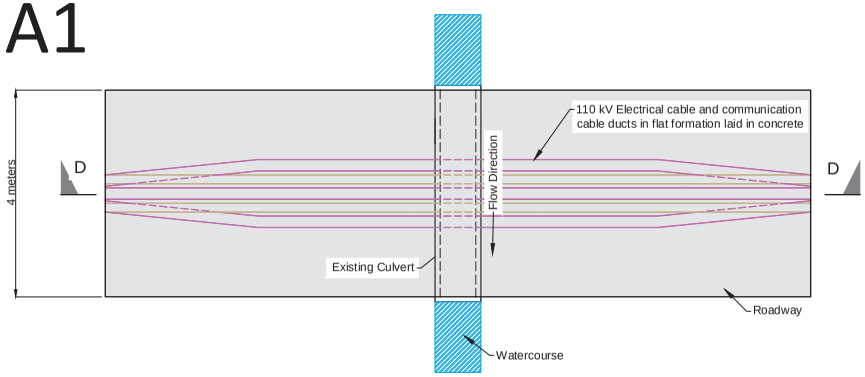
Cross Section D - D of watercourse crossing type A1 - Cables trench under existing structure

A1



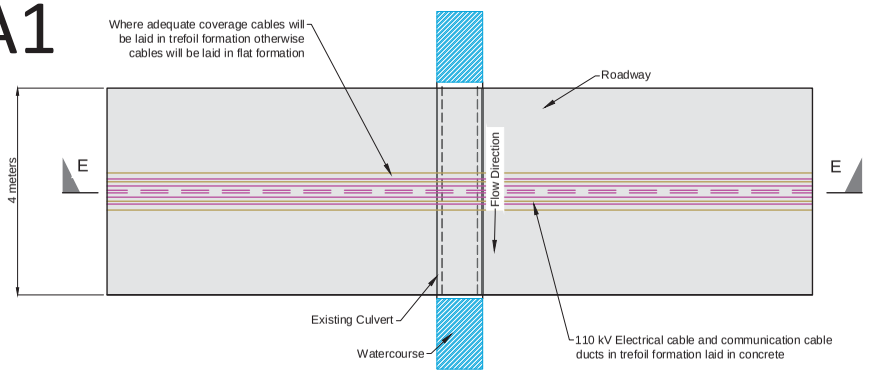
Cross Section E - E of watercourse crossing type A1 - Cables trench above existing structure

A1



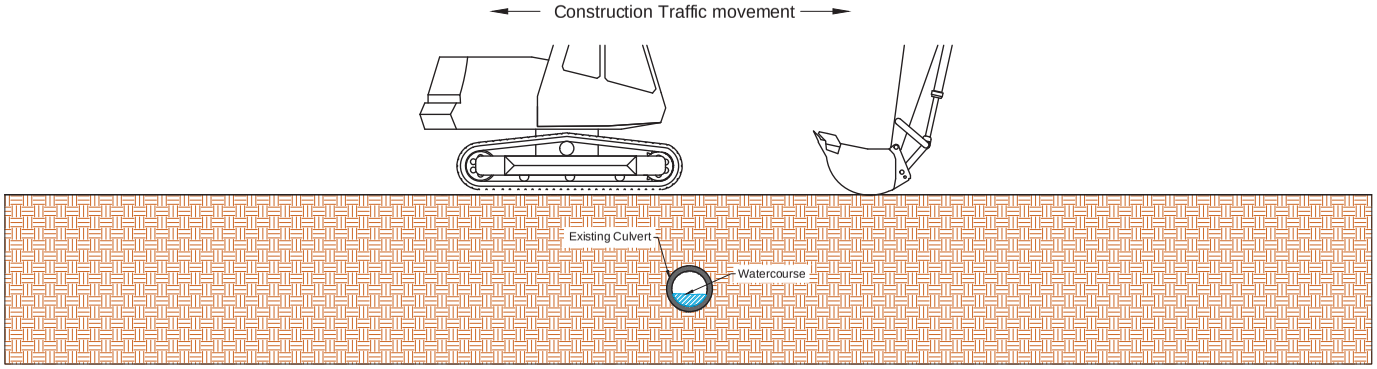
Plan View of watercourse crossing type A1 - Cable ducts laid in flat formation under existing structure
Excavation within 500mm of structure will be done by hand.
(No Instream works required)

A1



Plan View of watercourse crossing type A1 - Cable ducts laid in trefoil formation over existing structure
Excavation within 500mm of structure will be done by hand.
(No Instream works required)

A2



Cross Section of watercourse crossing type A2 - Traffic Movement only over structure (No instream works required)

Note :
Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications

Title:

Figure GC 5.24

Watercourse Crossing Type A1 & A2 - Existing Crossing Structure

Note:

Watercourse Crossing Type A1 (Total 25)

Class 1 - EPA Blue Line - Fisheries Value: W27,W42

Class 2 - EPA Blue Line Equivalent - Fisheries Value: W38, W50, W54, W56

Class 3 -Sub-Optimal - Low Fisheries Value: W62

Class 4 - Drain - No Fisheries Value: W9, W14, W15, W16, W17, W24, W25, W26, W28, W39, W40, W41, W43, W44, W51, W52, W53, W63

Description of Crossing Type A1

- Existing crossing structure
- No Instream Works
- Cable and Traffic crossing
- No works to existing watercourse crossing structure
- 110kV Cables and Ducting installed over or under existing structure

Watercourse Crossing Type A2 (Total 24)

Class 1 - EPA Blue Line - Fisheries Value: W66, W67, W74, W76, W84, W89

Class 2 - EPA Blue Line Equivalent - Fisheries Value: W70, W72, W73, W75

Class 3 - Sub-Optimal - Low Fisheries Value: W83, W85, W86, W87, W88

Class 4 - Drain - No Fisheries Value: W68, W69, W71, W77, W78, W79, W80, W81, W82

Description of Crossing Type A2

- Existing crossing structure
- No Instream Works
- Traffic crossing only
- No works to existing watercourse crossing structure
- No Cables or Ducting installed

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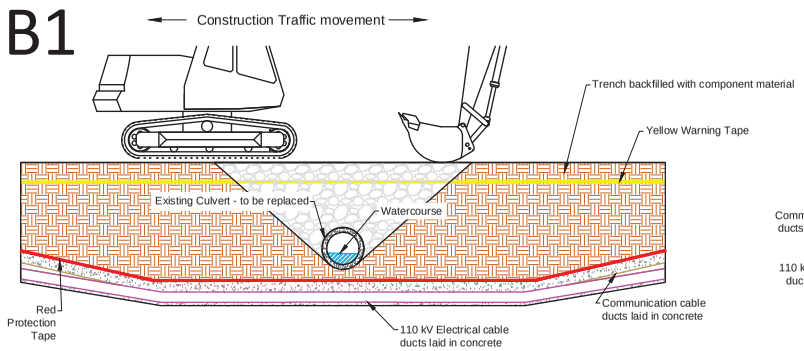
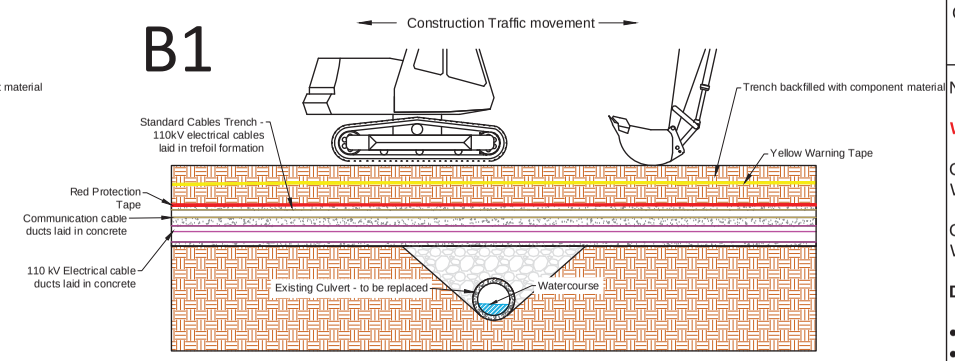
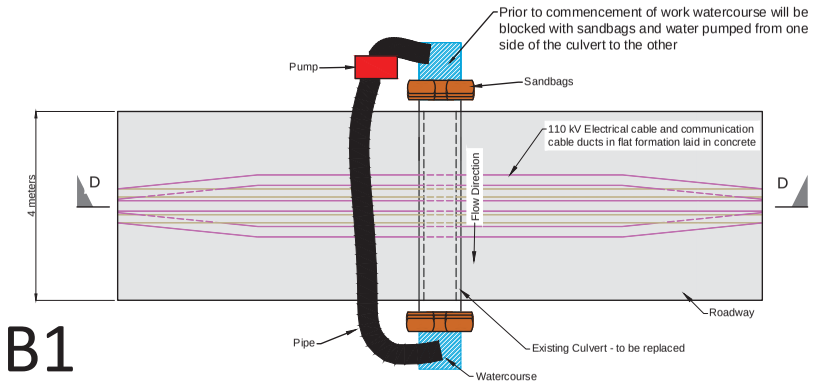


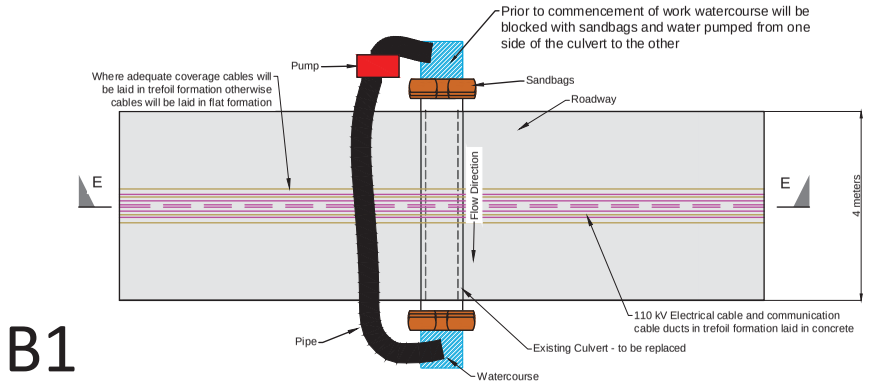
Cross Section D - D of watercourse crossing type B1 - Cables trench under replaced structure



Cross Section E - E of watercourse crossing type B1 - Cables trench over replaced structure



Plan View of watercourse crossing type B1 - Cable ducts laid in flat formation under replaced structure



Plan View of watercourse crossing type B1 - Cable ducts laid in trefoil formation over replaced structure

Note:

The damming and over-pumping method will typically be carried out at watercourses where a permanent crossing structure is being installed or where an existing culvert is being replaced.

All permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be at least 900mm in diameter regardless of the anticipated flood flow. 900mm culverts will be set into the river bed to a depth of 300mm and 1200mm culverts will be set in 500mm.

Note :
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Title:

Figure GC 5.25

Watercourse Crossing Type B1 - Replaced Crossing Structure

Note:

Watercourse Crossing Type B1 (Total 3)

Class 1 - EPA Blue Line - Fisheries Value: W8, W47

Class 3 - Sub-Optimal - Low Fisheries Value: W35

Description of Crossing Type B1

- Existing crossing structure
- Instream Works
- Cable and Traffic crossing
- Replacement of existing watercourse crossing structure
- 110kV Cables and Ducting installed over or under replaced existing crossing structure

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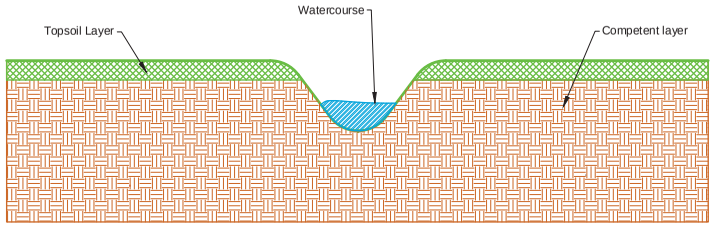
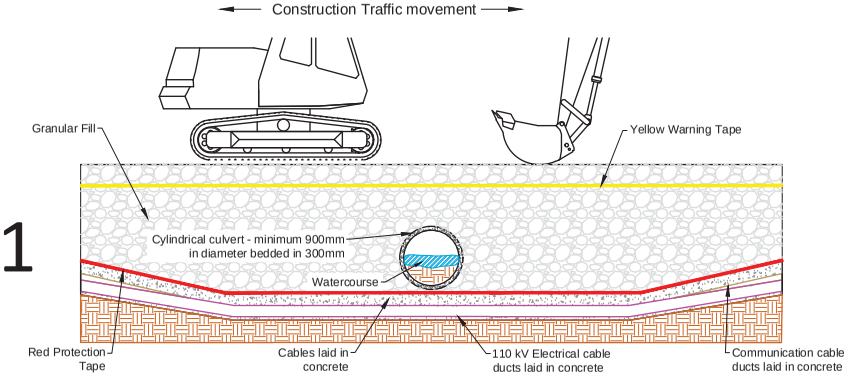
C1



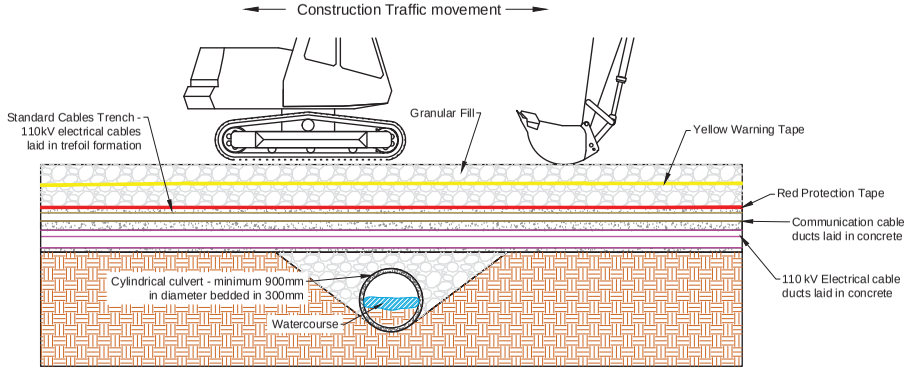
Cross Section View of watercourse crossing C1 - Existing watercourse

C1

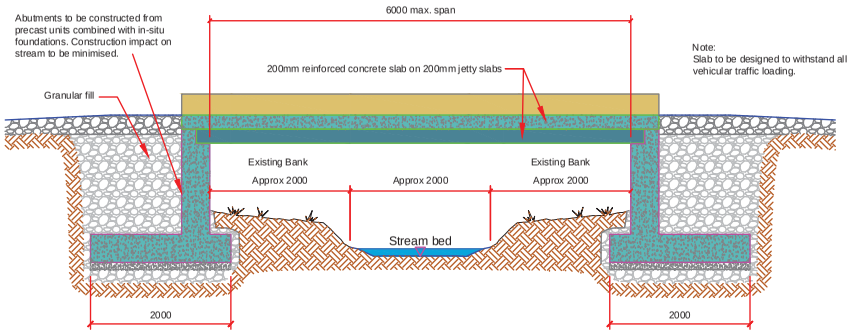


Cross Section View of watercourse crossing types C1 - Cables trench under new permanent crossing structure

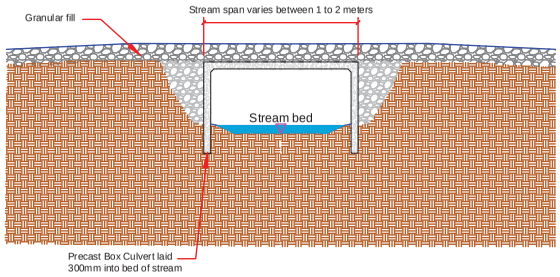
C1



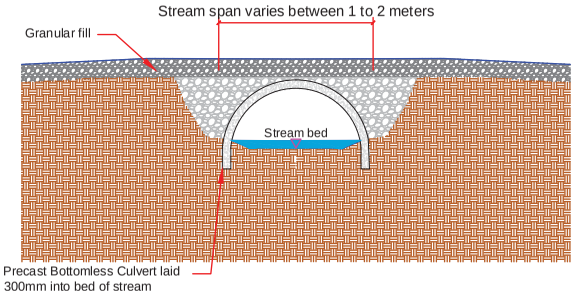
Cross Section View of watercourse crossing C1 - Cables trench over new permanent crossing structure



Permanent Crossing structure - Clear span bridge



Permanent Crossing structure - Bottomless Box Culvert



Permanent Crossing structure - Bottomless Box Culvert

Note:

The damming and over-pumping method will typically be carried out at watercourses where a permanent crossing structure is being installed or where an existing culvert is being replaced.

All permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be at least 900mm in diameter regardless of the anticipated flood flow. 900mm culverts will be set into the river bed to a depth of 300mm and 1200mm culverts will be set in 500mm.

Title:

Figure GC 5.26

Watercourse Crossing Type C1 - New Permanent Structure

Note:

Watercourse Crossing Type C1 (Total 12)

Class 1 - EPA Blue Line - Fisheries Value: W48, W55

Class 2 - EPA Blue Line Equivalent - Fisheries Value: W3, W4, W13

Class 3 - Sub-Optimal - Low Fisheries Value: W2

Class 4 - Drain - No Fisheries Value: W18, W19, W20, W21, W22, W23

Description of Crossing Type C1

- No existing crossing structure
- Instream Works
- Cable and Traffic crossing
- Installation of New Permanent watercourse crossing structure
- 110kV Cables and Ducting installed over or under new permanent watercourse crossing structure

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Note :
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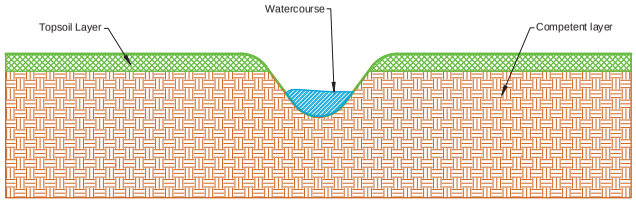
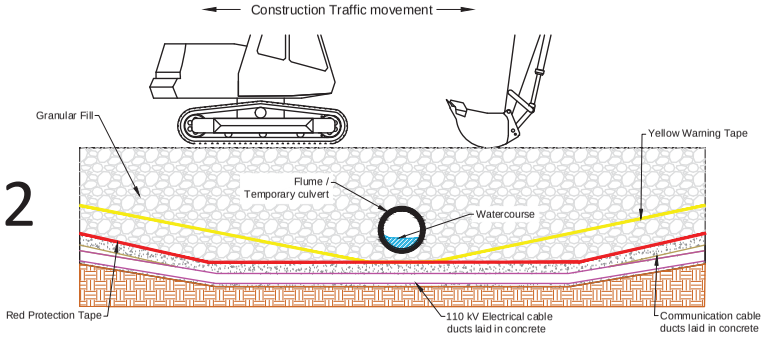
C2

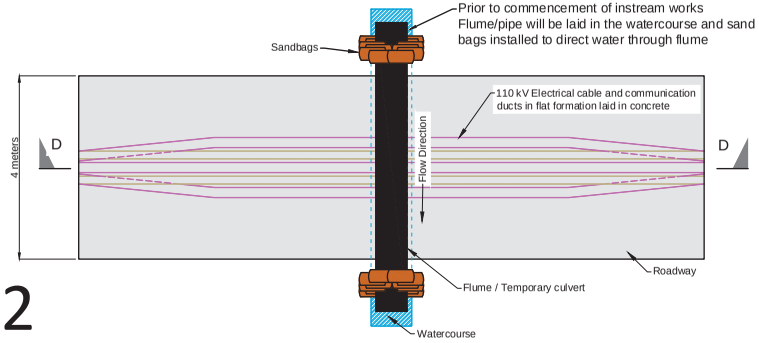


Cross Section View D - D of watercourse crossing C2 - Existing watercourse



C2

Cross Section View D - D of watercourse crossing types C2 - Cables trench under new temporary crossing structure



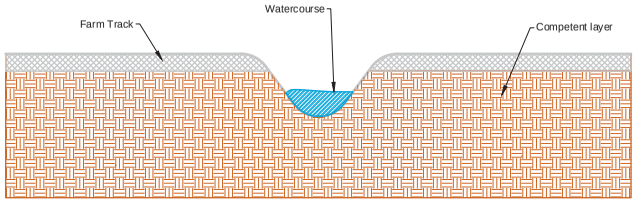
C2

Plan View of watercourse crossing C2 - Cables trench under new temporary crossing structure

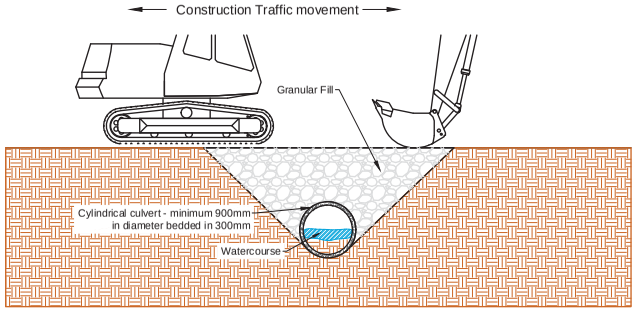
Note on C2:

The flume/pipe watercourse crossing method will typically be used where a temporary watercourse crossing structure is proposed.

C4

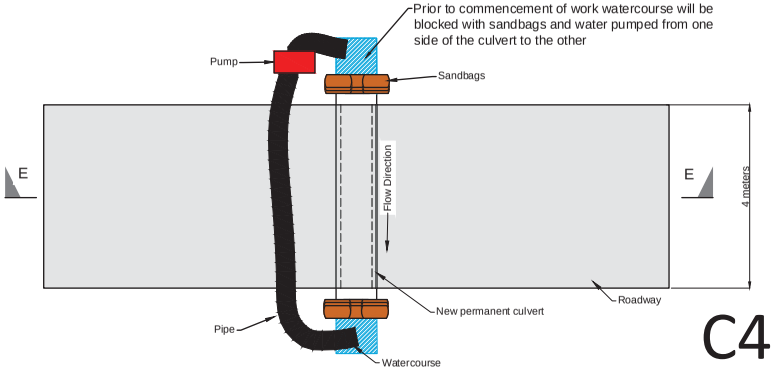


Cross Section View E - E of watercourse crossing W90 - Existing watercourse



C4

Cross Section View E - E of watercourse crossing types C4 - Traffic over new permanent crossing structure



C4

Plan of watercourse crossing types C4 - Traffic over new permanent crossing structure

Note on C4:

The damming and over-pumping method will typically be carried out at watercourses where a permanent crossing structure is being installed or where an existing culvert is being replaced.

All permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be at least 900mm in diameter regardless of the anticipated flood flow. 900mm culverts will be set into the river bed to a depth of 300mm and 1200mm culverts will be set in 500mm

Title:

Figure GC 5.27

Watercourse Crossing Type C2 - New Temporary Structure & Watercourse Crossing Type C4 - New Permanent Structure

Watercourse Crossing Type C2 (Total 15)

Class 1 - EPA Blue Line - Fisheries Value: W11

Class 2 - EPA Blue Line Equivalent - Fisheries Value:
W1, W46

Class 3 - Sub-Optimal - Low Fisheries Value:W6, W49

Class 4 - Drain - No Fisheries Value:
W5, W29, W30, W31, W33, W34, W37, W45, W58, W59

Description of Crossing Type C2

- No existing crossing structure
- Instream Works
- Cable and Traffic crossing
- Installation of New Temporary watercourse crossing structure
- 110kV Cables and Ducting installed under new temporary watercourse crossing structure

Watercourse Crossing Type C4 (Total 1)

Class 2 - EPA Blue Line Equivalent - Fisheries Value:
W90

Description of Crossing Type C4

- No existing crossing structure
- Instream Works
- Traffic crossing only
- Installation of New Permanent watercourse crossing structure
- No Cables or Ducting installed

Note :
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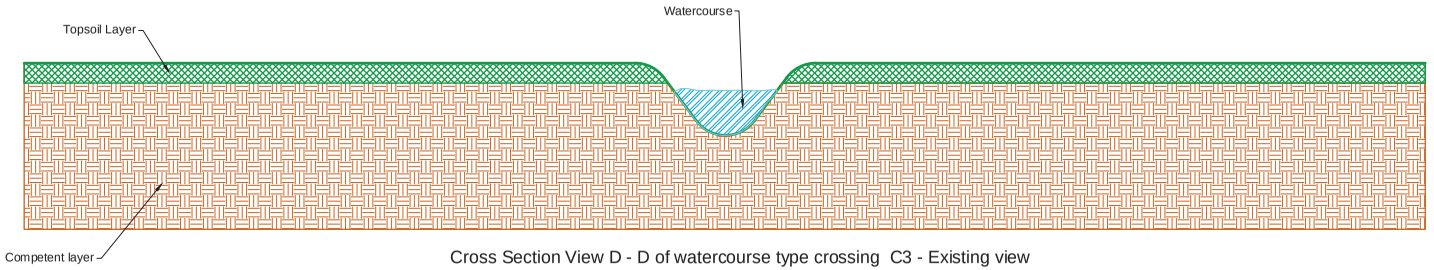
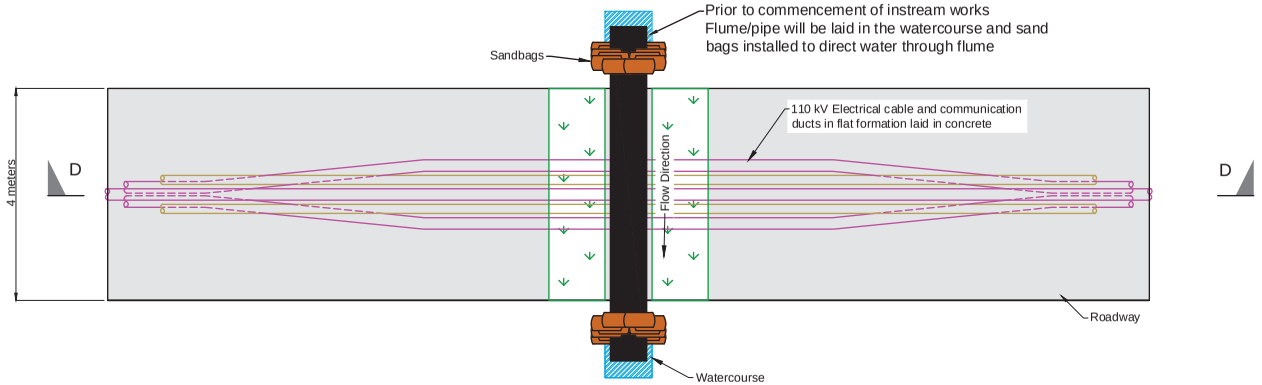
C3



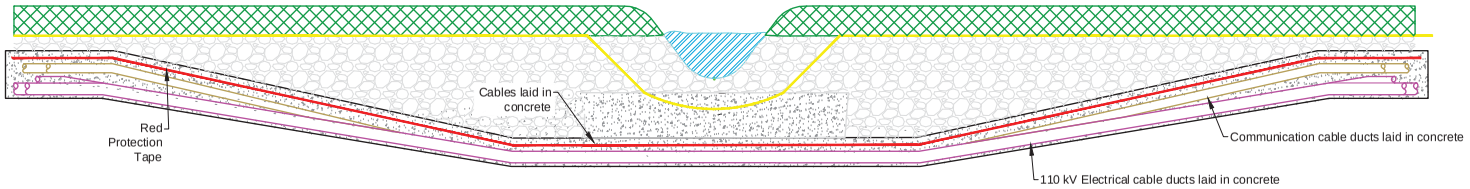
Cross Section View D - D of watercourse type crossing C3 - Existing view

C3



Plan View of watercourse crossing type C3 - Cables trench under watercourse

C3



Cross Section D - D of watercourse crossing type C3 - Cables trench under watercourse

Note:

The damming and over-pumping method will also be used at cable-only crossings where flows are very low at the time of the proposed crossing works.

The flume/pipe watercourse crossing method will also be used or at cable-only crossings where flows are too large to be managed by the dam and over pump method at the time of the proposed crossing works.

Title:

Figure GC 5.28

Watercourse Crossing Type C3 - 110kV

UGC Trenching and Ducting only

Note:

Watercourse Crossing Type C3 (Total 6)

Class 1 - EPA Blue Line - Fisheries Value: W12, W32, W61

Class 2 - EPA Blue Line Equivalent - Fisheries Value:
None

Class 3 - Sub-Optimal - Low Fisheries Value: None

Class 4 - Drain - No Fisheries Value: W60, W64, W65

Description of Crossing Type C3

- No existing crossing structure
- Instream Works
- Cable crossing only
- No watercourse crossing structure required
- 110kV Cables and Ducting installed under watercourse

REFERENCE DOCUMENTS

Note :
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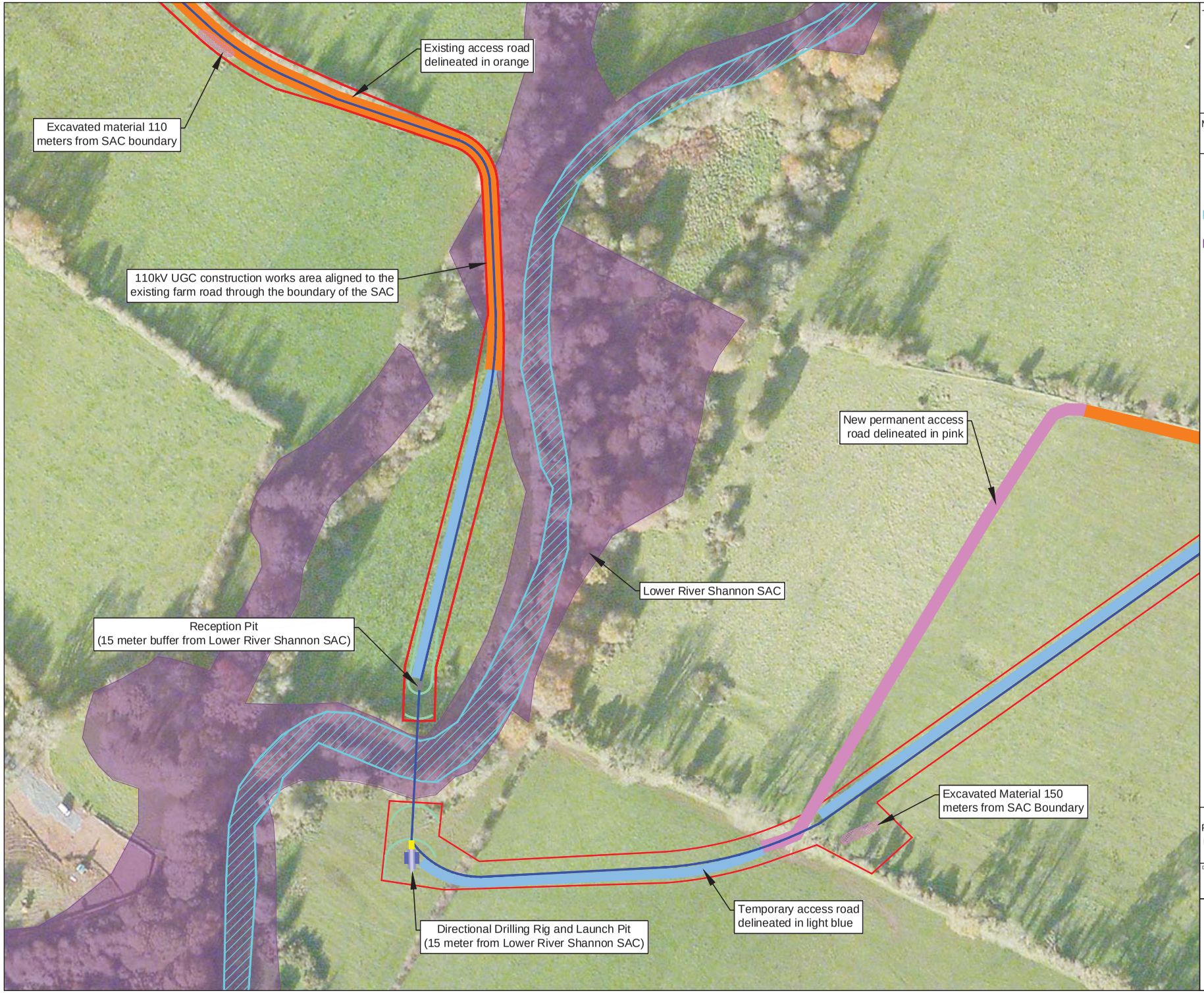

Title:

Figure GC 5.29

Watercourse Crossing Type D - Directional Drilling at the Newport (Mulkear) River (W10)

Map Number:

N/A

Legend:

- UGC 110kV Cables Trench
- Mulkear River
- Lower River Shannon SAC
- Construction Works Area
- Silt Fence - Double silt fencing between SAC Boundary and Drilling Rig
- Reception Pit and Launching Pit
- Launching Pit
- Directional Drilling Rig
- Excavated Material
- New permanent access road
- Temporary access road
- Existing access road

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DIRECTIONAL DRILLING SPECIALISTS

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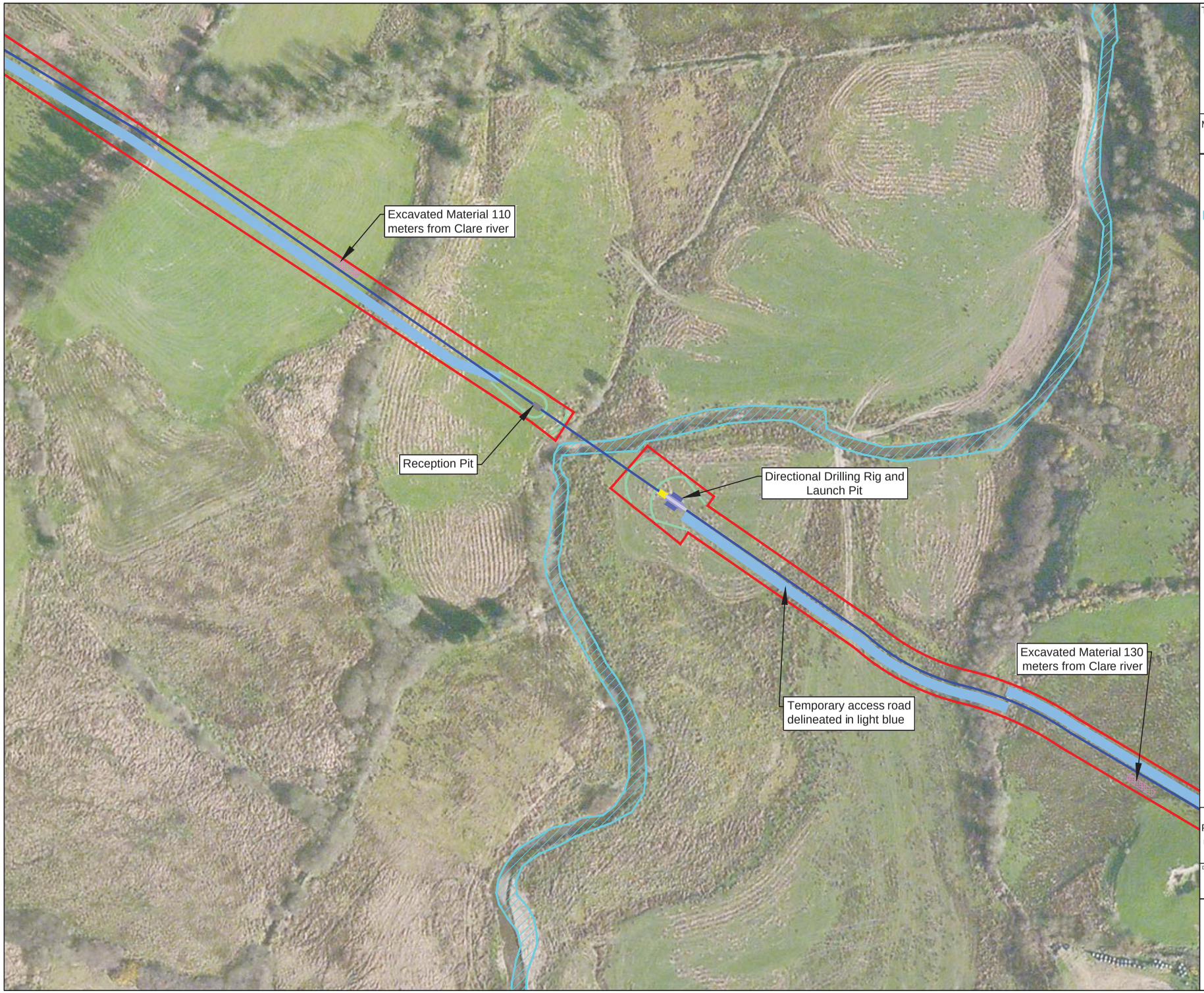

Title:

Figure GC 5.30

Watercourse Crossing Type D - Directional Drilling at the Clare River (W36)

Map Number:

N/A

Legend:

- UGC 110kV Cables Trench
- Clare River
- Construction Works Area
- Silt Fence - Double silt fencing between banks of Clare River and Drilling Rig
- Reception Pit and Launching Pit
- Launching Pit
- Directional Drilling Rig
- Excavated Material
- Temporary access road

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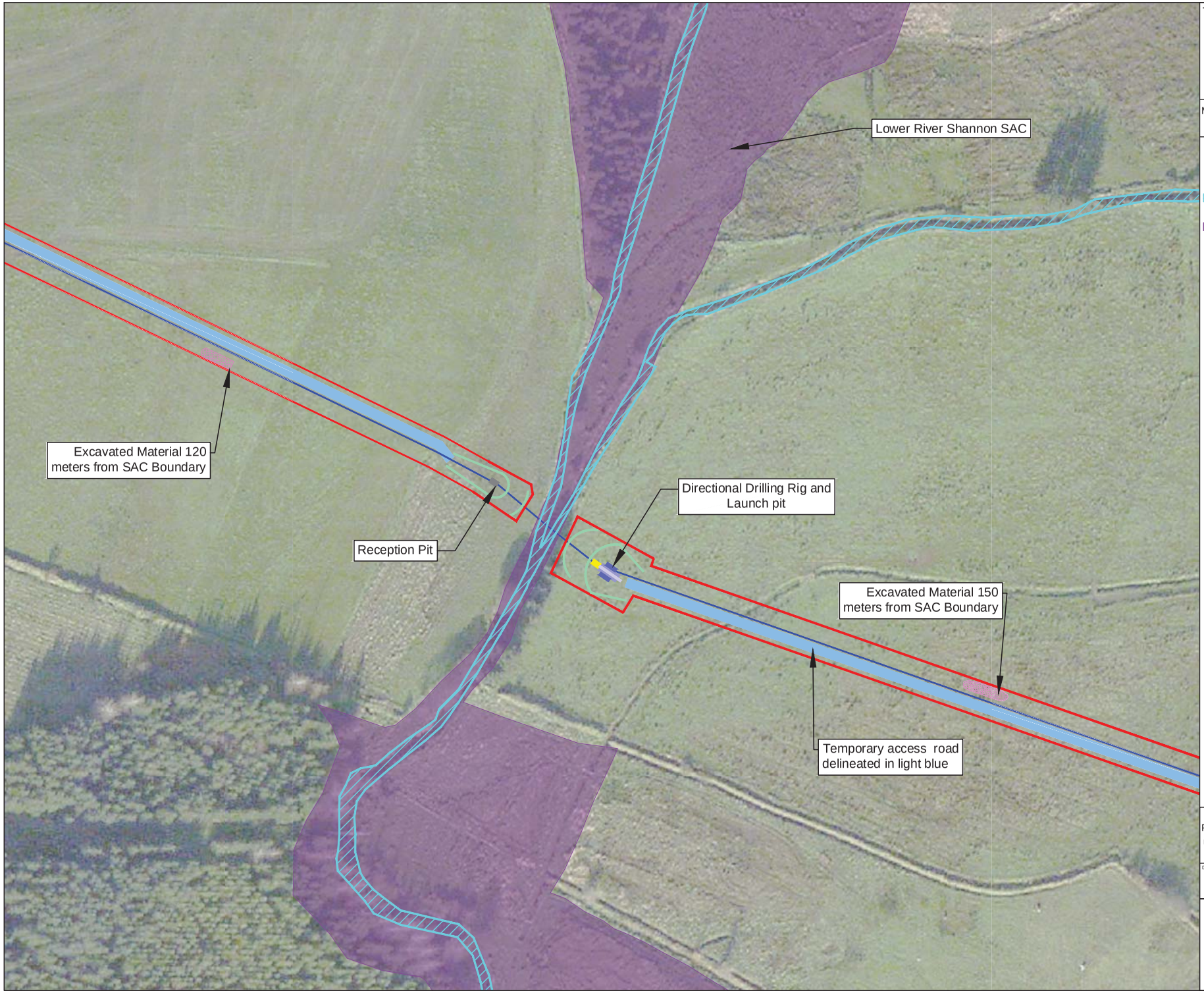

Title:

Figure GC 5.31

Watercourse Crossing Type D - Directional Drilling at the Bilboa River (W57)

Map Number:

N/A

Legend:

- UGC 110kV Cables Trench
- Bilboa River
- Lower River Shannon SAC
- Construction Works Area
- Silt Fence - Double silt fencing between SAC Boundary and Drilling Rig
- Reception Pit and Launching Pit
- Launching Pit
- Directional Drilling Rig
- Excavated Material
- Temporary access road

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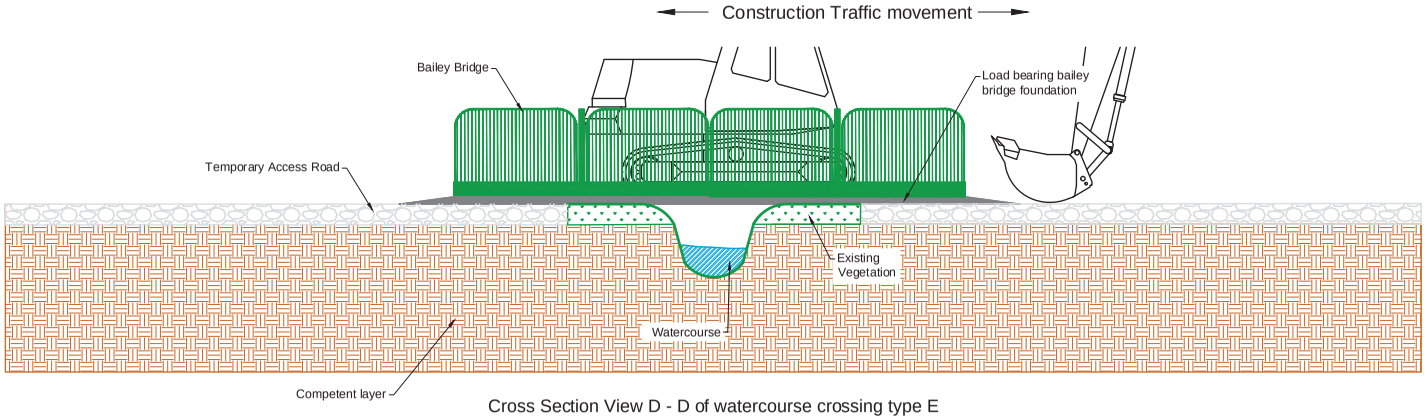
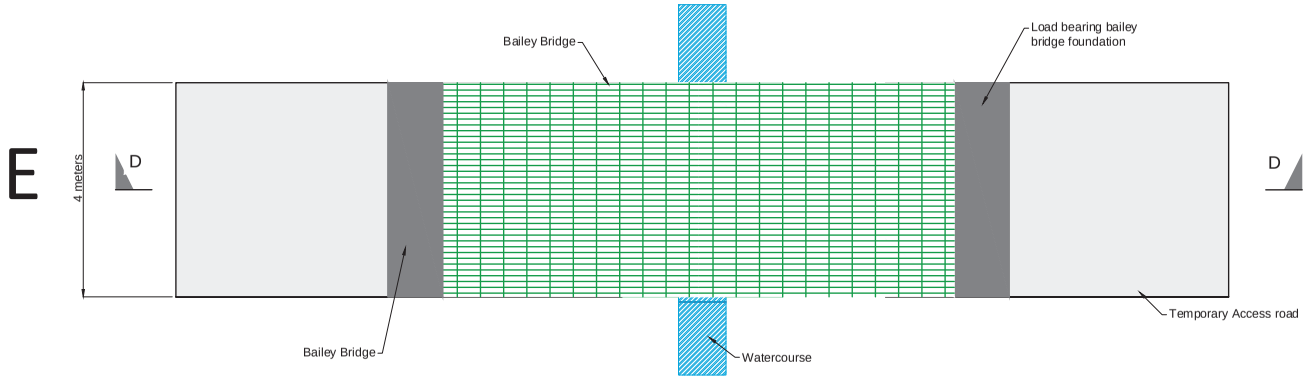


Cross Section View D - D of watercourse crossing type E
Bailey Bridge - (No Instream Works)

E



Plan View of watercourse crossing type E
Bailey Bridge - (No Instream Works)

Title:

Figure GC 5.32

Watercourse Crossing Type E - Temporary Portable Bailey Bridge

Note:

Watercourse Crossing Type E

Used at C type water crossings at EPA Blue Line & EPA Blue Line Equivalent streams

Description of Crossing Type E

- No existing crossing structure
- No instream Works
- Traffic crossing only
- No Cables or Ducting installed

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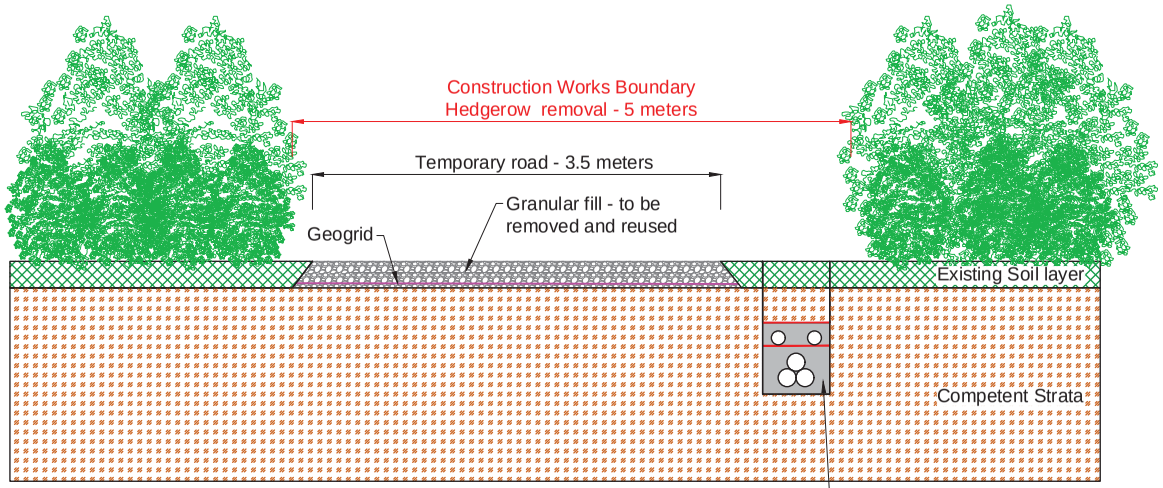
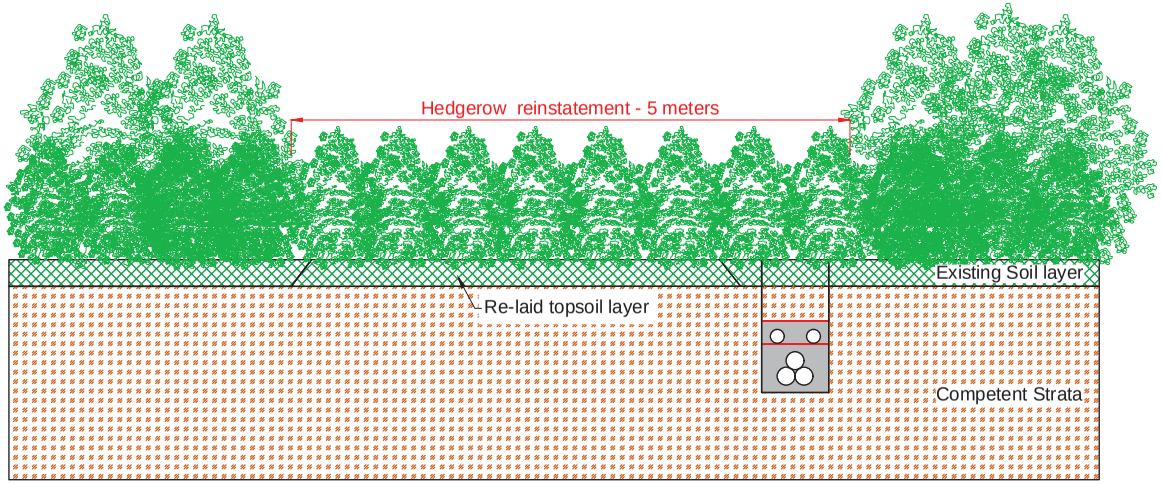


Cross Section of Hedgerow Removal and temporary access road - Construction Phase



Cross Section of Hedgerow Reinstatement and temporary access road - Post Construction

Title:

Figure GC 5.33

Cross Sections of Hedgerow Removal and Reinstatement

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

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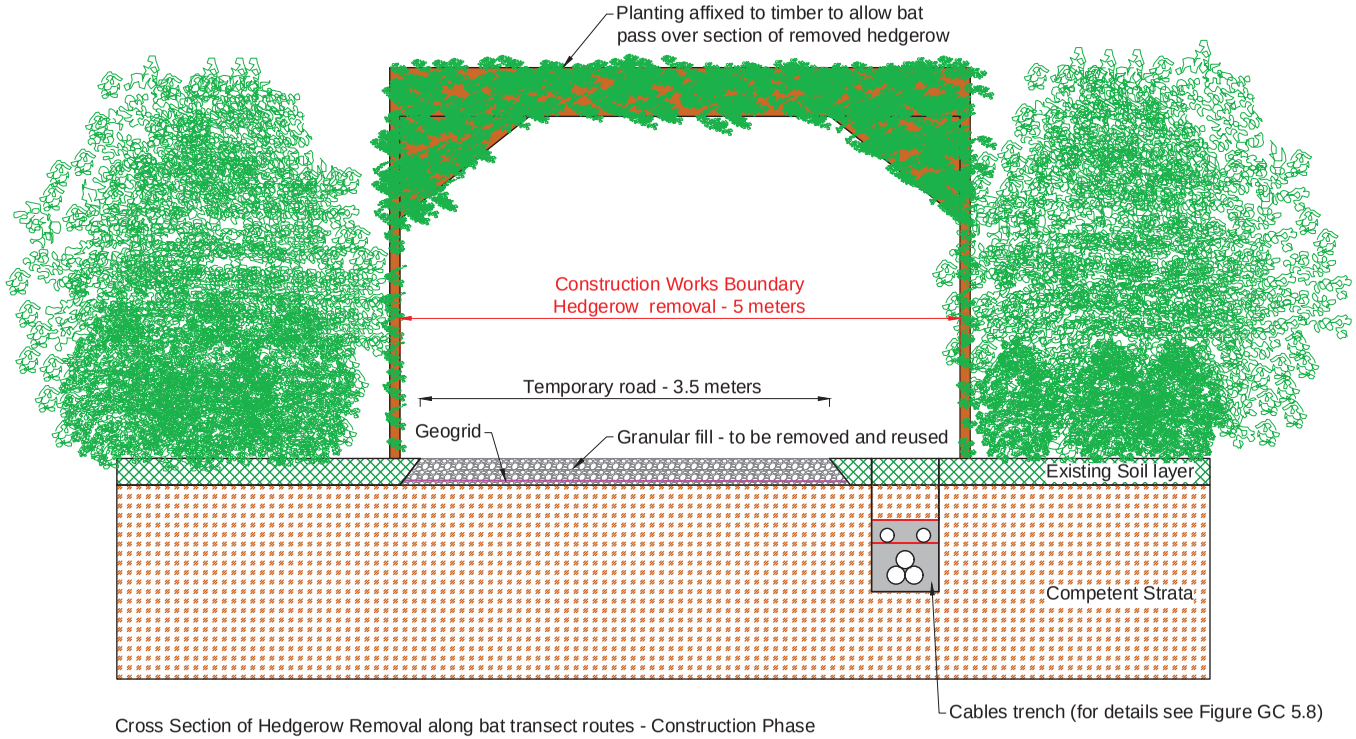
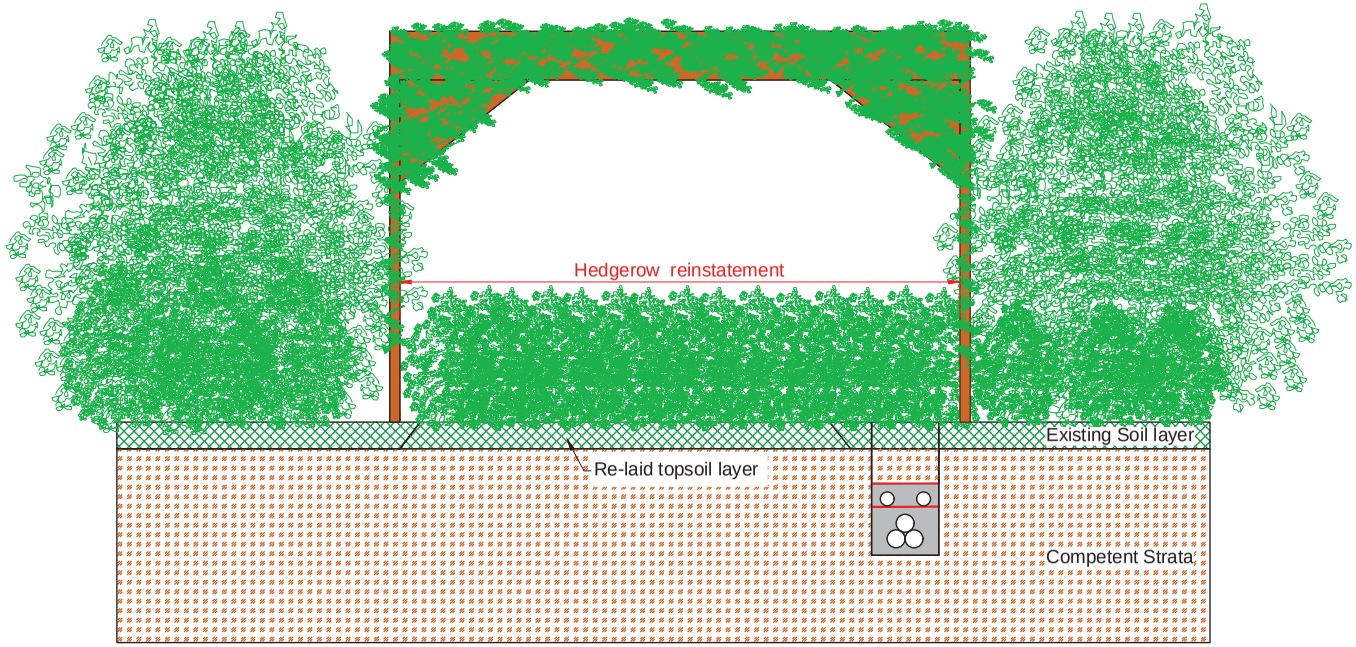


Cross Section of Hedgerow Removal along bat transect routes - Construction Phase



Cross Section of Hedgerow Reinstatement - Post Construction

Title:

Figure GC 5.34

Cross Sections of Bat Crossing Structure

Map Number:

N/A

Note :
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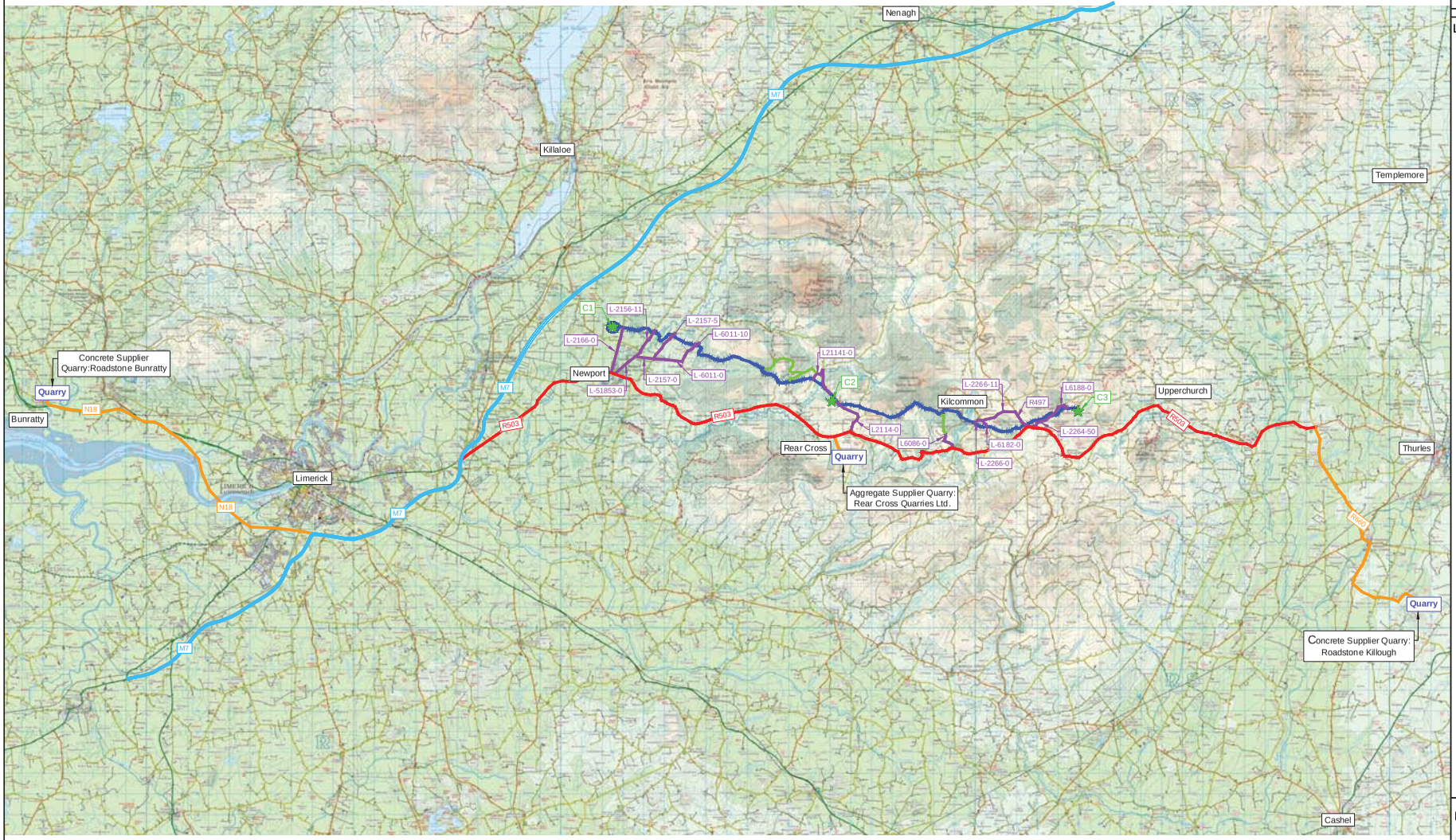

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Figure GC 5.35

Haul Routes for Aggregate and Concrete Deliveries (Overview Map & Map 1)

Map Number:

Overview Map

Legend:

- UWF Grid Connection
- Regional Road R503
- Haul Route from Local Quarries to the R503
- Temporary Compound
- C1 Temporary Compound Numbers
- Haul Route to Temporary Compounds from the R503 along local roads
- L-2264-0 Local Road Numbers
- Access Road

N

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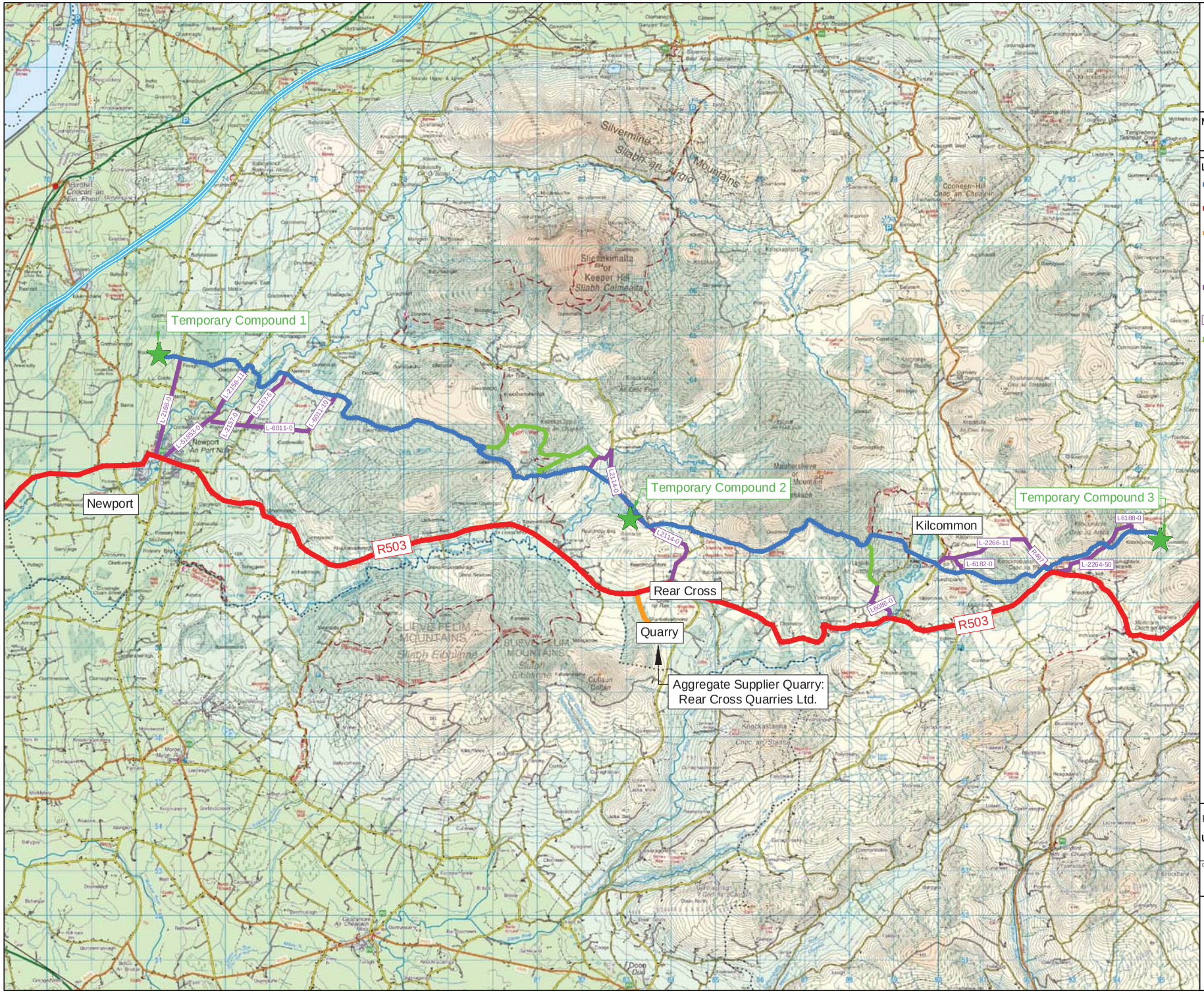

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Figure GC 5.35

Haul Routes for Aggregate and Concrete Deliveries (Overview Map & Map 1)

Map Number:

Map 1 of 1

Legend:

- UWF Grid Connection
- Regional Road R503
- Haul Route from Local Quarries to the R503
- Temporary Compound
- Haul Route to Temporary Compounds from the R503 along local roads
- L-2264-0 Local Road Numbers
- Access Road

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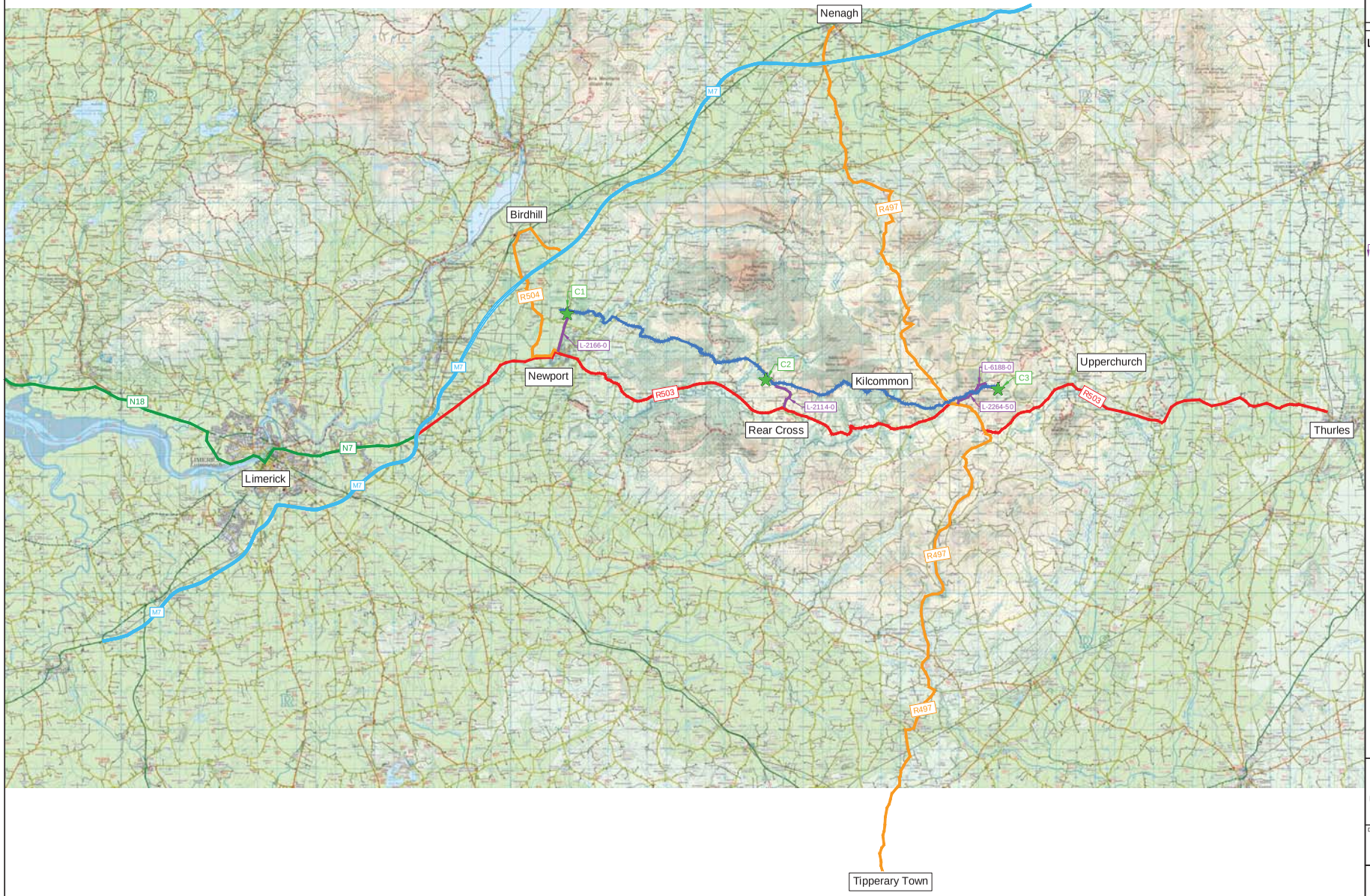

Title:

Figure GC 5.36

Haul Route for Other Construction Materials & Equipment

Map Number:

Map 1 of 1

Legend:

- UWF Grid Connection
- Haul Route from Adjacent Town or City along a Regional Road to the R503
- Regional Road R503
- Temporary Compound
- C1 Temporary Compound Numbers
- Haul Route to Temporary Compounds from the R503 along local roads
- L-2264-0 Local Road Numbers

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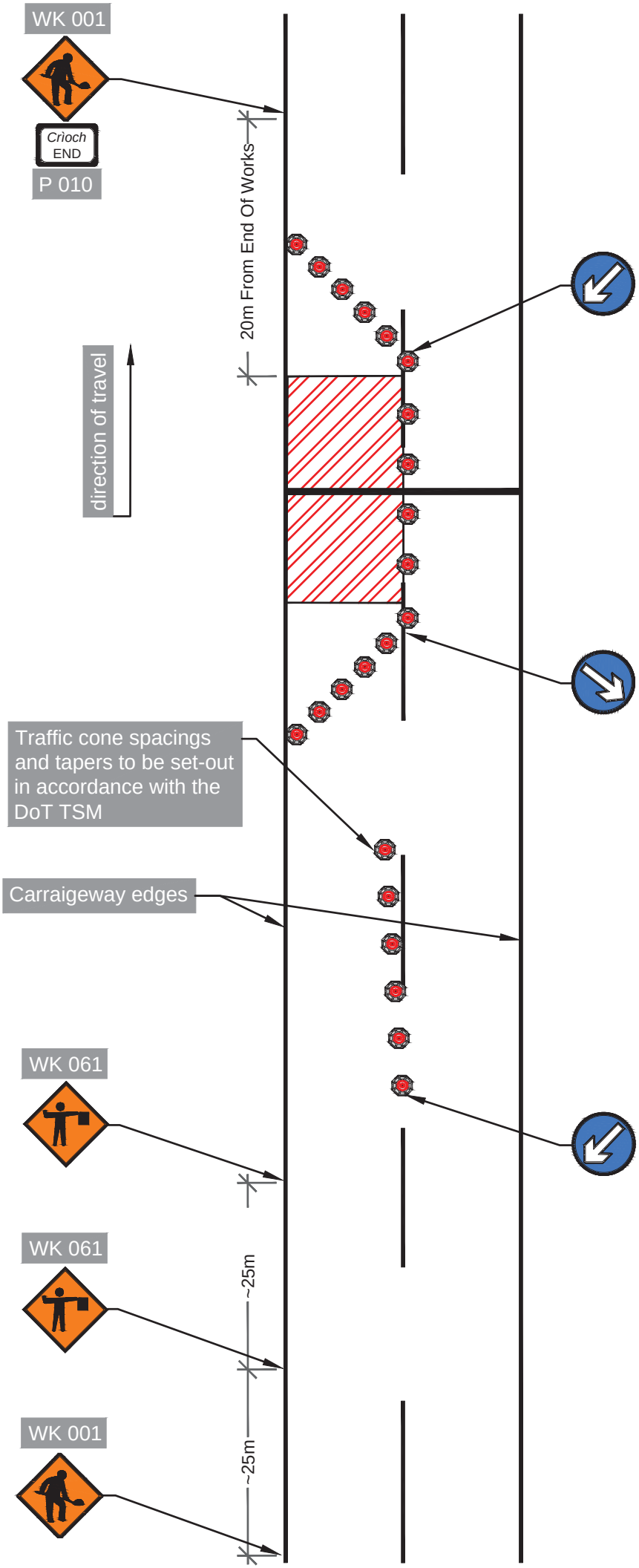

Figure GC 5.37

Advance Warning Signage for Road Works & Site Entrances

Designed in conjunction with

NRB consulting engineers

Note: This drawing is not to scale

Department of Transport Traffic Signs Manual (DoT TSM)

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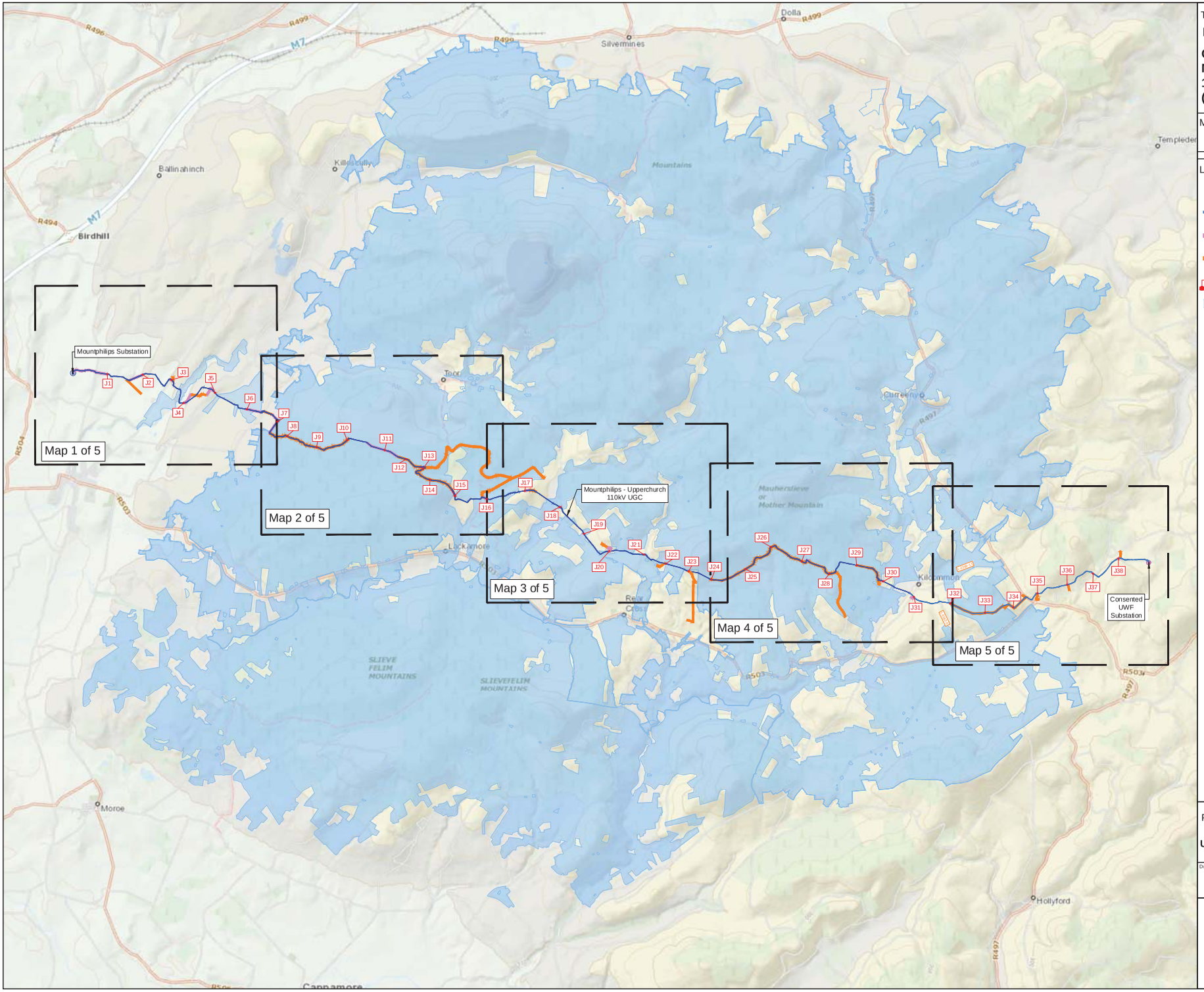

Title:

Figure GC 5.38

Operational Stage Access to Mountphilips Substation and 110kV UGC (Overview & Maps 1 to 5)

Map Number:

Overview Map

Legend:

- Mountphilips Substation
- UWF Grid Connection
- New permanent road to joint bays
- Existing access road
- Joint Bay Locations
- Slievefelim - Silvermines SPA
- Consented UWF Substation

N

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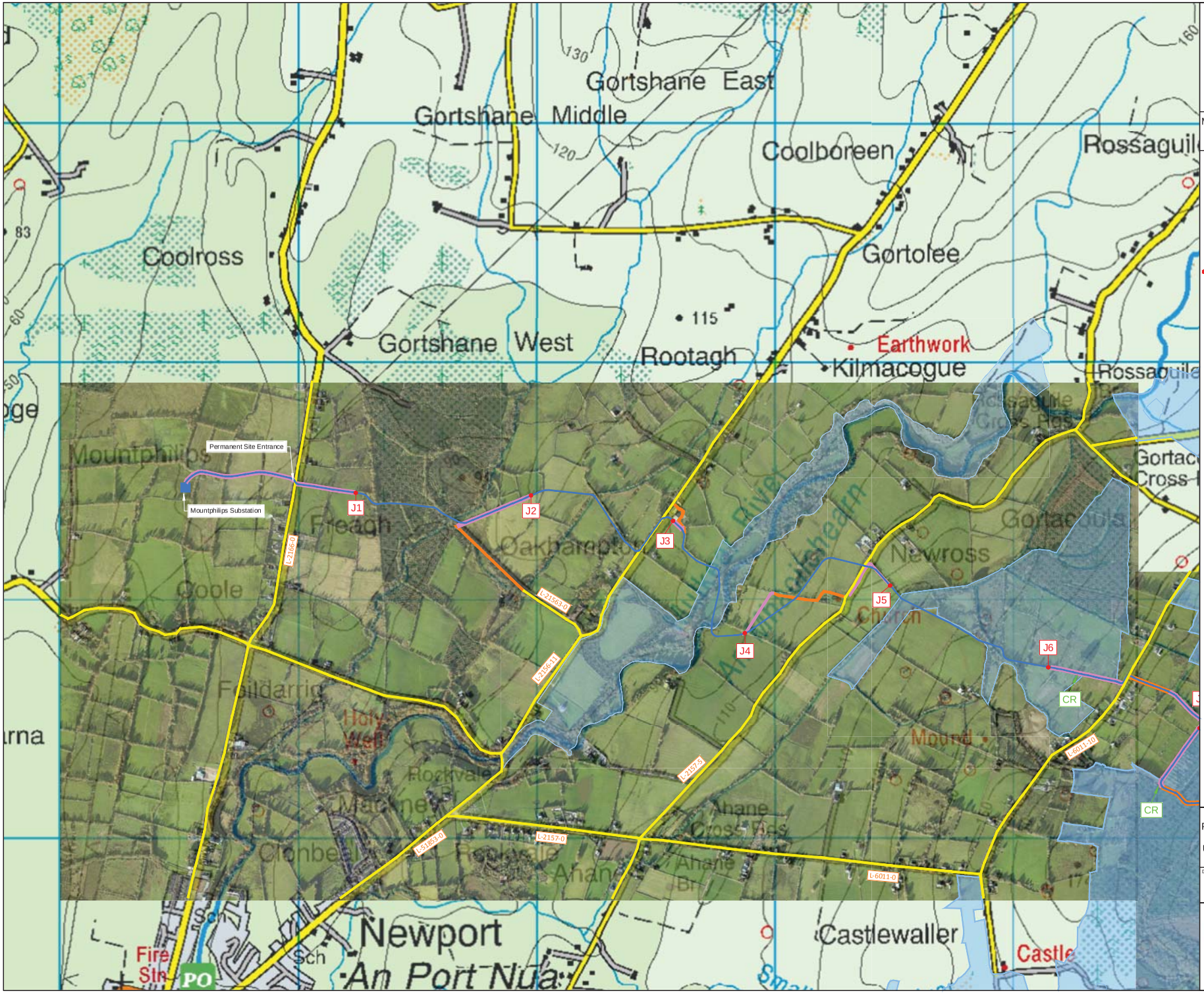

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Figure GC 5.38

Operational Stage Access to Mountphilips Substation and 110kV UGC (Overview & Maps 1 to 5)

Map Number:

Map 1 of 5

Legend:

- UWF Grid Connection
- New permanent access road to joint bays
- Existing access road
- J16 Joint Bay Locations
- CR Consealed Permanent access road
- Public Road
- L-2064-0 Public Road Number
- Slievefelim - Silvermines SPA

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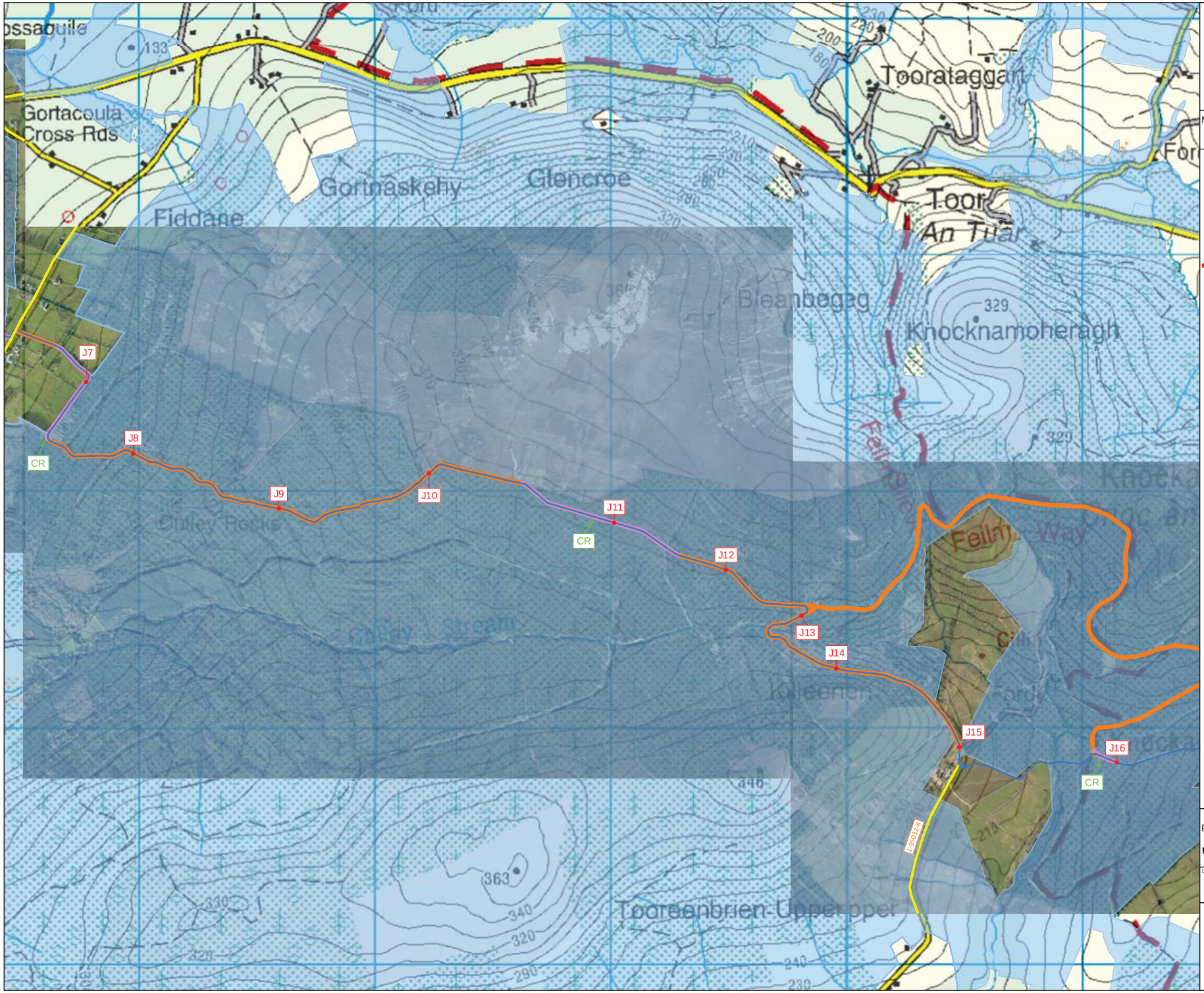

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Figure GC 5.38

Operational Stage Access to Mountphilips Substation and 110kV UGC (Overview & Maps 1 to 5)

Map Number:

Map 2 of 5

Legend:

- UWF Grid Connection
- New permanent access road to joint bays
- Existing private access road
- Joint Bay Locations
- Consealed Permanent access road
- Public Road
- Public Road Number
- Slievefelim - Silvermines SPA

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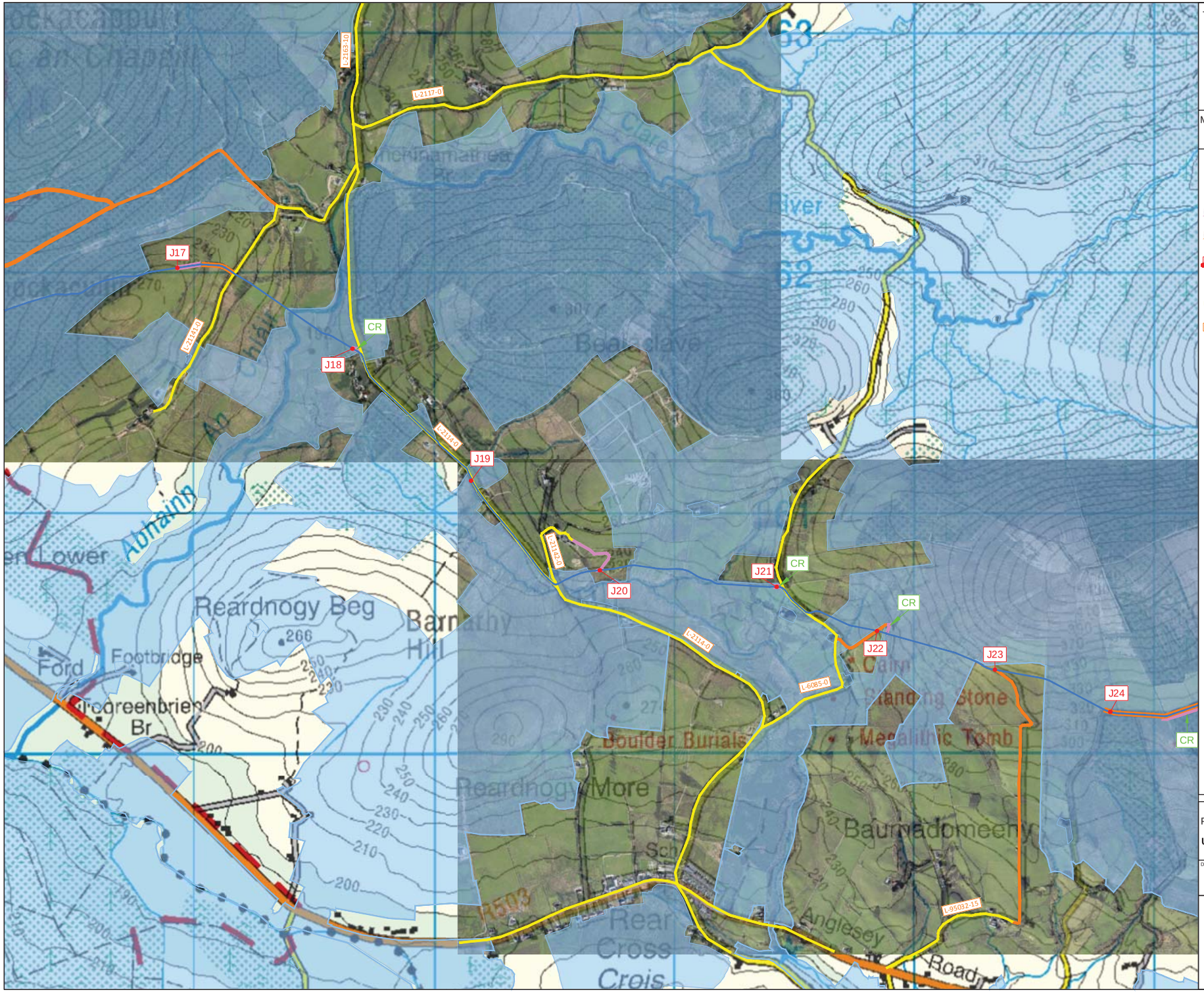

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Figure GC 5.38

Operational Stage Access to Mountphilips Substation and 110kV UGC (Overview & Maps 1 to 5)

Map Number:

Map 3 of 5

Legend:

- UWF Grid Connection
- New permanent access road to joint bays
- Existing private access road
- Joint Bay Locations (J16)
- Consealed Permanent access road (CR)
- Public Road
- Public Road Number (L-2664)
- Slievefelim - Silvermines SPA

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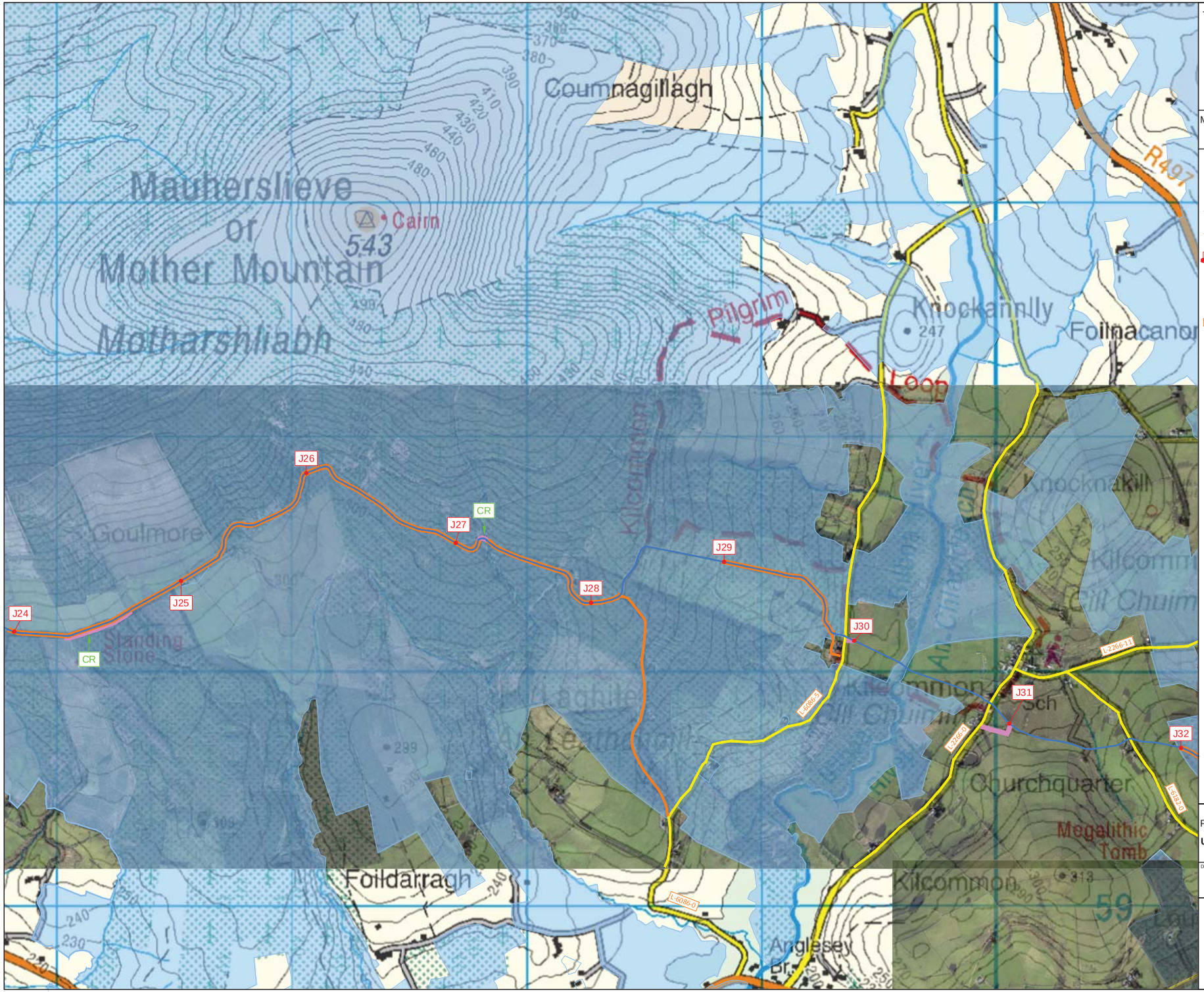

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Figure GC 5.38

Operational Stage Access to Mountphilips Substation and 110kV UGC (Overview & Maps 1 to 5)

Map Number:

Map 4 of 5

Legend:

- UWF Grid Connection
- New permanent access road to joint bays
- Existing private access road
- J16 Joint Bay Locations
- CR Consealed Permanent access road
- Public Road
- L-2106-0 Public Road Number
- Slievefelim - Silvermines SPA

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Figure GC 5.38

Operational Stage Access to Mountphilips Substation and 110kV UGC (Overview & Maps 1 to 5)

Map Number:

Map 5 of 5

Legend:

- UWF Grid Connection
- Consented UWF Substation
- New permanent access road to joint bays
- Existing private access road
- J16 Joint Bay Locations
- Public Road
- L-2264-0 Public Road Number
- Slievefelim - Silvermines SPA
- CR Consealed Permanent access road

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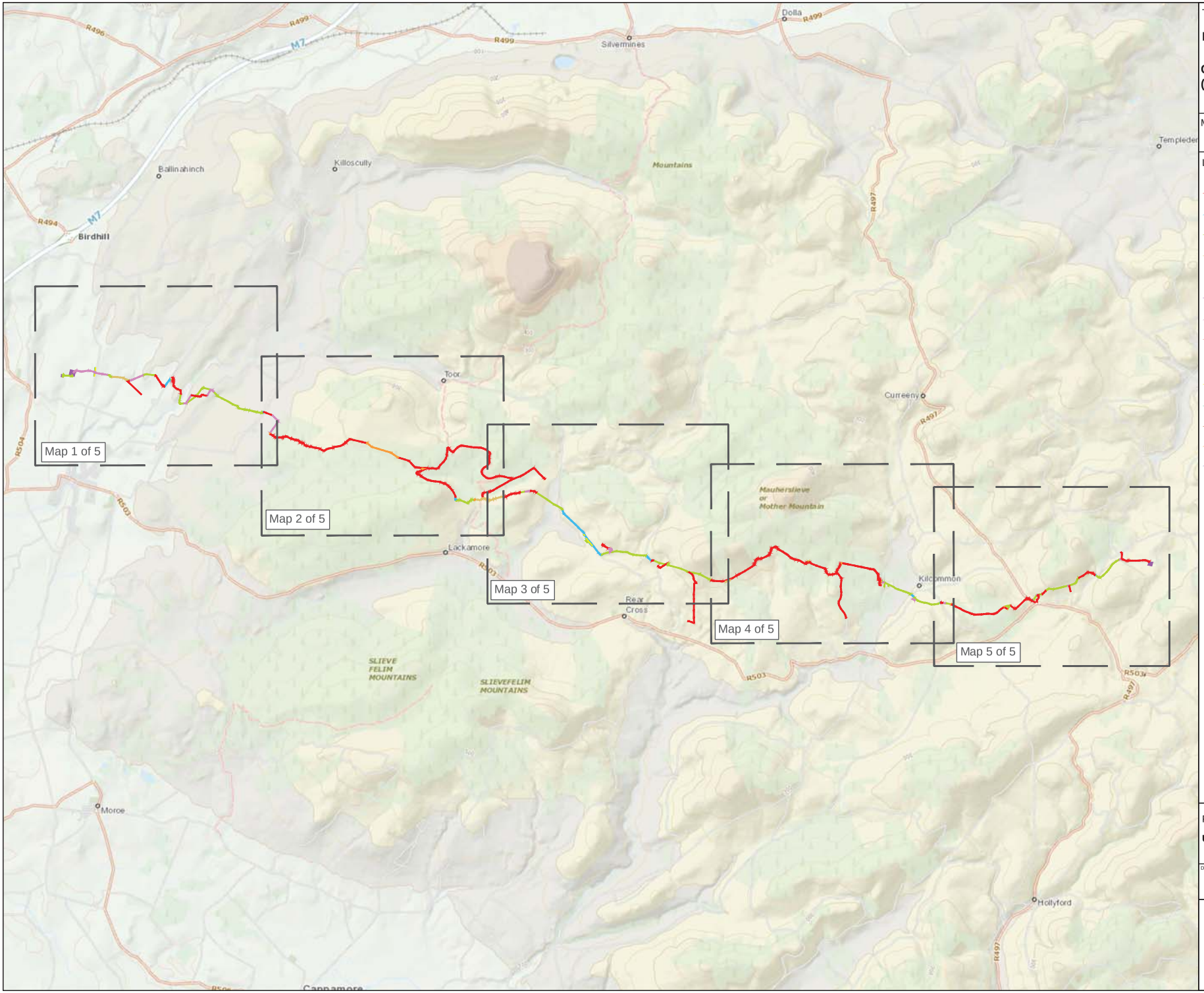

Title:

Figure GC 5.39

Operational Stage Land Use Change (Overview & Maps 1 to 5)

Map Number:

Overview Map

Legend:

- Existing private road (no change)
- Public road (no change)
- Agricultural land (no change)
- Forestry Firebreak (no change)
- Agricultural land to Utility
- Agricultural land to Permanent road
- Agricultural land to Conseal Permanent road
- Hedge to public road verge
- Agricultural land to Hedge
- Forestry to Permanent Road
- Forestry to Firebreak
- Forestry Firebreak to Permanent Road

N

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UWF Grid Connection (GC)

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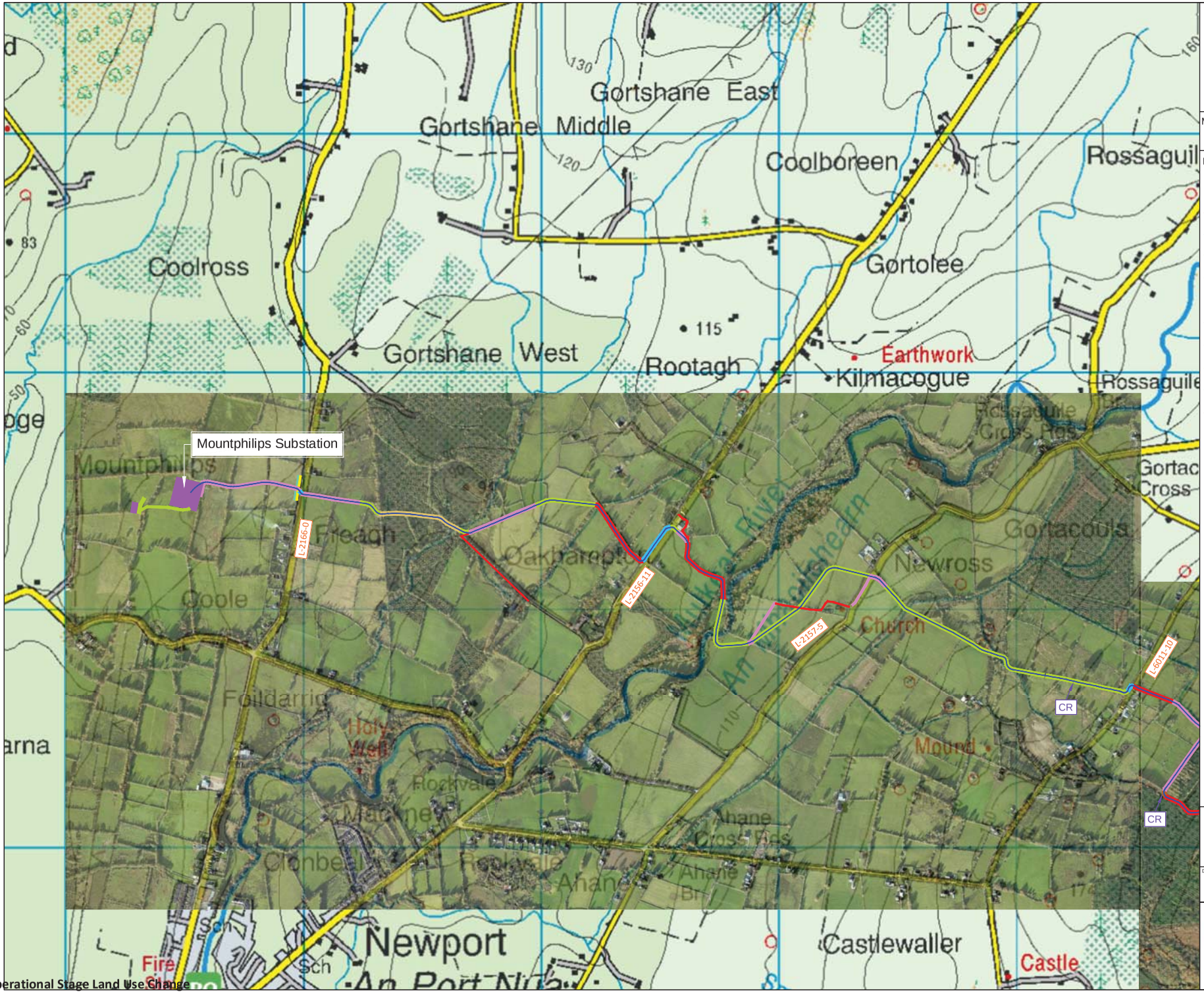

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Figure GC 5.39

Operational Stage Land Use Change (Overview & Maps 1 to 5)

Map Number:

Map 1 of 5

Legend:

- UWF Grid Connection
- Existing private road (no change)
- Public road (no change)
- Agricultural land (no change)
- Forestry Firebreak (no change)
- Agricultural land to Utility
- Agricultural land to Permanent road
- Hedge to public road verge
- Agricultural land to Hedge
- Felled Forestry to Permanent Road
- Townlands
- Public Road Number
- New Permanent - Concealed Access Road

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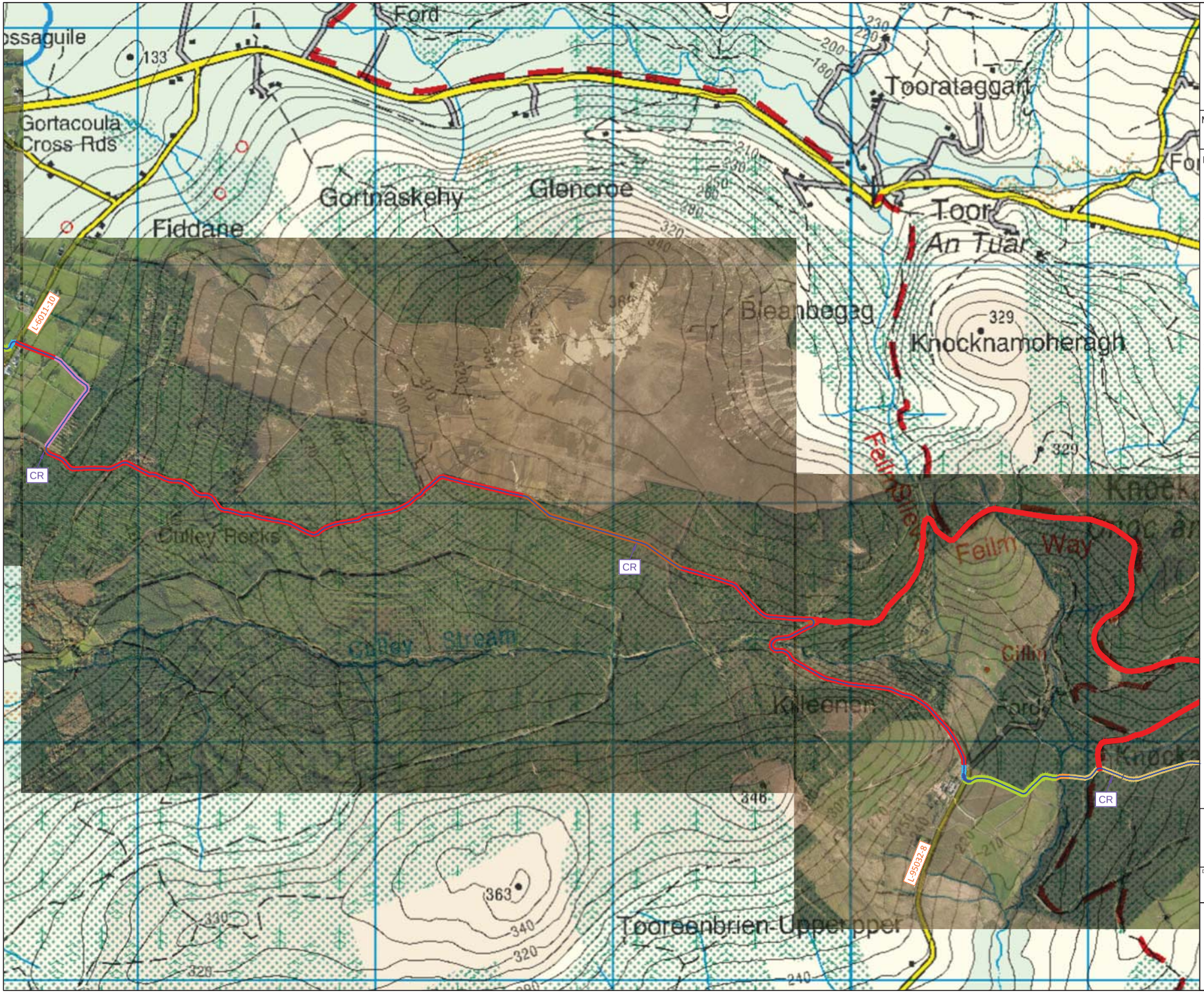
Operational Stage Land Use Change
(Overview & Maps 1 to 5)
ge Land Use Change



Title:

Figure GC 5.39

Operational Stage Land Use Change (Overview & Maps 1 to 5)

Map Number:

Map 2 of 5

Legend:

- UWF Grid Connection
- Existing private road (no change)
- Public road (no change)
- Agricultural land (no change)
- Forestry firebreak (no change)
- Agricultural land to Permanent road
- Felled Forestry to Permanent Road
- Forestry to Firebreak
- Forestry firebreak to Permanent road
- Townlands
- Public Road Number
- CR New Permanent - Concealed Access Road

N

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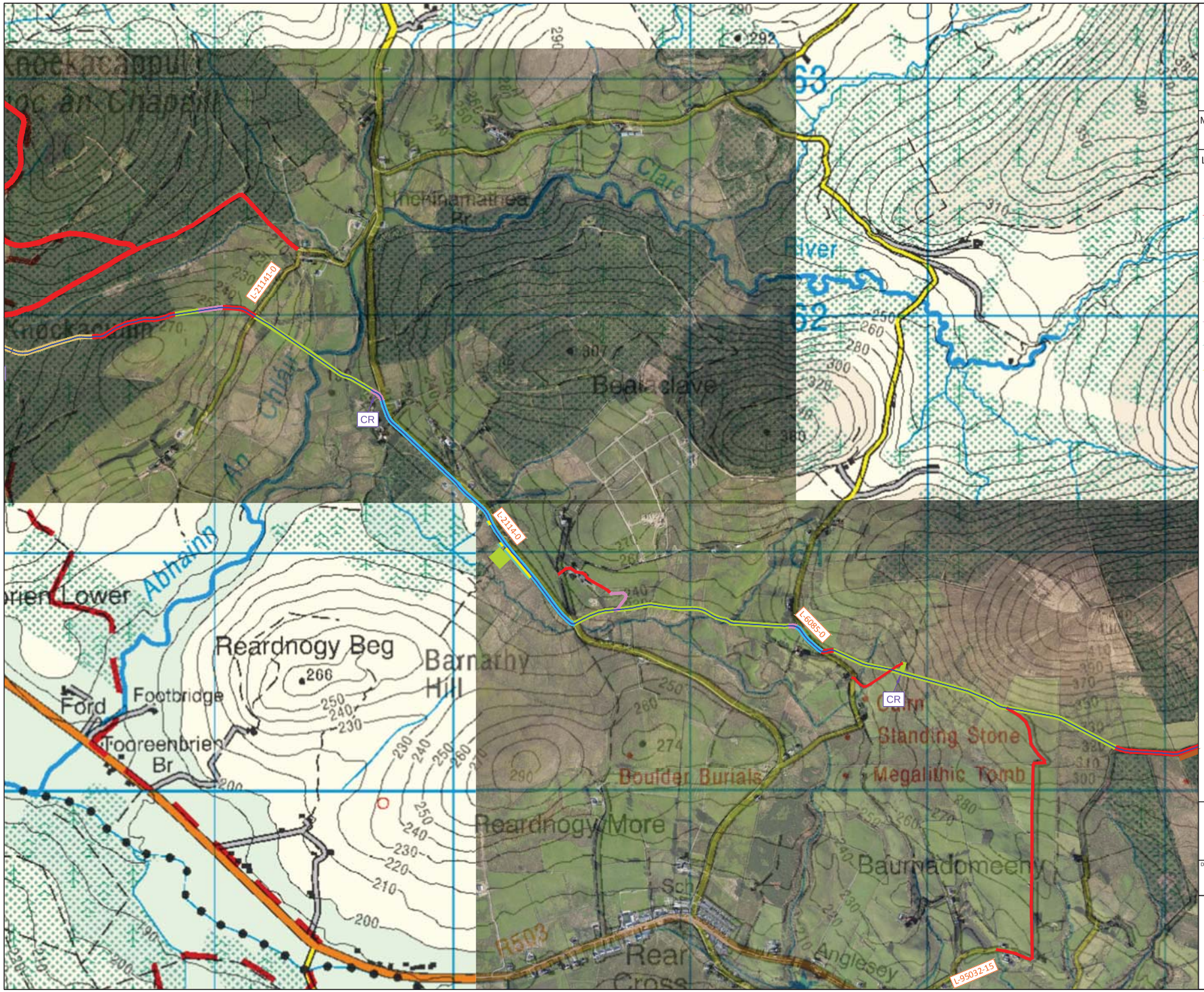

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Figure GC 5.39

Operational Stage Land Use Change (Overview & Maps 1 to 5)

Map Number:

Map 3 of 5

Legend:

- UWF Grid Connection
- Existing private road (no change)
- Public road (no change)
- Agricultural land (no change)
- Forestry firebreak (no change)
- Agricultural land to Permanent road
- Agricultural land to Hedge
- Hedge to public road verge
- Townlands
- Public Road Number
- CR — New Permanent - Concealed Access Road

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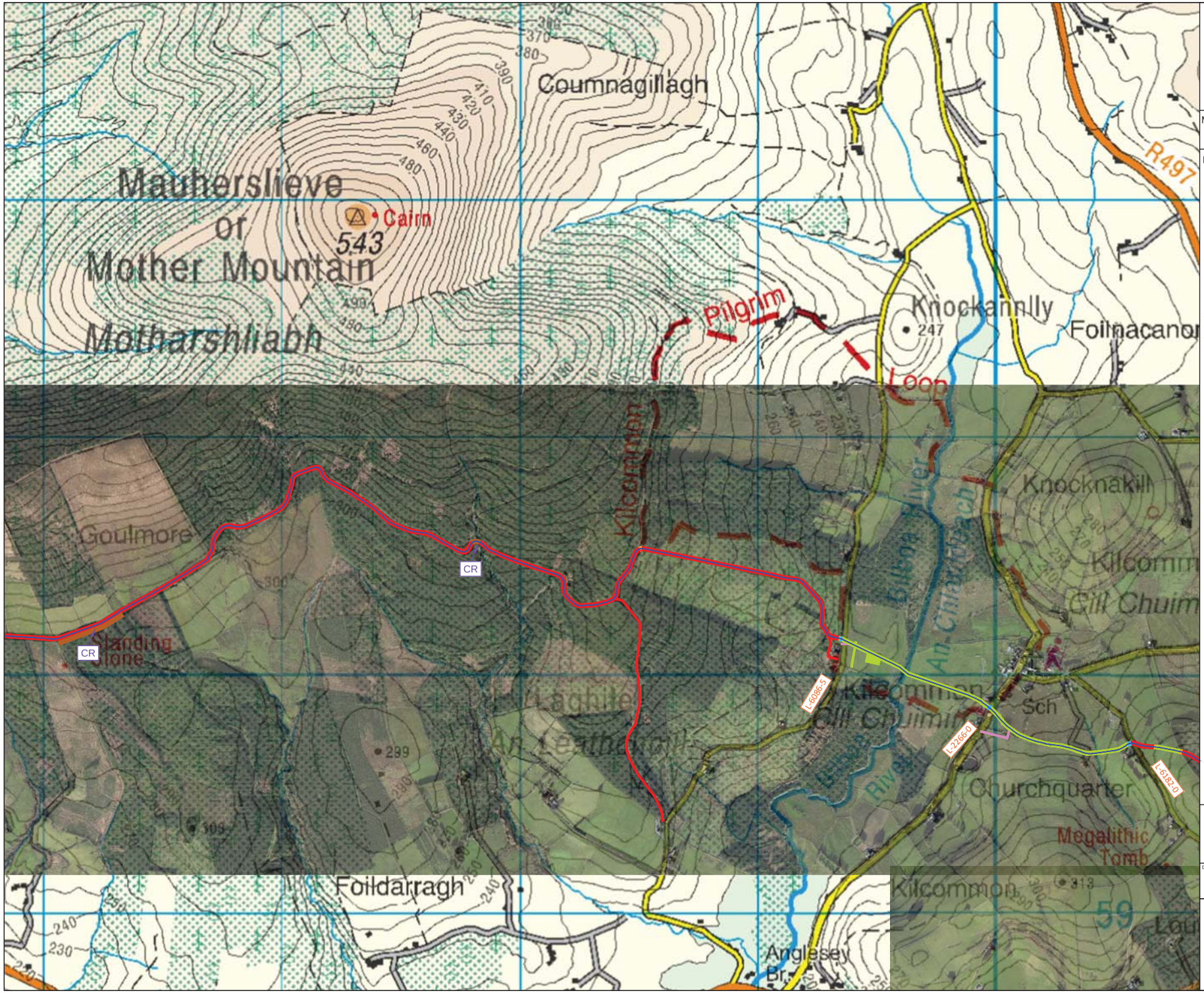

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Figure GC 5.39

Operational Stage Land Use Change (Overview & Maps 1 to 5)

Map Number:

Map 4 of 5

Legend:

- UWF Grid Connection
- Existing private road (no change)
- Public road (no change)
- Agricultural land (no change)
- Agricultural land to Permanent road
- Felled forestry to Permanent road
- Felled forestry to Firebreak
- Townlands
- Public Road Number
- New Permanent - Concealed Access Road

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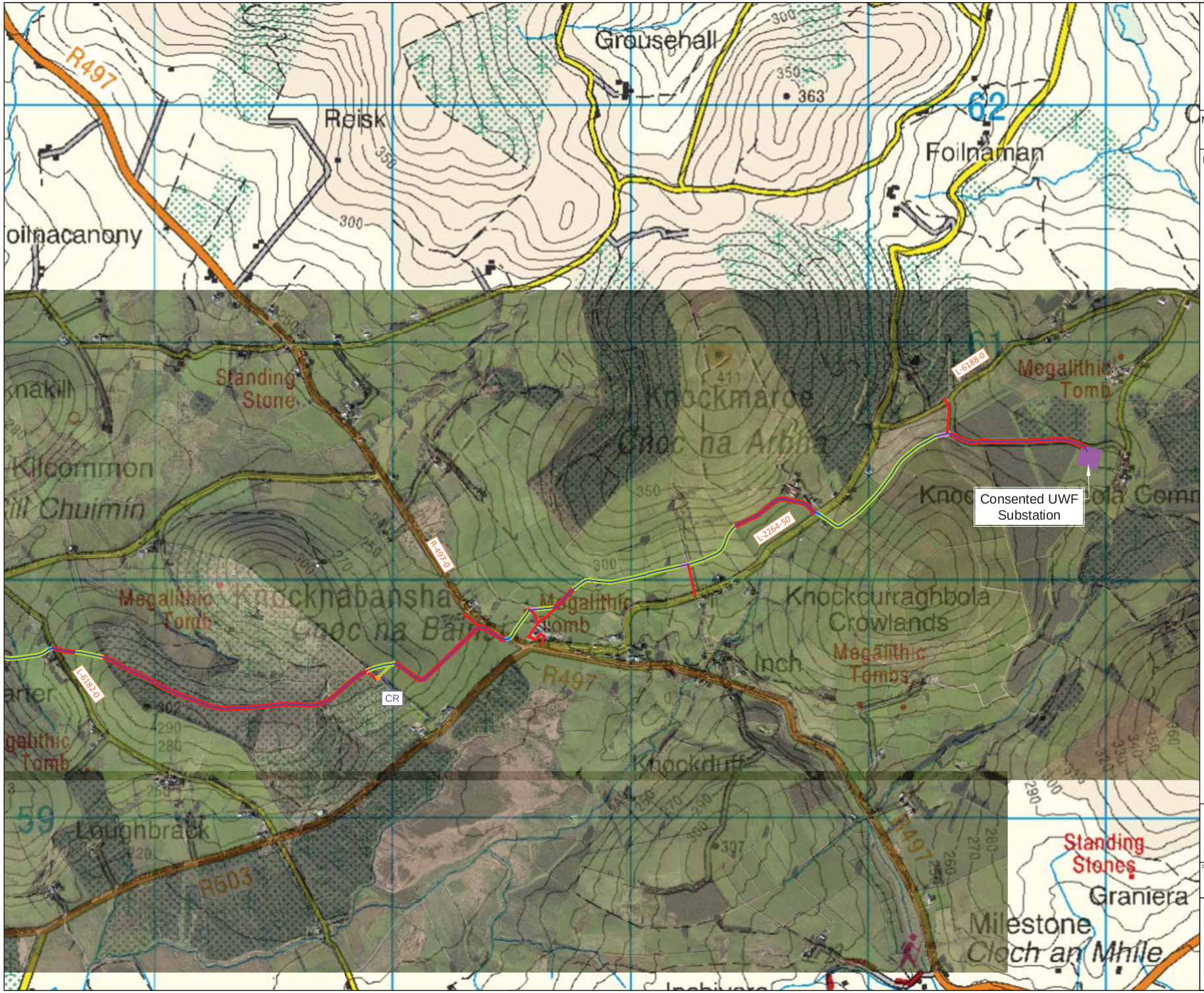

Title:

Figure GC 5.39

Operational Stage Land Use Change (Overview & Maps 1 to 5)

Map Number:

Map 5 of 5

Legend:

- UWF Grid Connetion
- Existing private road (no change)
- Public road (no change)
- Agricultural land (no change)
- Forestry to Firebreak
- Agricultural land to Permanent road
- Agricultural land to Utility
- Townlands
- Public Road Number
- CR — New Permanent - Concealed Access Road

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Appendix to Chapter 5: Description of Development (UWF Replacement Forestry)

Appendix 5.4: Description of Development (UWF Related Works)

The data and descriptions in this appendix have informed Chapter 5: Description of Development (UWF Replacement Forestry) of the EIA Report. The information presented in this Appendix 5.4 is outlined below and the relevant element(s) of the Whole UWF Project are also identified.

Appendix	Title	Relevant EIAR
A.5.4	Description of Development (UWF Related Works)	UWF Related Works

UWF Related Works

Volume C2: EIAR Main Report

Chapter 5

Description of Development

(UWF Related Works)

ECOPOWER

May 2018

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Figure RW 5.20	Watercourse Crossing Type C3 – Internal Windfarm Cable trench and ducting only
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Note: The numbering system for Figures follows the sequence 'Figure Number-Appendix Number'.

LIST OF APPENDICES – Contained in Volume C4: EIAR Appendices

Appendix No.	Appendix Title
Appendix 5.1	Outline Construction Methodologies for UWF Related Works
Appendix 5.2	Classification and Crossing Method for UWF Related Works Watercourses
Appendix 5.3	Description of Development (UWF Grid Connection)
Appendix 5.4	Description of Development (UWF Replacement Forestry)
Appendix 5.5	Complied Description of Upperchurch Windfarm
Appendix 5.6	Description of the UWF Other Activities
Appendix 5.7	A Guide to Risk Assessment in Major Emergency Management Jan 2010

Note: The numbering system for Appendices follows the sequence 'Chapter Number-Appendix Number'.

Glossary of Terms

Term	Definition
EIA Directive	European Union Directive 2011/92/EU (as amended by Directive 2014/52/EU)
Environmental Factors	The factors in the environment required to be identified, described and assessed during the EIA process. These are specified in Article 3 (1) of the EIA Directive as Population and Human Health; Biodiversity; Land; Soils; Water; Air; Climate; Material Assets; Cultural Heritage and Landscape.
Competent Authority	The body legally delegated to decide on the Planning Application
Competent Expert	Experts who are qualified and competent in their field of expertise
Consented Windfarm	Upperchurch Windfarm – 22 wind turbines, substation, windfarm roads and ancillary works, consented in August 2014 under Planning Reference: Tipperary County Council 13/51/0003, ABP PL 22.243040
Element	One of the 5 No. elements listed in 'Whole UWF Project' below.
Project Design Environmental Protection Measures	Measures for environmental protection, incorporated into the design of the project.
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.
Whole UWF Project	Project made up of 5 No. elements – UWF Grid Connection; UWF Related Works, UWF Replacement Forestry, Upperchurch Windfarm (UWF) and UWF Other Activities.

List of Abbreviations

Abbreviation	Full Term
ABP	An Bord Pleanála
EDL	Ecopower Developments Limited
EIA	Environmental Impact Assessment

Abbreviation	Full Term
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
PD	Ecopower Project Design Environmental Protection Measure developed by members of the EIAR Team
RFI	Response to Further Information
SAC	Special Area of Conservation
SPA	Special Protection Area (for wild birds)
OCM	Outline Construction Methodologies
UWF	Upperchurch Windfarm
UGC	Underground Cables

5. Description of the UWF Related Works Development

5.1. Introduction to Chapter 5

UWF Related Works are described in this chapter, in the following order:

Section 5.2	• A Description of the Location and Characteristics of the subject development (the UWF Related Works). • The Project Design Environmental Protection Measures incorporated into the design to avoid, prevent or reduce likely significant adverse effects on the environment.
The Development as described in Section 5.2 At the conception of the UWF Related Works, the design team evaluated the potential or likely significant effects of the development, on the receiving environment. Any potential or likely significant effects were avoided, in most cases, by integrating environmental protection measures into the fundamental design of the UWF Related Works. Various measures, particularly options for mitigation by avoidance and mitigation by prevention, were considered; these included alternative locations, alternative designs and alternative processes. Once the chosen location, design and process was decided the proposal was examined for opportunities to incorporate further mitigation measures (generally mitigation by reduction) in the final iteration of the development to be evaluated in the EIA Report. The development, as described in Section 5.2, is the final iteration of the UWF Related Works. It is this final iteration that is examined in Chapters 6 to 17, for effects on the prescribed environmental factors, by the topic competent experts.	
Section 5.3	The durations and timing, main activities, personnel and material requirements for both the construction and operation stages. Any changes to the UWF Related Works, such as decommissioning.
Section 5.4	The use of natural resources, emissions and production of wastes for each stage.
Section 5.5	The vulnerability of the UWF Related Works to major accidents and natural disasters.
Section 5.6	Cumulative Descriptions: For the purposes of cumulative assessment of the whole Upperchurch windfarm (UWF) project, a description of the other elements of the Whole UWF Project namely; UWF Grid Connection; UWF Forestry Replanting; the already consented Upperchurch Windfarm (UWF) and UWF Other Activities, is provided. For the purposes of a cumulative assessment with Other Existing or Consented Projects or Activities, a description of Other Existing or Consented Projects or Activities that were scoped in by the EIAR Team is also provided.

5.2. Characteristics of UWF Related Works

The UWF Related Works proposal comprises of the following parts:

- Internal Windfarm Cabling
- Realigned Windfarm Roads
- Haul Route Roads
- Telecom Relay Pole
- RW Ancillary Works

5.2.1. Purpose of UWF Related Works

Internal Windfarm Cabling: to connect the Consented UWF Turbines to the Consented UWF Substation.

Realigned Windfarm Roads: to realign two lengths of Consented UWF Roads and to provide access to a new telecom relay pole.

Haul Route Works: to facilitate the haulage of turbine components to the Upperchurch Windfarm site.

Telecom Relay Pole: to be erected in order to carry telecoms relay equipment, which will mitigate communication links impacts from operational Consented UWF Turbines on the communication signals between Foilnaman Mast and Laghtseefin Mast. The Telecom Relay Pole will fulfil Condition No. 18 of the planning conditions associated with the Upperchurch Windfarm.

RW Ancillary Works: will facilitate the construction of the UWF Related Works.

Note: the Consented UWF Turbines, Consented UWF Roads and the Consented UWF Substation refer to components of Upperchurch Windfarm (UWF). UWF has already received planning consent, but is not yet constructed.

5.2.2. Location and overview description of UWF Related Works

The **Internal Windfarm Cabling** will connect the Consented UWF Turbines to the Consented UWF Substation, through the installation of underground cables in agricultural; forestry lands; and across public roads; in the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnaman, Gleninchnaveigh, Coumnageeha, Coumbeg, Knocknamena Commons, Glenbeg and Seskin. Approximately 62% of the Internal Windfarm Cabling is located under Consented UWF Roads or Realigned Windfarm Roads, the remaining Cabling is located in the vicinity of the windfarm site.

The Internal Windfarm Cabling consists of electrical cables, communication cables and the copper conductor cables which are installed inside High Density Polyethylene (HDPE) ducting in underground trenches. Cable Protection and Warning Tapes will also be laid in the trench. The trench will be excavated, ducting and warning tapes installed and the trench backfilled and reinstated. When the ducting installation is finished and the trench reinstated, the electrical, communication and copper conductor cables will then be pulled through the ducting. The only surface expression of the Internal Windfarm Cabling will be the over-ground identification marker posts and marker plates which will be installed at regular intervals above the cables trench.

The **Realigned Windfarm Roads** (labelled RWR on the mapping) are two sections of the already consented windfarm roads which require realignment and one length of new road to link a telecoms mast to the windfarm road. These changes are proposed for windfarm roads in agricultural and forestry lands in the townlands of Shevry, Knockmaroe, and Grousehall, which are all within the Upperchurch Windfarm site.

The **Haul Route Works** (labelled HW on the mapping), are proposed for public road verges, roadside boundaries and grassland fields located adjacent to the L4139-0, L4138-12, L2264-50, L6188-0, L6185-13 and R503 roads in the following townlands: Shevry, Knockcurraghbola Commons, Knocknabansha, Knockmaroe and Grousehall. Works include the removal of soils and laying of crushed stone and hard-core in roadside verges; temporary removal or part-removal of roadside boundaries; opening of temporary entrances and the construction of temporary access roads on private lands.

The **Telecom Relay Pole** is an 18m wooden pole proposed for a location in Knockmaroe townland, close to the existing Foilnaman Mast. Laghtseefin Mast is 9.5km directly south. The Relay Pole will be contained within a small compound, and a low voltage power and communications supply will be provided from the existing Foilnaman Mast. A short length of access road, Realigned Windfarm Road No. RWR3, will provide access to the Telecom Relay Pole from the Consented UWF Road network.

RW Ancillary Works will facilitate the construction of the UWF Related Works and will include temporary access roads; temporary and permanent watercourse crossings (labelled WW on the mapping); temporary site entrances (labelled EW on the mapping); change of use from 'agriculture' to 'forestry and agriculture' at the UWF Replacement Forestry entrance at Foilnaman (labelled EW10 on the mapping); along with forestry felling; temporary and permanent hedgerow/tree removal; permanent hedgerow replanting; fencing; relocation of existing telephone poles and temporary storage of excavated materials; at various locations within construction works area boundaries.

Relevant Volume C3 EIAR Figures:

Figure RW 5.1: Location of UWF Related Works on OSI Discovery Mapping

Figure RW 5.2: Layout of UWF Related Works on Aerial Photography Mapping which comprises all the UWF Related Works in one large format map in order to provide a comprehensive overview.

Figure RW 5.3: UWF Related Works Construction Works Area Boundary.

Construction Works Area Boundary: All construction works e.g. machinery movement; excavations; excavated materials storage, will take place within the construction works area boundary as delineated on **Figure RW 5.3**. This construction works area is predominately 12m in width. On Figures RW 5.3, consecutive Sections along the Internal Windfarm Cabling routes, (numbered from SW1 to SW84) are identified. These section numbers are used throughout the EIA Report and Appendices to refer to a particular geographical area of the Internal Windfarm Cabling routes.

UWF Related Works is abbreviated throughout this chapter as RW. All the Figures Numbers are prefaced by RW per e.g. Figure RW 5.1

5.2.3. Characteristics of UWF Related Works

5.2.3.1. Realigned Windfarm Roads

The Upperchurch Windfarm Roads require realigning at three locations; RWR1, RWR2 and RWR3 as follows

- RWR1: The consented windfarm road to Turbine No.5 in Shevry is 560m in length, and it will replace this road in its entirety by the Realigned Windfarm Road RWR1, which will be 230m in length through forestry and will require forestry felling of 0.2ha, but will avoid the felling of 0.4Ha along the original consented route to Turbine No.5.
- RWR2: The consented windfarm road between Turbine No.19, Turbine No. 20 and Turbine No. 21, is 840m long in total. It will replace 370m of this road by Realigned Windfarm Road RWR2, which will also be 370m in length. 220m of RWR2 is located on grassland field, with the remaining length located on existing farm road. The existing farm road section will be upgraded during construction works.
- RWR3: A short length (30m) of new access road will be between the Upperchurch Windfarm Roads in Knockmaroe to the new Telecom Relay Pole.

Relevant Volume C3 EIAR Figures:

Figure RW 5.7: Layout of Realigned Windfarm Roads on Aerial Photography Mapping

Figure RW 5.8: Cross Section of Realigned Windfarm Road

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-04: Realigned Windfarm Roads

5.2.3.2. Internal Windfarm Cabling

Internal Windfarm Cabling will comprise c.17.9km of trenching, laid with ducts which will house 33kV electrical cables and communications cables. The cables trench will be 1.25m deep and 0.6 m wide. Closer to the windfarm substation in Knockcurraghbola Commons (in Section SW84, SW29, SW30 and SW31 where the electrical circuits from different directions are merging), a 400m length of the trench will be double width at 1.2m, to accommodate the double set of cabling. Cable Protection and Warning Tapes will also be laid in the trench as warning of the presence of electrical cables. Above ground identification marker posts and plates will be positioned to mark the location of the underground cables. The design of Internal Windfarm Cabling is typical of medium voltage windfarm cabling systems.

The majority (11.1km) of the Internal Windfarm Cabling will be installed under Consented UWF Roads or Realigned Windfarm Roads. The remainder of the Internal Windfarm Cabling will be installed in agricultural lands (4.6km), forestry lands (2.1km), and crossing under 9 No. public roads (40 meters) (labelled RW1 to RW9 on the mapping).

5.2.3.2.1. Public Road Works for Internal Windfarm Cabling

Road works will be required along the route of the **Internal Windfarm Cabling** where it crosses the public road on the L4139-0, L4139-16, L6188-0, L61881-0, L2264-50, L6185-13 and the L2264-34 local roads. In total there are 9 No. crossing points where the cables trench will be excavated across the road. **Traffic flow** will be maintained by placing a steel plate over the trench to allow traffic to pass over, while the works are on-going and flagmen will control a stop/go system.

Lane closures: A lane closure will be required on the L–2264-50 (Borrisoleigh Road). Flagmen will control a stop/go system for these lane closures.

Relevant Volume C3 EIAR Figures:

Figure RW 5.4: Layout of Internal Windfarm Cabling on Aerial Photography Mapping

Figure RW 5.5: Cross Section of Internal Windfarm Cables Trench

Figure RW 5.6: Cross Section of Internal Windfarm Cabling in Public Road Pavement

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-08: Internal Windfarm Cabling

5.2.3.3. Haul Route Works

Haul Route Works will be carried out at thirteen locations in the vicinity of Upperchurch Windfarm. A description of the Haul Route Works at each location is included in the table below.

The **Haul Route Works** will take place on the L4139-0, L4138-12, L6188-0, L2264-50 and the L6185-13 local roads, and mainly comprise works within the public road corridor and consist of widening of the public road into the verge and in some cases, the removal of the roadside boundary and the widening of the road into the boundary or across the boundary into private lands. Soil in the verge will be removed and temporarily stored nearby and hardcore will be laid and compacted on these verges to provide access onto construction works areas on lands adjacent to the road. Any existing drainage channels at these entrances will be piped under the hardcore layer. This hardcore will prevent any damage to the edges of road pavements. This widening of the public road network will facilitate the delivery of the turbine components for the Upperchurch Windfarm. The verges and boundaries will be reinstated following the completion of component deliveries.

Table 5-1: Description of Haul Route Works

Haul Route Works ID	Description of the Haul Route Works
HW1	Widening of the L4139-0 by 0.5m into both verges for a length of c.120m. Temporary removal of 130m of roadside boundary.
HW2	Widening of the L4139-0 by 1.5m on the eastern side, for a length of c.280m, by moving the roadside drain and roadside boundary (earthen bank) onto agricultural grassland. Temporary removal of 150m of roadside boundary. As a result the existing concrete culvert at watercourse WW12 will be widened by 1m, with minimal interference to the existing structure.
HW3	Widening of bend along the L4139-0 by 1.5m on western side and 3.5m on eastern side in agricultural grasslands for a length of c.70m. Temporary removal of 100m of roadside boundary.
HW4	Widening of the L4139-0 by 1.5m on the eastern side, for a length of c.270m, by moving the roadside drain and earthen bank onto agricultural grassland. Temporary removal of 130m of roadside boundary.
HW5	Construction of 170m of new temporary site access road on agricultural lands between the L4139-0 and the L4138-12. Temporary removal of 40m of roadside boundary.
HW6	Widening of the L4138-12 by 0.5m into both verges for a length of c.170m. Temporary removal of 45m of roadside boundary.
HW7	Widening of Coillte entrance on the R503 by 30m, construction of 40m of new temporary site access road on forestry lands and the use of an existing hardcored yard for turning manoeuvres. Temporary removal of 70m of roadside boundary. Clearance of scrub and use of matting where required.
HW8	Widening of the L2264-50 on the eastern side by 13m for the initial 40m and then by 1.5m for the next 190m, by moving the roadside boundary (earthen bank) onto agricultural grassland. Temporary removal of 180m of roadside boundary.
HW9	Widening of the L2264-50 by 1.5m on the northern side, for a length of c.40m, by moving the roadside boundary (earthen bank) onto agricultural grassland. Temporary removal of 10m of roadside boundary.
HW10	Widening of the L2264-50 by 0.5m on the northern side, for a length of c.40m, by widening into the roadside verge.

HW11	80m of new temporary site access road on agricultural lands between the L2264-50 and the L6188-0. Temporary removal of 20m of roadside boundary.
HW12	Widening of the L6188-0 by 0.5m into both verges for a length of c.280m. Temporary removal of 160m of roadside boundary. As a result the existing concrete culvert at watercourse WW31 will be widened by 1m, with minimal interference to the existing structure.
HW13	Widening of the L6185-13 by 1.5m on the southern side, for a length of c.210m, by widening into the roadside verge. Permanent removal of 25m of roadside boundary. The public road pavement over watercourse crossing WW32 will be widened, by 1m, into the roadside verge with minimal interference to the existing structure.

In summary, the above Haul Route Works include widening of roadside verges for 1710m in total; temporary removal and reinstatement of 1035m of hedgerow and earthen banks which form roadside boundaries; permanent removal of 25m of roadside boundary and the construction of 290m temporary access roads on private lands.

All road works will be subject to a Road Opening License ---application to Tipperary County Council and will be carried out in accordance with the Tii Guidelines on the Opening, Backfilling and Reinstatement of Openings in Public Roads. The extensions to the existing structures at HW2 and HW12 will be carried out in accordance with the OPW guidelines Construction, Replacement or Alteration of Bridges and Culverts (2013). The detailed design will be agreed with the Tipperary County Council District Engineer prior to these extension works.

Following the delivery of turbine components to Upperchurch Windfarm, the Haul Route Works areas will be reinstated and roadside boundaries will be put back along their original alignment.

Relevant Volume C3 EIAR Figures:

Figure RW 5.9: Layout of Haul Route Works on Aerial Photography Mapping

Figure RW 5.10: Location and Layouts of Haul Route Works (Overview and Maps 1 to 3)

Relevant **Appendix 5.1 UWF Related Works Outline Construction Methodology:**

RW.OCM-06: Haul Route Works

5.2.3.4. Telecom Relay Pole

The Telecom Relay Pole will comprise a wooden pole, up to 18m in height, with relay equipment attached to the top of the pole. A small compound, 5m X 5m in size, will enclose the relay pole, along with a ground based outdoor cabinet 2m high, 1.2m long and 1m wide and ancillary equipment. The compound will be fenced with 2.4m high palisade fencing; a native hedgerow will be planted on the berm created from the excavations. A communications and low voltage (LV) electricity supply will be cabled 300m to the compound, from the existing supply at the Foilnaman mast. The connection will be by underground cables which will be laid under Realigned Windfarm Road RWR3 and Upperchurch Windfarm Road.

Relevant Volume C3 EIAR Figures:

Figure RW 5.11: Location of the Telecom Relay Pole on Aerial Photography Mapping

Figure RW 5.12: Plan and Elevation of Telecom Relay Pole and Compound

Relevant **Appendix 5.1 UWF Related Works Outline Construction Methodology:**

RW.OCM-07: Telecom Relay Pole

5.2.3.5. RW Ancillary Works

5.2.3.5.1. Site Entrances

There is a change of use required for an existing entrance and 14 No. temporary site entrances required, for UWF Related Works. In addition, 11 No. site entrances that are already consented for UWF will be used for the UWF Related Works developments.

5.2.3.5.2. Change of Use of Existing Agricultural Entrance to Agricultural and Forestry Entrance

Replacement forestry is required for any felled forestry that occurs during the construction works for the whole UWF project. This forestry, the UWF Replacement Forestry, will be planted on lands in Foilnaman. An existing agricultural entrance leading off the L-2264-34 at Foilnaman, will be used to access these UWF Replacement Forestry lands. The existing permanent entrance is a farm entrance only. This will change use to an agricultural and forestry entrance and as before, remain in permanent use. No widening of the entrance is required as the existing sightlines comply with North Tipperary County Development Plan 2010 (as amended) Table 10.1: Sightline Requirements. This entrance is identified on the mapping as EW10.

Relevant Volume C3 EIAR Figures:

Figure RW 5.13: Location of "Change of Use at Existing Entrance" (including sightlines)

5.2.3.5.3. Temporary Site Entrances

To facilitate the installation of the Internal Windfarm Cabling and the construction of the Haul Route Works for the delivery of turbine components, a total of 14 No. temporary site entrances will be required. These entrances are identified on the mapping as EW. The EW ID number; whether the entrance is existing or new; the type of boundary to be opened and UWF element to which the entrance relates; are listed in Table 5-2.

Table 5-2: Temporary Site Entrances for UWF Related Works

Entrance ID	Existing Entrance	Type	Relevant part of the UWF Related Works
EW1	No	Earthen bank (removed)	Haul Route Works – HW5
EW2	Yes	Gate and concrete block wall (widened)	Haul Route Works – HW5
EW3	No	Hedgerow (removed)	Internal Windfarm Cable
EW4	No	Hedgerow (removed)	Internal Windfarm Cable
EW5	No	Post and Wire Fence (removed)	Internal Windfarm Cable
EW6	No	Earthen bank (removed)	Internal Windfarm Cable
EW7	No	Post and Wire Fence (removed)	Internal Windfarm Cable
EW8	No	Earthen bank (removed)	Internal Windfarm Cable
EW9	Yes	Farm & House Entrance (no widening)	Internal Windfarm Cable
EW11	No	Hedgerow (removed)	Internal Windfarm Cable
EW12	Yes	Field Entrance (no widening)	Internal Windfarm Cable
EW13	Yes	Yard Entrance - needs to be widened by hedgerow removal	Haul Route Works - HW7
EW14	No	Hedgerow (removed)	Haul Route Works - HW11

Entrance ID	Existing Entrance	Type	Relevant part of the UWF Related Works
EW15	No	Post and Wire Fence (removed)	Haul Route Works - HW11

The above table does not include EW10, as this is a permanent entrance for the UWF Replacement Forestry.

In summary, 4 No. of the temporary site entrances will be through existing farm or forestry entrances. The remaining 10 No. will created by the removal of the roadside boundary, whether fence, earthen bank or hedgerow. Where widening is required, these entrances will be widened to 5m. All these entrances will be opened during the construction stage and closed after construction is complete. In the event of larger components such as blade or tower replacement at Upperchurch Windfarm during the operational phase, these entrances will need to be reopened to facilitate the delivery of the components, and will be closed again directly after the deliveries.

Relevant Volume C3 EIAR Figures:

Figure RW 5.2: Layout of UWF Related Works on Aerial Photography Mapping

Figure RW 5.4: Layout of Internal Windfarm Cabling on Aerial Photography Mapping

Figure RW 5.9: Layout of Haul Route Works on Aerial Photography Mapping

Figure RW 5.14: Plan View of Typical Temporary Site Entrance

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-03: Temporary Site Entrances

5.2.3.5.4. Temporary Access Roads

During the construction stage, up to 5.3km of temporary access roads will be constructed within the construction works area boundary, to facilitate the movement of machinery and vehicles along the Internal Windfarm Cabling areas. Three methods will be employed to provide temporary access roads, where needed: matting, excavate and fill, or floating road. In general, the method of temporary road construction employed at any particular location will depend on the prevailing soil and weather conditions at the time of construction, and will be determined by the Contractor in conjunction with the Environmental Clerk of Works. The layout and temporary access road cross sections are illustrated on:

Relevant Volume C3 EIAR Figures:

Figure RW 5.4: Layout of Internal Windfarm Cabling on Aerial Photography Mapping

Figure RW 5.15: Cross Section of Temporary Access Roads

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-05: Temporary Access Roads

5.2.3.5.5. Watercourse Crossings

The construction of the UWF Related Works will involve crossing a total of 32 No. watercourses, which range in size from streams to small field drains, as outlined on Table 5-3.

Table 5-3: Watercourse Classifications at Crossing Points

Class	Watercourse Description	Number
1	EPA mapped blue line, major river or stream (fisheries value)	1
2	Headwater Stream Equivalent to EPA blue line but not mapped (fisheries value)	5
3	Sub-optimal, heavily vegetated with low or no flow during dry periods (low fisheries value)	2
4	Drain (no fisheries value)	24

The construction of the UWF Related Works will involves:

- Crossing of 6 No. existing structures (Watercourse Crossing Type A1 and A2),
- Replacement of 1 No. existing crossing structures, (Type B1),
- Widening of 2 No. existing crossing structures at Watercourse Crossings WW12 and WW31, (Type B2)
- Construction of 5 No. new permanent crossing structures (cable and traffic), (Type C1),
- Construction of 5 No. new temporary crossing structures (cable and traffic), (Type C2) ,
- Trenching and ducting of 9 No. crossings (cable only, no traffic), (Type C3),
- Construction of 3 No. new permanent crossing structures (no cable, traffic only), (Type C4),
- Construction of 1 No. new permanent clear-span bridge (no in-stream works, cable and traffic), (Type F)
- In order to progress construction works across watercourses subject to fisheries timing restriction, temporary bailey bridges will be used to facilitate the passage of traffic across the watercourse.

All permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be at least 900mm in diameter regardless of the anticipated flood flow. 900mm culverts will be embedded into the bed of the watercourse to a depth of 300mm, while 1200mm culverts will be embedded to a depth of 500mm.

New and replaced permanent crossing structures will be construction in accordance with the Office of Public Works (OPW) guidelines Construction, Replacement or Alteration of Bridges and Culverts (2013), and as agreed with OPW (telephone consultation, February 2018) will be subject to a Section 50 application to OPW following the grant of planning permission. Details of the proposed works at WW12 and WW31 (culvert widening at Haul Route Works locations) will be agreed in advance with the District Engineer. No works to the road pavement will be required for the culvert extensions.

The treatment of each watercourse crossing along the UWF Grid Connection is specified in **Volume C4: EIAR Appendices:** Appendix 5-2: Classification and Crossing Method for UWF Grid Connection Watercourses.

Relevant Volume C3 EIAR Figures:

Figure RW 5.2: Layout of the UWF Related Works on Aerial Photography Mapping

Figure RW 5.16: Watercourse Crossing Type A1 & A2 – UWF Related Works at Existing Crossing Structure

Figure RW 5.17: Watercourse Crossing Type B1 & B2–UWF Related Works at Replaced and /or Widened Crossing Structure

Figure RW 5.18: Watercourse Crossing Type C1–New Permanent Structure

Figure RW 5.19: Watercourse Crossing Type C2 – New Temporary Structure & Watercourse Crossing Type C4 – New Permanent Structure

Figure RW 5.20: Watercourse Crossing Type C3 – Internal Windfarm Cable trench and ducting only

Figure RW 5.21: Watercourse Crossing Type E – Plan and Cross Section Views of Bailey Bridge

Figure RW 5.22: Watercourse Crossing Type F - New permanent clear-span bridge

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-09: Instream Works Preparation and Reinstatement

RW.OCM-10: Instream Works

RW.OCM-11: Bailey Bridge

5.2.3.5.6. Drainage Systems

New hard surface areas: An integrated drainage system will be installed along the newly Realigned Windfarm Roads and at the Telecom Relay Pole. This integrated drainage system will keep 'clean' water upslope of the works separate from 'dirty' water runoff from construction works areas, while maintaining the existing drainage regime through the regular piping and release of clean water from the upslope side the works area to the downslope side. The integrated drainage system will include the installation of check dams, settlement ponds, clean water cross drains and outfall weirs. These parts of the drainage system will effectively avoid any contribution to flooding risk, minimise erosion, maintain drainage regimes, and minimise the amount of sediment entering downslope watercourses, through the attenuation (slow-down) of water flow rates and the settlement of suspended solid (sediment).

Temporary roads will be constructed upslope of the cables trench so that any surface water runoff will flow into the trench. Where dewatering of trenches or excavations is required, there will be no direct discharge of treated water into any watercourse or drain. Rather, all pumped water will be treated prior to discharge using an infiltration trench, settlement pond, suitable water treatment train such as a Siltbuster or controlled release across existing vegetation, as appropriate.

Existing roadside drainage which occurs close to works associated with the Internal Windfarm Cables trench; Haul Route Works and at Permanent and Temporary Entrances will be piped to maintain flow.

Following construction, the drainage system around permanent features, will be left in place for the operations phase except for settlement ponds, which will be removed. The drainage system at all temporary works locations will be removed.

5.2.3.5.7. Forestry Felling

Small areas of coniferous forestry at various locations along the Internal Windfarm Cabling and the Realigned Windfarm Roads will be permanently felled to facilitate construction and operation in these areas. In total, 0.3 hectares of forestry will be felled, 0.2Ha in Shevry along RWR1 and 0.1Ha in Knockcurraghbola Commons along the Internal Windfarm Cable route. This felling will be carried out under a felling license from the Forest Service, and an equivalent area of forestry will be replanted in Foilnaman townland (UWF Replacement Forestry) under the conditions of this license.

Relevant Volume C3 EIAR Figures:

Figure RW 5.4: Layout of Internal Windfarm Cabling on Aerial Photography Mapping

Figure RW 5.7 : Layout of Realigned Windfarm Roads on Aerial Photography Mapping

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-13: Forestry Felling

5.2.3.5.8. Fencing

Fencing will be erected at a number of locations during the construction of the UWF Related Works and will include:

- Temporary post and wire fencing which will be used to delineate construction works areas;
- Temporary battery powered electric fencing on the outside of construction works area boundaries, to prevent livestock from entering works areas. Electric fencing will also be used to protect reinstated lands until the grass is established;
- Temporary goal posts to mark the location of overhead electricity and telephone lines along construction works areas;
- Temporary timber post and rail fencing with gates which will be erected at the temporarily widened site entrances and at Haul Route Works locations, where required.
- Temporary bat crossing structures at selected hedgerow crossing locations along UWF Related Works areas.

Existing fencing and boundaries which are required to be removed from the works areas or from widened existing entrances or Haul Route Works locations will be reinstated, in the original alignment and position, following construction works.

5.2.3.5.9. Relocation of local overhead services

A number of existing telephone poles will be moved, in conjunction with the infrastructure owner, as follows:

- At HW3, 1 No. existing telephone pole will be moved behind the widened haul route area;
- At HW4, 1 No. existing telephone pole will be moved behind the widened haul route area;
- At HW6, 1 No. existing telephone pole will be moved behind the widened haul route area.
- At HW9, 1 No. existing telephone pole will be moved behind the widened haul route area.
- At HW13, 1 No. existing telephone pole will be moved behind the widened haul route area.

These telephone poles are identified with blue dot on Figure RW 5.10**.**

Relevant Volume C3 EIAR Figures:

Figure RW 5.10: Location and Layout of Haul Route Works (Maps 1 and 2 of 3)

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-06: Haul Route Works

5.2.3.5.10. Storage of Excavated Materials

In total 11,830m^3 of material will be excavated from the UWF Related Works areas. This will include topsoil, subsoils and to a lesser extent bedrock, along with spoil from public road sections.

This excavated material will be managed as follows:

- 930m^3 will be permanently stored in berms on both sides of the Realigned Windfarm Roads and around the Telecom Relay Pole Compound;
- 10,850m^3 will be temporarily placed alongside the Internal Windfarm Cables and Haul Route Works construction works areas, in separate soils layers, and will be used for infilling the trenches and reinstatement of the works areas. No excavated materials will be stored within 50m of a Class 1 or Class 2 Watercourse;
- 50m^3 will consist of spoil from public road sections and will be removed to the licensed landfill at Thurles.

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-14: Overburden Storage Berms

5.2.3.5.11. Reinstatement of Construction Works Areas

Following the completion of construction works in an area, with the exception of new permanent infrastructure such as Realigned Windfarm Roads or Telecom Relay Pole hardstand, the lands under the construction works areas will be reinstated to their former condition and returned to the landowner for use as before.

Reinstatement of construction works areas: the temporarily stored excavated soils will be used to backfill and landscape the works areas. These areas will then be sown with native, Irish sourced, certified seeds, seedlings or plants to reflect the habitats that were present before the work.

Landholding boundaries including any existing, hedgerows, banks or gates will be reinstated on their original alignment.

Haul Route Works locations: will be reinstated, in the original alignment and boundary position, following construction works.

Reinstatement of hedgerow: will involve the replanting of hedgerow with established (at least 3 years old) native hedgerow plants in their original locations, following the completion of the works in the area.

Along **sensitive bat corridors**, the bat crossing structures which will be installed during construction works will remain in place post-construction until the hedgerow has sufficiently regrown to provide viable habitat for bats. These bat crossing structures will be monitored by a suitably qualified bat specialist and maintained on a yearly basis, until they are no longer required.

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-15: Reinstatement of Land

5.2.3.5.12. Reinstatement of Public Roads

Trenches within road pavements will be reinstated in accordance with the Tii Guidelines on the Opening, Backfilling and Reinstatement of Openings in Public Roads. Where the cables trench crosses perpendicular to the road, full width surface overlay to a distance of 5m beyond either side of the trench will be carried out.

Along **construction materials haulage routes**, confirmatory condition surveys involving pre-construction and post-construction inspections, high definition video surveys and falling weight deflectometer (FWD) surveys will be undertaken along the routes of concentrated construction traffic between the R503 and the site access points. Whilst it is not expected to occur, any damage to structures or road pavements will be repaired to at least as good a condition as pre-works, and on damaged sections of roads where the Surface Curvature Index (SCI), measured during FWD testing, is greater than 250, full-width surface overlay will be carried out.

Reinstatement of **roadside boundaries**: All road boundaries at temporary site access points will be reinstated along the existing alignment.

5.2.4. Environmental Protection Measures designed into the UWF Related Works

The design of the UWF Related Works includes the Project Design Environmental Protection Measures listed on Table 5-4, which were devised to avoid, prevent or reduce likely or potentially significant effects on the environment.

Relevant individual Project Design Environmental Protection Measures from the list below are duplicated in the Environmental Factor topic chapters, and the list is duplicated in full as a set of Environmental Commitments in Volume D: Environmental Management Plan with the planning application.

The interaction of Project Design Environmental Protection Measures across the various Environmental Factors is provided in matrix format in Chapter 18: Interaction of the Foregoing.

Table 5-4: Environmental Protection Measures as part of the UWF Related Works design

PD ID	Project Design Environmental Protection Measure
PD01	All construction works will be carried out during daylight hours.
PD02	Flag-men will be used at temporary site entrances rather than creating sightlines by the removal of roadside boundaries. These flagmen will control the movement of traffic on the public road, so that road users can continue to use the local road network in a in a safe and efficient manner.
PD03	Construction works in Knockmaroe and Knockcurraghbola Commons townlands, which are within 350m of local residences, will not take place at the same time as either the UWF Grid Connection or Upperchurch Windfarm.
PD04	Confirmatory consultations with Irish Water, Eir and ESB and confirmatory ground surveys at service locations will be carried out ahead of works; 'Goal Posts' will be used to identify and highlight the height of nearby overhead lines; and a foreman will look out for underground pipes during excavations near services.
PD05	Land reinstatement will not be carried out during very wet weather or when the soil is waterlogged.
PD06	If any compaction has occurred along the construction works area, these areas will be ploughed with a sub-soiler to loosen the subsoil layer
PD07	Construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted
PD08	All initial groundworks will be monitored by an archaeologist under license from the National Monuments Service, to archaeologically record and preserve, either in situ or by record, any structures, features or objects of archaeological significance which may be encountered during the works.
PD09	New permanent access roads will have a permanent surface water drainage network in place which will include check dams. These check dams will settle suspended solids in water runoff while also slowing down the rate of water run-off from these areas.
PD10	Only precast concrete culverts or structures will be used at watercourse crossing locations. No batching of wet cement will take place on-site.
PD11	Instream construction works will be followed by site-specific reinstatement measures to ensure the restoration of flow character and morphology within the affected reach. Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margin to stabilise banks, add flood protection and provide riparian buffer.
PD12	A phased approach will be undertaken in relation to watercourse crossing works, earthworks, forestry felling and excavation dewatering, where these works occur within 50m of a Class 1 or Class 2 watercourse. The phased approach will only permit one of main potential sediment producing activities, listed above, to be carried out within 50m of a Class 1 or Class 2 watercourse, at any one time.

PD ID	Project Design Environmental Protection Measure
PD13	All excavated material will be removed for temporary or permanent storage at a suitable location more than 50m away from all other Class 1 and Class 2 watercourses.
PD14	Temporary silt control methods such as silt fencing or containment berms will be placed around all overburden storage areas.
PD15	Permanent overburden storage berms will be graded and seeded immediately after emplacement.
PD16	For works within 50m of a Class 1 or Class 2 watercourse, additional mitigation measures include double silt fencing, temporary drain blocking, placement of straw bale arrangements along preferential surface water flowpaths and, where necessary, the use of matting to prevent ground erosion and rutting.
PD17	Where dewatering of trenches or excavations is required, there will be no direct discharge of treated water into any watercourse or drain. Rather all pumped water will be treated prior to discharge using an infiltration trench or settlement pond or suitable water treatment train such as a Siltbuster, as appropriate.
PD18	There will be no refuelling of vehicles or plant permitted within 100m of a watercourse
PD19	The main fuel stocks for, and chemical wastes arising from, construction activities will be stored in a designated location, away from main traffic activity, within the temporary compound. All fuel will be stored in bunded, locked storage containers.
PD20	Overnight parking of plant and machinery will only be permitted at locations which are greater than 50m from watercourses and where there is an existing hard-core surface in place.
PD21	No refuelling of plant or equipment will be permitted within 100m of identified wells
PD22	In-stream works at Class 1 and Class 2 watercourses will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
PD23	In-stream works will not be undertaken without isolation of flow within the watercourse, any fish within the isolated section will be removed using electrofishing and, following collection of biometrics, transferred immediately downstream of the crossing point and placed back in the water. The water will then be isolated from the works by over pumping, flume (pipe) or channel diversion methods.
PD24	All new permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be a minimum of 900mm in diameter regardless of the anticipated flood flow.
PD25	All new permanent culverts on Class 1 and Class 2 type watercourses will be bottomless or clear spanning.
PD26	If works are programmed to begin in the Hen Harrier breeding season (March to August) confirmatory hen harrier breeding surveys will be completed, before such works initiate, such that all pre breeding nuptial activity, nesting activity and active nests are recorded within 2km of the construction works area boundary. These surveys will be completed prior to the start-up of all construction activities, until construction is complete and for 3 years thereafter. No construction works will take place within 500m of an active hen harrier breeding attempt or active nesting activity, during the breeding season (March to August).
PD27	During the hen harrier roosting season (October to February inclusive), construction works within 1000m of a roost will be limited to the period between one hour after sunrise to one hour before sunset.
PD28	Hedgerow removal and clearance of any other breeding bird vegetation will take place outside of the bird breeding season *i.e.* not during the period of March to August inclusive where possible. This includes hedgerow and scrub removal in addition to hedgerow trimming.
PD29	Confirmatory surveys for active Otter holts and activity (particularly holts at which breeding females or cubs are present) will be carried out 150m upstream and downstream of watercourse crossing locations.
PD30	All construction works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer/outside of 1 hours after sunrise or before sunset during winter.
PD31	If an active holt (particularly holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken *while cubs are present in the holt* and NPWS will be notified immediately

PD ID	Project Design Environmental Protection Measure
PD32	No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding otter Holts, and light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under license.
PD33	The prohibited working area associated with otter holts will, where appropriate, be fenced with temporary fencing prior to any possibly invasive works and declared as 'out of bounds'. Fencing will be in accordance with Clause 303 of the NRA's Specification for Roadworks (National Roads Authority). Appropriate awareness of the purpose of the enclosure will be conveyed through toolbox talks with site staff and sufficient signage will be placed on each exclusion fence. All contractors or operators on site will be made fully aware of the procedures pertaining to each affected holt (NRA, 2006) and subject to audits and non-conformance records in the event of non-compliance, to be included in reports submitted to Local Authorities and relevant Statutory Consultees.
PD34	Confirmatory surveys will be carried out within 50 m of either side of the construction works area boundary of identified badger setts to determine the current status of known badger setts (i.e. active or inactive) and to determine if any new setts have been established in the intervening period following initial pre-planning surveys and the commencement of construction activity. These confirmatory badger surveys will be undertaken no more than 10-12 months in advance of proposed construction activities, during the period November and April when vegetation cover is reduced. NWPS will be notified immediately if the sett previously identified is confirmed as active or if a further active sett is located within 50 meters of the footprint of the development. If sett exclusion is required, this will be undertaken by an experienced ecologist under the necessary license and following best practice guidance (NRA, 2005).
PD35	No construction works will be carried within 50m of an active sett during the main breeding season (December 1st to June 30th).
PD36	Construction activity in the environs of a known active badger sett outside of the breeding period will follow NRA (2005) guidelines, i.e. no heavy machinery will be used within 30m of badger setts (unless carried out under license); lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances.
PD37	All construction works will be carried out during daylight hours. Security lighting will be used at compounds. All lighting will be cowled in order to prevent light spill and no lighting will be left turned on overnight. Lighting will be controlled by motion and time sensors to minimise the amount of time the lights are operational.
PD38	Confirmatory surveys will be carried out at all trees with bat suitability that will require felling or other major modifications (e.g. removal of rotten branches). These trees will be subject to a ground-level visual inspection by the Project Ecologist (or a bat specialist acting on their behalf) prior to site clearance works in order to confirm the findings of the 2016 / 2017 surveys.
PD39	Where a tree with moderate or high bat suitability is to be felled, a presence/absence bat surveys will be carried out. (Note. It is not expected that any trees with moderate or high suitability will be felled).
PD40	Felling of trees with bat roost suitability will be undertaken in the period late-August to late-October/early-November. Trees with low suitability for bats will be felled carefully and slowly in order to avoid impact-related injuries to any bats that may be roosting inside them. Sections of the tree with potential roost features for bats (e.g. crevices, damaged branches) will be cut in sections, lowered carefully to the ground and left undisturbed for 48 hours before removal.
PD41	Where the felling of trees with bat suitability is carried out, robust, weather-proof bat-boxes, for example Schwegler type 1FF and 2F models, will be placed in each of the affected sections to compensate for the loss of potential tree roosts. The number of bat boxes will match the number of trees with bat suitability to be felled.
PD42	Installation of bat crossing structures at severed hedgerows, proximate to areas of high bat activity or roost locations. And following the completion of construction works, the replanting of these severed hedgerows with semi-mature shrubs/trees (like for like) and limits on temporary lighting near hedgerows.
PD43	Pre-construction survey of the distribution of Devil's-bit Scabious (larval food plant of Marsh Fritillary) during the last available April prior to the commencement of construction works. This requires that any

PD ID	Project Design Environmental Protection Measure
	areas of Devil's-bit Scabious that are located within the construction works area boundary, will be strimmed/cut to ground level in the last available late April / early May period prior to the commencement of construction.

5.2.4.1. Environmental Management Plan

An Environmental Management Plan (EMP) is included with Volume D of the planning application. The purpose of the EMP is to communicate environmental control measures that apply to the development of the UWF Related Works to those with responsibility for carrying out works on site so that any likely significant adverse effects of the development on the receiving environment can be prevented.

The Environmental Management Plan includes the list of Project Design Environmental Project Measures (listed above), along with the Best Practice Methods that are included at the end of topic Chapters 6 to 17. Management plans for Traffic, Waste, Surface Water Quality and Invasive Species are also included in the EMP.

The environmental protection measures for UWF Other Activities which relate to UWF Related Works will be monitored through the UWF Related Works Environmental Management Plan.

See: Volume D: Environmental Management Plan for UWF Related Works

5.3. Life Cycle Stages of UWF Related Works

5.3.1. Construction Stage - UWF Related Works

5.3.1.1. Overview of the Construction Process

The construction process for the UWF Related Works, is a relatively straightforward civil build. A number of separate dedicated 'crews' will work from the consented compound associated with the Upperchurch Windfarm (Site Compound No.1), each working on a different part of the UWF Related Works. The workers will arrive and depart daily to and from the relevant construction compounds, parking spaces will be provided at the site compound. The various crews will then be transported to the specific works location by means of 'crew-cab' 4x4 vehicles or similar. Bulk deliveries of materials will be delivered to the site compound and stored there until needed. Materials required at works locations will be transported by way rigid body vehicle or tractor and trailer. Aggregate and concrete will be delivered directly to works locations.

5.3.1.2. Duration & Timing

The duration and timing of the construction of UWF Related Works is outlined in Table 5-5.

Table 5-5: Duration and timing of the construction of the UWF Related Works

Construction Activities	Duration of the Construction Stage	Timing of Construction Activities
Pre-Construction - Detailed design, confirmatory surveys, felling, hedgerow/tree removal or pruning etc.	3 - 6 months	Immediately prior to the commencement of the main construction period
Main Construction Activities - Construction of Internal Windfarm Cabling, Realigned Windfarm Roads, Haul Route Works, Telecom Relay Pole and RW Ancillary Works	6 – 8 months	Projected Start Date: 2018/2019 The UWF Related Works will take place during the same period as the construction of the Upperchurch Windfarm and Grid Connection (exceptions listed in Scheduling of Works below)

The duration of works provided are approximate and may be shorter or longer, depending on the final number of crews used, weather conditions etc. A formal programme of works will be prepared by the appointed Contractor prior to the commencement of construction activities.

5.3.1.2.1. Construction Hours of Work

Normal construction times will be 07.00 to 19.00hrs Monday to Friday and 08.00 – 16.30hrs on Saturdays. These normal hours of work will be further restricted at particular locations as outlined in Scheduling of Works.

5.3.1.2.2. Scheduling of Works

To protect residential amenity, surface water quality and biodiversity, the following timing or scheduling of works will be implemented during the Construction Stage:

- Construction works will be carried out during daylight hours.
- Construction works in Knockmaroe and Knockcurraghbola Commons townlands, which are within 350m of any local residences, will not take place at the same time as other elements of the Whole UWF Project.
- To reduce the potential for localised in-combination effects on surface water quality from the main potential sediment sources during construction works (i.e. Watercourse Crossing Works, Earthworks, Tree Felling and Excavation Dewatering), a phased approach will be undertaken during the construction works for these activities, where works within 50m of a Class 1 or Class 2 watercourse are required. The phased approach will only permit one of main potential sediment producing activities to be carried out at any one time within the local catchment to a watercourse (refer to Chapter 11: Water).
- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses.
- No construction works will take place within 500m of an active hen harrier nest, or active nesting activity, during the breeding season (March to August). Additionally, during the roosting season, (October to February), construction works will only be carried out during the period between one hour after sunrise and one hour before sunset in areas within 1000m of an active winter roost.
- No construction works will be carried within 50m of an active badger sett during the main breeding season (December 1st to June 30th).
- Felling of trees (if any) with bat roost suitability will be undertaken in the period late-August to late-October/early-November.
- If an active otter holt (holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken *while cubs are present in the holt.*
- All construction works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer/outside of 1 hours after sunrise or before sunset during winter.

5.3.1.3. Construction Personnel

The civil and electrical construction personnel involved in the construction of the Upperchurch Windfarm will also be involved in the construction of the Internal Windfarm Cabling, Realigned Windfarm Roads, Haul Route Works and the construction of the Telecom Relay Pole compound and the installation of underground communication and electricity cables between the existing Foilnaman Mast and the Relay Pole compound, no extra personnel will be required for these works and c.5 personnel from the Upperchurch Windfarm construction crew will be involved in the UWF Related Works. A specialist communication engineering crew, made up of c. 3 personnel, will be involved in the erection and set up of the Telecom Relay Pole.

5.3.1.3.1. Welfare Facilities

Upperchurch Windfarm Site Compound No.1 will contain site offices, welfare, canteen and parking facilities, storage locations for oils and fuels, materials and wastes.

Welfare Facilities at active construction works areas will consist of solar powered, single, self-contained portable toilets.

Toilet Servicing: All toilets will be serviced on a weekly (Toilet blocks at Upperchurch Windfarm Site Compound No.1) or bi-weekly (portable toilets at construction works areas) basis. A record of servicing will be kept by the licensed waste removal operator. Servicing shall include internal cleansing, emptying and recharging with water and toilet additive and replenishing of all consumables.

5.3.1.4. Construction Stage Activities

Construction stage activities will involve the following works:

- Pre-Construction Activities
- Construction Works Area Preparation
- Temporary Site Entrances
- Realigned Windfarm Roads
- Temporary Access Roads
- Haul Route Works
- Telecom Relay Pole
- Internal Windfarm Cabling
- Instream Works Preparation and Reinstatement
- Instream Works
- Bailey Bridge
- Relocation of Overhead Lines
- Felling of Forestry
- Overburden Storage Berms
- Reinstatement of Land

Individual Outline Construction Methodologies (OCMs) for all of the above listed main works and activities of UWF Grid Connection can be found at **Appendix 5-1: Outline Construction Methodologies for UWF Related Works.** In the OCMs, a brief description of the work involved; the duration of this work; personnel, machinery, equipment and tools requirements; construction materials; details of the standard methodology for the construction activities and any variations to those methods are also outlined. These

OCMs are specific to each distinct body of work or activity. The final Method Statements for the construction works will be developed by the appointed Contractor and will be based on these OCMs, prior to construction.

The OCMs are also provided in **Volume D: Environmental Management Plan (EMP)** which comprises the main EMP statement; environmental commitments, environmental control measures and management plans; and Best Practice Measures. The purpose of the EMP is to communicate environmental control measures that apply to the development to those with responsibility for carrying out works on site. An Environmental Clerk of Works will be appointed and it will be their responsibility to ensure that the EMP is implemented through liaising with the Construction Site Manager and the Project Manager and by carrying out weekly audits on EMP compliance.

5.3.1.5. Use of Machinery and Equipment

The main machinery, equipment and tools which will be required during the construction stage are listed in Table 5-6. A full list of machinery, equipment and tools which will be used during the construction of the UWF Related Works is listed on the Outline Construction Methodologies in Appendix 5.1.

Table 5-6: Construction machinery, equipment and tools

Construction Machinery	Construction Equipment and Tools
1 No. 12ton excavator	Hand tools
1 No. 6ton excavator	Cable Jointing tools
2 No. dump trucks	1 No. dewatering pumps
1 No. Vibrating roller	1 No. water pumps and associated pipes
1 No. roller	1 No. Diesel generator
1 No. van	Sand bags
1 No. Cable Pulling winch	Silt traps and silt fences
Pole planter and auger drill	Oil absorbent booms
	Siltbuster units and skips
	Wooden stakes and wooden fencing lats
	Boundary tape and wire
	Battery powered electric fencers
	geotextile matting /plastic mats

5.3.1.6. Use of Hydrocarbons

Hydrocarbons will be used on UWF Related Works areas during construction activities and is limited to the diesel or petrol fuel and oils used by the site vehicles and machinery, delivery vehicles and any mobile generators used. Grease may be coated on the cables to aid in cable pulling during the construction stage.

5.3.1.7. Other Facilities - Fuel Storage & Tool Storage

All fuels required for construction activities will be stored in a designated location, away from main traffic flows, within Upperchurch Windfarm Site Compound No.1. All fuel will be stored in bunded, locked storage containers.

Tools and smaller pieces of equipment will be stored in locked containers, at Upperchurch Windfarm Site Compound No.1, during the construction stage.

5.3.1.8. Imported Construction Materials

The construction materials, which will be brought onto the UWF Related Works areas, are listed in Table 5-7 along with details of the quantity and source of the materials.

Table 5-7: Quantities, type and source of construction materials
Note: The quantities shown below are worst case volumes and will be lower than those stated.

Materials	Quantity	Source of Materials
Semi-dry Lean Mix Concrete	180m³ / 23 No. loads	Roadstone Killough, Co Tipperary Roadstone Bunratty, Co Clare
Aggregate (crushed stone)*Based on use of stone on all temporary access roads. Any stone used for the temporary access roads will be reused in the windfarm roads and hardstands.*	4620m³ / 285 No. loads	Shanballyedmond, Rear Cross
Hard core for temporary public road surface	50m³ / 7 No. loads	Clare
Surface dressing asphalt (public road sections)	12m³ / 2 No. loads	Clare
Geotextile	4 No. loads	Cork
Duct jointing collars	1 No. load	Cork
125mm outer diameter HDPE Duct	12 No. loads	Cork
50mm outer diameter HDPE Comms Duct	4 No. loads	Cork
33KV electrical cable	12 No. loads	Cork
Fibre Optic communication cables	3 No. loads	Cork
Red cable protection strip	1 No. load	Cork
Relay Pole and Telecommunication Equipment	1 No. load	Cork
Yellow warning tape	1 No. load	Cork
Marker posts and plates	1 No. load	Dundrum, Co Dublin
Hedging	1 No. load	Dundrum, Co Tipperary
Fencing materials, posts, rails, wire	1 No. load	Arrabawn Co-Op, Reiska
Precast concrete and HDPE culverts Plastic matting and bog mats	1 No. load	Thurles

5.3.1.8.1. Material and Delivery Traffic Management

Aggregate and Concrete

HGV loads of aggregate, concrete and public road dressing will be delivered directly to construction works areas. These HGVs will travel to the works areas using both the regional and local road networks, as specified on Figure RW 5.23. These haul routes have been agreed with the Area Roads Engineer.

Other Construction Material

Other materials, such as ducting, geotextile and other construction materials, will be sourced from various suppliers and will be transported to the Upperchurch Windfarm Site Compound No.1 via the national and regional road network, as identified on Figure RW 5.24.

This material will be stored at Upperchurch Windfarm Site Compound No.1 until required at works areas. Each day a smaller truck will be used to deliver the daily volume of ducting, matting, cable protection strip, warning tape, duct jointing collars etc. to each active works area.

Relevant Volume C3 EIAR Figures:

Figure RW 5.23: Haul Routes for Delivery of Aggregate, Concrete and Other Materials to UWF Site Compound No. 1

Figure RW 5.24: Haul Routes from UWF Site Compound No.1 to Construction Works Areas.

5.3.1.9. Traffic Management at Temporary Entrances and Road Work Locations

5.3.1.9.1. Road Licences

All road works will be subject to a Road Opening License application to Tipperary County Council and will be carried out in accordance with the Tii Guidelines on the Opening, Backfilling and Reinstatement of Openings in Public Roads.

5.3.1.9.2. Flagmen

Flagmen will be employed at temporary site entrances and road work locations to control the movement of traffic on the public road, so that road users can continue to use the local road network in a in a safe and efficient manner.

5.3.1.9.3. Advance warning signage

Advance warning signage will be erected on both approaches to temporary site entrance locations and road works locations. The placement of this signage has been designed based on the recorded 85th percentile traffic speeds, or the posted limit, whichever is the higher.

5.3.1.9.4. Reinstatement of road boundaries

Following the completion of construction works, all road boundaries at temporary site access points or at temporary road widening locations will be reinstated along the existing alignment.

5.3.1.9.5. Engagement with Local Residents regarding Traffic

Contact will be maintained with the landowners on the day to day timing of the works. A Community Liaison Officer (CLO) will be appointed as the point of contact between the developer, the local community

and the wider public. The CLO will keep very active contact with local residents on the traffic arrangements around the works day to day.

5.3.1.9.6. Traffic Management Plan

A Traffic Management Plan is included in Volume D: Environmental Management Plan.

Relevant Volume C3 EIAR Figures:

Figure RW 5.25: Advance Warning Signage for Half Lane Closures

5.3.1.10. EMP for the UWF Related Works

An Environmental Management Plan (EMP) for the UWF Related Works is included with Volume D of the planning application. The purpose of the EMP is to communicate environmental control measures that apply to the development of the UWF Related Works to those with responsibility for carrying out works on site so that any likely significant adverse effects of the development on the receiving environment can be prevented.

The Environmental Management Plan includes the list of Project Design Environmental Project Measures (listed above), along with the Best Practice Methods that are included at the end of topic Chapters 6 to 17.

Management plans for Traffic, Waste, Surface Water Quality and Invasive Species are also included in the EMP, which accompanies the planning application as Volume D: Environmental Management Plan for the UWF Related Works.

5.3.2. Operational Stage – UWF Related Works

Once constructed and commissioned, as required, the UWF Related Works will be operated and maintained as part of the Upperchurch Windfarm.

5.3.2.1. Duration and Timing of Operational Stage

Table 5-8: Duration and timing of Operation Phase of the UWF Related Works

Description	Duration
Operation of the UWF Related Works	The duration of the operational period for the UWF Related Works will correspond with the operational period of the Upperchurch Windfarm which is granted for *25 years from the date of commissioning of the wind turbines* under Condition 4 of the grant of planning permission for Upperchurch Windfarm, unless a planning period for a further period is granted.
Internal Windfarm Cables	1 day per year to carry out a visual inspection
Realigned Windfarm Roads	30mins per month 1 day per 5 years
Haul Route Works	During any subsequent, although infrequent, turbine component delivery: 2 days to re-use Haul Route Works Areas 1 week to reinstate roadside boundaries and lands
Telecom Relay Pole	1 day per year
RW Anclilary Works	No works

5.3.2.2. Operational Personnel

The personnel involved in the operation and maintenance of the Upperchurch Windfarm will also be involved in the operation and maintenance of the UWF Related Works. In addition, 2-3 No. specialised telecommunications personnel will be involved in an annual inspection and maintenance of the Telecom Relay Pole.

5.3.2.3. Operational Activities

5.3.2.3.1. Internal Windfarm Cabling

Operational activities will include both annual visual inspections of the cable routes, using a four wheel drive vehicle along Upperchurch Windfarm Roads and Realigned Windfarm Roads, or by walking over cross-country sections. The cables will have a design life of 80 to 100 years. It is not expected that the cables will require replacement during their operation.

5.3.2.3.2. Realigned Windfarm Roads

Operational activities will include both monthly visual inspection of the Realigned Windfarm Roads, using a four wheel drive vehicle and annual maintenance of roads and the associated drainage network, using both hand tools and mini-diggers as required.

5.3.2.3.3. Haul Route Works

Annual visual inspection of Haul Route Works areas at H1 to H13. Occasional hedge trimming may be required, to accommodate the delivery of abnormal loads during major maintenance works at the Upperchurch Windfarm. To facilitate the occasional delivery of larger components, some roadside boundaries at Haul Route Works locations will be temporarily reopened (having been reinstated following construction) or temporarily removed. Geotextile material will laid over the concealed hard-core access roads in private lands where required. Once the components have been delivered, the roadside boundaries on these temporarily widened areas will be reinstated in their original alignment and ground cover on private lands will be reinstated.

5.3.2.3.4. Telecom Relay Pole

The support structure itself requires little maintenance during its operational lifetime; operational activities would consist of annual inspection and maintenance of the communications equipment mounted on the structure, outdoor cabinet, and compound area.

5.3.2.3.5. UWF Ancillary Works

No operational activities associated with these works are expected to take place during the operational stage.

5.3.2.4. Use of Machinery and Equipment

Table 5-9: Use of Machinery and Equipment during the Operation of the UWF Related Works

Machinery	Equipment	Materials
4x4 vehicle for routine inspection,	Tools for occasional maintenance works	Aggregate for Realigned Windfarm Road maintenance, if required
	Hand tools & testing equipment	Replacement communication equipment for the Telecom Relay Pole, if required
small excavator and roller for occasional maintenance and haul route works	fencing equipment	Replacement fencing for Haul Route Works locations, if required.

5.3.2.5. Use of Hydrocarbons

A small volume of hydrocarbons will be used on-site during operational activities and is limited to the diesel or petrol fuel used by the site vehicles and occasional machinery used.

5.3.2.6. Welfare Facilities

The Upperchurch Windfarm site office (identified as Site Compound No.2), containing site offices, welfare, and canteen and parking facilities will be available to any personnel working on UWF Related Works.

5.3.2.7. Other Facilities - Fuel Storage & Tool Storage

There will be no requirement for fuel storage for the UWF Related Works. There will also be no requirement for tool storage facilities -all tools will be brought onto site as required.

5.3.3. Changes to UWF Related Works

5.3.3.1. Decommissioning

The UWF Related Works will cease to function following the decommissioning of the Upperchurch Windfarm. The following decommissioning works are relevant to the UWF Related Works:

Internal Windfarm Cables: The cables will be pulled from the ducts and will be re-used or recycled off-site in a licensed recycling facility.

Realigned Windfarm Roads will be left in situ, for use by the landowner. No works required.

Haul Route Works will be left in situ. No works required.

Telecom Relay Pole: The Relay Pole will be decommissioned following the decommissioning of the Upperchurch Windfarm. The communication links between Foilnaman Mast and Laghtseefin Mast will be restored, and then the antennae removed from the Relay Pole, the Pole, fence and the outdoor equipment will be decommissioned and removed. The footprint of the compound will be reinstated with the soils which formed the berms around the compound during construction.

5.4. Use of Natural Resources, Emissions & Wastes

5.4.1. Use of Natural Resources

The resources which will be imported onto the UWF Related Works areas or which will be obtained from within the works areas during the development of the UWF Related Works are described below.

5.4.1.1. Use of Resources: Land

5.4.1.1.1. Requirements for Land

Construction Stage Requirement: In order to safely accommodate the construction works and construction traffic, the land requirement for the construction of the UWF Related Works is greater than for the operation of the UWF Related Works. In total UWF Related Works will take place on 20.9 hectares of land within construction works areas, as follows; 0.3ha of farm roads, 6.9ha of agricultural land, 0.2ha of forestry road, 0.7ha of forestry firebreak, 0.4ha of forestry, 1.4ha of public road and 11.1ha of Upperchurch Windfarm Roads. These lands are outlined in red on Figure RW 5.3

Operational Stage Requirement: Following construction, with the exception of the 25m^2 Telecom Relay Pole compound, all of the lands will be returned to the landowner for their own use. The Realigned Windfarm Roads will be used by both the landowner and Upperchurch Windfarm.

5.4.1.1.2. Landuse Restrictions

Restrictions on the use of land by landowners is limited to the Construction Stage, during which the use of the lands by the landowner will be restricted to varying degrees depending on the location and type of works taking place, as per:

- The use of agricultural lands, firebreaks and felled forestry in the construction works area will be restricted during construction works on these areas, with restrictions continuing until vegetation has re-established following construction works; and
- The use of farm or forestry roads can continue during the construction works with some restrictions in place, forestry traffic if it occurs will use alternative routes along the forestry road network where available.
- Access will be maintained to lands at all times during construction, by arrangement with the individual landowners.
- Following construction, the majority of the lands will be returned to their former use.

5.4.1.1.3. Landuse Change

The construction of the UWF Related Works will result in the change of use of 25m^2 (0.0025Ha) of agricultural land to utility for the Telecom Relay Pole. In addition, 0.13ha of agricultural land will change use to Permanent Road, 0.09ha of forestry plantation will change use to Permanent Roads and 0.21ha will change use to Unplanted Forestry Firebreak.

During decommissioning, the Telecom Relay Pole will be removed, and 25m^2 of associated lands will be reinstated and returned to use as agricultural lands.

Relevant Volume C3 EIAR Figures:

Figure RW 5.3: UWF Related Works Construction Works Area Boundary.

Figure RW 5.26: Operational Stage Land Use Change

5.4.1.2. Use of Resources: Biodiversity

5.4.1.2.1. Field Boundaries – Earthen Banks/Hedgerow/Trees

Hedgerows and earthen banks occur at most field boundaries within the Internal Windfarm Cabling, Realigned Windfarm Roads and Haul Route Works locations. Some hedgerows also contain trees of varying maturity. The removal of field boundaries and the pruning or removal of hedgerows and trees is predominately limited to the construction stage. Field boundaries at Haul Route Works locations may also require temporary pruning or removal during the operational and decommissioning stage to facilitate the transport of turbine components.

Pruning: In total 540m of hedgerow will be pruned, 330m at Haul Route Works locations to facilitate delivery of turbine components and 210m close to works locations to facilitate the passage of machinery along works areas. All pruning will be conducted outside of the bird breeding season.

Permanent Removal: In total, 170m of hedgerow will be permanently removed to facilitate Haul Route Works (HR6 and HR13) and Realigned Windfarm Roads (RWR2). These hedgerows and trees will be replaced with an equivalent length of new native hedgerow along with an equivalent number of native trees immediately adjacent to the area.

Temporary Removal: In total, 145m of hedgerow and 4 No. trees will be temporarily removed at Internal Windfarm Cabling and some Haul Route Works locations.

Bat Crossing Structures: Bat crossing structures will be install at 2 no. locations. 1 no. at a 10m wide section of field boundary along Realigned Windfarm Road RWR2 and another at a 10m wide sections of roadside boundary (concrete wall) Haul Route Works HW5, a bat crossing structure in the form of 'goal posts' will be erected following the removal of a 10m section of each boundary. Vegetation and netting will be attached to these goal posts to provide a continuation of flight-line for bats during the construction works.

Reinstatement of Hedgerows: Following the completion of construction works in an area, **the temporarily removed** section of field boundary will be reinstated, with the formation of earthen banks and the replanting like for like with established (at least 3 year old) native hedgerow plant. Reinstatement will be carried out immediately following the completion of the works in the area.

Along **sensitive bat corridors**, the bat crossing structures installed during construction works will remain in place post-construction until the field boundary has been reinstated.

New Hedgerow created: c.370m of new hedgerow will be planted with locally sourced native species alongside the Realigned Windfarm Road RWR2.

Relevant Volume C3 EIAR Figures:

Figure RW 5.2 : Layout of the UWF Related Works on Aerial Photography Mapping

Figure RW 5.27: Cross Section of Hedgerow Removal and Reinstatement

5.4.1.2.2. Forestry Felling

Forestry felling is limited to the construction stage. In total 0.3ha of coniferous forestry will be permanently felled[1], under a felling license from the Forest Service. Forestry felling will be carried out outside of the bird breeding season.

5.4.1.2.3. Invasive Species

Packaging will be checked for the presence of white toothed shrew and prior to arrival on site, contractor's vehicles and equipment will be thoroughly cleaned and then dried. High-pressure steam cleaning, with water hotter than 65 degrees Celsius, in addition to the removal of all vegetative material, will be required for all vehicles and equipment involved in construction works.

An Invasive Species Management Plan will be implemented to prevent the spread of knotweed species, this Plan is included in Volume D: Environmental Management Plan.

5.4.1.3. Use of Resources: Water

5.4.1.3.1. Potable & Non-Potable Water

During construction, All water requirements for welfare facilities and drinking purposes will be supplied at Upperchurch Windfarm Site Compound No.1 during the Construction Stage, no additional water will be required for the UWF Related Works.

During operation, All water requirements for welfare facilities and drinking purposes will be supplied at the Upperchurch Windfarm Site Office during the Operational Stage, no additional water will be required for the UWF Related Works.

[1] A condition of the felling license will require that an equivalent area of forestry be replanted in another location. The New native woodland at Foilnaman, (UWF Replacement Forestry element of the whole UWF project) will fulfil this obligation.

5.4.1.4. Use of Resources: Soils

5.4.1.4.1. Excavated Soils

During the construction of the UWF Related Works, natural materials such as topsoil, subsoil and rock will arise from excavation works during the construction of the UWF Related Works. Approximately 4750m^3 topsoil, 6670m^3 subsoil and 360m^3 rock, will arise from excavation works. All of this excavated material will be used to backfill cables trenches, used to reinstate land along construction works areas. In addition, c.50m^3 of spoil will also arise during excavations in public roads

5.4.1.4.2. Permanent Storage

Some of the excavated material (930m^3) will be permanent stored in berms alongside Realigned Windfarm Roads and around the Telecom Relay Pole compound.

5.4.1.4.3. Temporary Storage

The remaining material excavated from UWF Related Works construction works areas will be temporarily stored, within the construction works area. Topsoil, subsoil and rock will be stored separately, with as much surface vegetation left intact on the topsoil layer as possible. Suitable excavated competent material will be used to backfill the Cables Trench and following the completion of works in any area; the temporarily stored soil will be used to reinstate and landscape the works areas.

5.4.1.4.4. Public Road Arising's and Contaminated Material

The excess material arising from short lengths of Internal Windfarm Cabling excavated in the public road at the 9 no. road crossing locations, or contaminated material arising during the construction of UWF Related Works will be collected by Arlo Group and transported to their approved licensed facilities at Thurles, County Tipperary,

5.4.1.4.5. Imported Rock

Approximately 4,600m^3 of graded crushed stone will be imported onto UWF Related Works areas from the local Rear Cross Quarry. This stone will be mainly used for the Realigned Windfarm Roads, telecom relay pole compound and temporary access roads for installing the internal windfarm cabling.

This calculation is based on a circumstances where there is not plastic/bog mats used for the temporary roads but all of the temporary roads are built with crushed stone. The volume of crushed stone will reduce substantially by the use of matting and the promoter intends to utilise matting as much as possible.

Also the amount of stone required for the realigned roads will offset a similar amount of rock that will not be required for the section of originally consented roadway because it will not be built so therefore there will be no overall increase in the volume of stone required for the windfarm roadways.

5.4.1.4.6. Operational Stage - Soil

No excavations of soils will be required during the routine operation of the UWF Related Works.

Small amounts of aggregate/hard core may be required from time to time, during occasional maintenance activities, to recap the Realigned Windfarm Roads.

5.4.2. Emissions

5.4.2.1. Dust

During the construction stage, dust may arise, due to the transportation of aggregate to UWF Related Works areas, the movement of excavated material within the works areas and from stored excavated materials at the works areas, particularly during dry and windy weather. Dust will not cause any significant adverse effects to Air Quality. During the operational stage, the works areas will be re-vegetated therefore dust emissions will not occur. Dust emission would be limited to that emanating from occasional maintenance of the Realigned Windfarm Roads.

5.4.2.2. Vehicle Exhausts

During the construction stage, operating machinery used during the construction stage will be run on hydrocarbons and will emit nitrogen dioxide and other greenhouse gas emissions during their operation. Exhaust emissions will not be at levels to cause significant adverse effects. During the operational stage, a van or four wheel drive vehicle will be used for c.12 half days per year for monthly visual inspections, larger machinery may be required for 2 – 3 days every five years or so for road maintenance on the Realigned Windfarm Roads or occasionally for re-use of Haul Route Works areas. This minimal use of vehicles will result in negligible amounts of nitrogen dioxide and other greenhouse gas emissions during operation.

5.4.2.3. Noise

During the construction stage, heavy machinery and vehicles which will be used at works areas during the construction stage will emit noise during their operation, noise will also be emitted from certain construction activities such as excavation or rock breaking or by mobile generators which may be used at work areas. Noise emissions will not be at levels to cause significant adverse effects. During the operational stage, the presence of vehicles, and therefore noise emissions, during operation is considered negligible with a van or four wheel drive vehicle being used c.2 days per year during monthly visual inspections, larger machinery may be required for 2 – 3 days every five years for road maintenance on the Realigned Windfarm Roads or occasionally for c.7 days longer during any re-use of Haul Route Works areas.

5.4.2.4. Vibration

Construction works, including excavations and the use of heavy machinery will cause low levels of ground vibration. No blasting or piling will occur at the UWF Related Works construction works areas. Vibration emissions will not be at levels to cause significant adverse effects. No vibration emissions are expected during the operation of the UWF Related Works.

5.4.2.5. Light

Lighting will be used at Upperchurch Windfarm Site Compound No.1 during construction. This lighting will use a cowled design along with motion-sensor and timer controlled lights which will not remain turned-on overnight. No lighting will be required at construction works areas associated with the UWF Related Works and all construction works will be carried out during daylight hours.

5.4.2.6. Electromagnetic Radiation

Low frequency electrical and magnetic fields (EMF) will be present anywhere electricity is generated, distributed or used and therefore these fields are a common occurrence in everyday life. The operational

Internal Windfarm Cables will be a source of very low frequency (50Hz) electromagnetic fields. Electromagnetic fields will not be at levels to cause significant effects. No emissions of electromagnetic fields will occur during the construction stage.

5.4.3. Waste

The greatest potential for waste occurs during the Construction Phase.

5.4.3.1. Waste Water

The UWF Related Works will be constructed by the personnel involved in the construction of the Upperchurch Windfarm. Self-contained toilets, with integrated waste water storage tanks, will be provided for construction workers at Upperchurch Windfarm Site Compound No.1. Waste water will be collected by licensed collector - by Arlo Group or other appropriately licensed operator, and transported to an approved water treatment plant in Thurles, County Tipperary or other appropriately licensed facility.

The personnel involved in the operation and maintenance of UWF Related Works will also be involved in the operation and maintenance of Upperchurch Windfarm, and will have access to the Upperchurch Windfarm site office facilities, including toilets serviced by an existing septic tank. Waste water will be collected by licensed collector - by Arlo Group or other appropriately licensed operator, and transported to an approved water treatment plant in Thurles, County Tipperary or other appropriately licensed facility.

5.4.3.2. General Waste

During the construction stage, general waste materials such as pallets, packaging, and excess construction and building materials will be generated in small quantities at construction works areas. All individual waste streams will be identified at source, and stored at a designated area at Upperchurch Windfarm Site Compound No.1 with other General Waste arising from the Upperchurch Windfarm construction works. General waste will be collected by licensed collector - Arlo Group or other appropriately licensed operator and transported to their approved licensed facilities at Thurles, County Tipperary or other appropriately licensed facility. No general waste is expected during the operation of the UWF Related Works

5.4.3.3. Chemical Waste

Any chemical waste which may be generated during the construction of the UWF Related Works will be limited to solid waste-oil such as oily rags or any oil contaminated material. Should any chemical waste arise, it will be stored in a secure, bunded container in a designated area at Upperchurch Windfarm Site Compound No.1 with other Chemical Waste arising from the Upperchurch Windfarm construction works. All chemical waste will be removed by Arlo Group or other appropriately licensed operator and transported to either Enva Ireland Limited approved licensed facilities at Shannon, Cork, Portlaoise or Dublin or to the Rilta Environmental Ltd. approved licensed facility in Dublin.

No chemical waste or contaminated material is expected during the operation of the UWF Related Works. However, should any chemical waste occur, it will be stored in a secure bunded container at the Upperchurch Windfarm site office with any other chemical waste arising from the Upperchurch Windfarm operational activities. All chemical waste will be removed from the Upperchurch Windfarm site office by Arlo Group or other appropriately licensed operator and transported to either Enva Ireland Limited approved licensed facilities at Shannon, Cork, Portlaoise or Dublin or to the Rilta Environmental Ltd. approved licensed facility in Dublin.

5.4.3.4. Arisings

During the construction stage, arisings from any excavations within the structure of the public road will consist of old chip, tar, subsoils and rock material. Arisings also include any contaminated soils from off-road construction works areas. All of this material will be collected by operator Arlo Group or other appropriately licensed operator and transported to their approved licensed facilities at Thurles, County Tipperary or other appropriately licensed facility. No arisings from the public road network are expected during operation.

5.4.3.5. Waste Management Plan

Any wastes which result from the operation of the UWF Related Works will be managed under the Waste Management Plan. The Plan includes a hierarchy of controls in relation to waste; Prevent, Reduce, Reuse, Recover and Responsibility and the controls and procedures which will be undertaken as part of the management of waste are specified. A strict chain of custody system will be set up as part of the Waste Management Plan to enable all wastes to be controlled in the appropriate manner.

The **Waste Management Plan** is included in **Volume D: EMP for UWF Related Works.**

5.5. Vulnerability of the Project to Major Accidents and Natural Disasters

Major accidents or natural disasters which have the potential to affect the UWF Related Works are described hereunder. The vulnerability (exposure and resilience) of the UWF Related Works to major accidents and disasters and the risk of these accidents or disasters is classified according to the *Guide to Risk Assessment in Major Emergency Management* (DoEHLG, 2010). This Guide is included as Appendix 5.7 Volume C4: EIAR Appendices.

5.5.1. Vulnerability to Major Accidents

It is clear from the EIA Directive that 'major accident' mainly applies to notified Seveso establishments which operate under the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015, where Dangerous Substances are identified in Schedule 1.

The UWF Related Works **is not vulnerable to Major Accidents**, due to the minimal volumes of the Dangerous Substances which will be used, limited to small volumes of diesel fuel used by vehicles during the construction and operation of the UWF Related Works. Furthermore there are no Seveso sites in proximity to the UWF Related Works site, the closest being Grassland Agro in Limerick and MSD (pharmaceutical) in Kilsheelan, near Clonmel, Co Tipperary.

5.5.2. Vulnerability to Natural Disasters (Land slippage, Flooding)

Natural disasters which could potentially affect the UWF Related Works include land slippage and flooding. The likelihood of these natural disasters occurring is discussed below, with likelihood of the natural disaster occurring rated according to the DoEHLG 2010 Guidelines. The risk classification tables are included in Appendix 5.7: A Guide to Risk Assessment in Major Emergency Management Jan 2010.

5.5.2.1. Land-slippage

It is considered that the UWF Related Works is not vulnerable to natural disasters such as land slippage, due to the absence of peat or very shallow peats at the works locations. Therefore it is considered that the likelihood of land slippage disaster occurring along the UWF Related Works is **Extremely Unlikely**.

5.5.2.2. Flooding

In recent years, high rainfall events and subsequent flooding have become more frequent in Ireland. Where complete the Catchment Flood Risk Assessment and Management (CFRAM)[2] OPW Flood Risk Assessment Maps are now the primary reference for flood risk planning in Ireland and supersede the Preliminary Flood Risk Assessment Maps (PFRA) maps. CFRAM mapping is not currently available for the area of the Upperchurch Windfarm site and therefore the PFRA maps have been examined.

[2] CFRAM is Catchment Flood Risk Assessment and Management. The national CFRAM programme commenced in Ireland in 2011, and is managed by the OPW. The CFRAM Programme is central to the medium to long-term strategy for the reduction and management of flood risk in Ireland.

A Stage II Flood Risk Assessment was completed for the subject development by Hydro Environmental Services, a specialist hydrological and hydrogeological consultancy, who concluded that there is a low risk of impact on the UWF Related Works as a result of potential flooding because based on the PFRA mapping all of the works areas and infrastructure are located in mapped Flood Zone C (Low Risk) – where the probability of flooding is low (less than 0.1% or 1 in 1,000). The elevated nature of the UWF Related Works areas means no significant pluvial or fluvial flooding would be expected.

Also, there will be no potential of increased local flood risk as a result of the UWF Related Works as most of the subject development is located underground (i.e. windfarm cabling). The footprint of the above-ground permanent infrastructure (i.e. realigned windfarm access roads, relay pole base etc) is minimal and distributed over several catchments and all new permanent watercourse crossing culverts will be suitably designed to accommodate flood flows.

Therefore it is considered that the likelihood of flooding disaster affecting the UWF Related Works areas is **Unlikely.**

The Flood Risk Assessment can be found in Appendix 11.3: Flood Risk Assessment, of Volume C4 EIA Report Appendices**.**

5.5.2.3. Consequences of Natural Disasters Occurring

The consequence of the impact if the event occurs is described here.

Due to the low number of personnel working on-site at any one location, the consequence of any flooding or land slippage events, if they did occur, is considered to be **Limited**.

Due to the low number of people living or working locally, the consequence of any flooding or land slippage events, if they did occur, is also considered to be **Limited.**

The consequences to water quality due to land slippage or flooding could be **Serious** due to the widespread effects and extended duration of sedimentation effects in downstream watercourses.

5.5.2.4. Overall Risk

When the likelihood and the consequence of a potential land slippage or flooding event occurring is applied to the risk matrix from the DoEHLG 2010 guidelines, a broad indication of the critical nature of each risk can be determined.

In relation to on-site personnel and other people in the locality, a land slippage or flooding event would be classed a 'normal emergency' - based on a likelihood rating of Extremely Unlikely and a consequence rating of Limited.

In relation to downstream water quality, due to the higher level of effect (Serious) on water quality a land slippage or flooding event could be a major emergency. According to the DoEHLG 2010 guidelines, both flooding and landslip events would be at the lowest extreme of 'major emergency'.

5.5.2.5. Mitigation Measures

No measures are required for land slippage risk. In relation to flooding, instream works on Class 1 and Class 2 watercourses will also be carried out during dry periods in the months of July, August and September, and all new permanent crossing structures will be sized to cope with a minimum 100 year flood event.

Should a disaster occur, unconnected to the project but in the locality – the above mitigation measures already designed into the project will ensure that the project will not make the consequences of the event worst. In addition the presence of the project will not increase the likelihood of such an event occurring.

5.6. Cumulative Descriptions

Table 5-10: Subject Development: UWF Related Works - Element 2 of the Whole UWF Project

Element No.	The Subject Development	Composition of the Subject Development	Relevant Appendix Location for description of each element
2	The Subject Development UWF Related Works (RW)	Internal Windfarm Cabling Realigned Windfarm Roads Haul Route Works Telecom Relay Pole RW Ancillary Works	Current planning application to Tipperary County Council

An **overview of Element 2, UWF Related Works**, the subject development, is provided in Section 5.2.2 above. A **full description** of the subject development is provided in the successive Sections 5.2 to 5.5**.**

5.6.1. Description of the Other Elements of the Whole UWF Project

In order that a cumulative evaluation can be carried out for the UWF Related Works, an overview description is provided hereunder of all the other elements of the whole UWF project.

Table 5-11: Element 1 and Element 3 to 5 of the Whole UWF Project

	Element of the whole UWF project	Composition of each Element	Relevant Appendix Location for description of each element
1	UWF Grid Connection (GC)	Mountphilips Substation Mountphilips – Upperchurch 110kV UGC Grid Connection Access Roads Grid Connection Ancillary Works	Appendix 5.3
3	UWF Replacement Forestry (RF)	Replacement Forestry at Foilnaman	Appendix 5.4
4	Upperchurch Windfarm (UWF)	Consented UWF Turbines Consented UWF Substation Consented UWF Roads UWF Ancillary Works	Appendix 5.5
5	UWF Other Activities (OA)	Haul Route Activities Upperchurch Hen Harrier Scheme Monitoring Activities Overhead Line Activities	Appendix 5.6

Relevant Volume C3 EIAR Figures:

Figure CE 1.1: Location of UWF Related Works and the Other Elements of the Whole UWF Project on OSI Mapping.

An EIA Report has also been prepared to accompany concurrent planning applications to the relevant Competent Authorities, for the UWF Related Works and UWF Replacement Forestry.

This information on the other elements of the whole UWF project can be found in the following locations;

- **Full EIA Report** or EIS (as appropriate) for **Elements 1, 3, and 4** in Volume F: Reference Documents for Other Elements of the Whole UWF Project.
- **Description of each element 1, 3, 4 and 5** (presented in a format similar to this chapter and with smaller scale reference mapping and figures) in Appendix 5.3 to Appendix 5.6**,** see Volume C4: EIAR Appendices**.**
- **Overview description of each elements 1, 3, 4, and 5** of each other element in this Section hereunder.

5.6.1.1. Element 1: UWF Grid Connection

An application for planning permission for UWF Grid Connection has been submitted directly to An Bord Pleanála under Section 182A (9) of the Planning and Development (Strategic Infrastructure) Act (2006). The application is accompanied by an EIA Report.

The full **EIA Report including mapping and figures for UWF Grid Connection** is included in Volume F: Reference Documents for Other Elements of the Whole UWF Project.

An extract from Volume F of the **detailed description** of the UWF Grid Connection (presented in a format similar to 5.2 to 5.5 above) along with a **copy of the accompanying figures** is included in Appendix 5.3: Description of Development (UWF Grid Connection).

A summary overview of UWF Grid Connection is provided hereunder.

5.6.1.1.1. Location and Characteristics of UWF Grid Connection

The UWF Grid Connection will comprise of the following:

Mountphilips Substation: A new substation is proposed for a location adjacent to the existing Killonan - Nenagh 110kV overhead line in agricultural grassland in Mountphilips townland, 2km north of Newport, 4km south of Birdhill, 17km north east of Limerick City and 23km west of the Upperchurch Windfarm. The new 110kV electrical substation will comprise 2 No. End Masts located at the Killonan – Nenagh 110kV overhead line; a compound, 230 meters east of the overhead line, measuring 95 meters x 94 meters which will contain a control building; 110kV busbars; circuit breakers; line disconnects; current and voltage measuring equipment; cable chairs; surge arresters; lightening protection monopoles and other electrical apparatus. The 2 No. End Masts will be connected to the electrical equipment in the compound via underground cable.

Mountphilips - Upperchurch 110kV UGC: The 110kV UGC will connect the Mountphilips Substation to the Upperchurch Windfarm through the Consented UWF Substation, through the installation of underground cables. The route of the underground cables, which is 27.5km in length, will follow a generally west/east course through a mix of agricultural grassland (11.9km), commercial forestry plantations (1.9km), private forestry and farm roads (c.12km) and public roads (c.1.7km) through the townlands of Mountphilips, Coole, Freagh, Oakhampton, Newross, Castlewaller, Killeen, Knockacullin, Bealaclave, Baurnadomeeny, Goulmore, Laghile, Churchquarter, Knocknabansha, Knockmaroe, Knockcurraghbola Crownlands and Knockcurraghbola Commons. The 110kV UGC will be installed underground in trenches, which will be laid with ducts through which the electrical cables and communications cables will be pulled. The cable lengths will be pulled through and joined together at Joint Bay locations, in joint bay chambers. The ducts will be surrounded by concrete and the trench backfilled with excavated material or aggregate depending on the location. The only surface expression of the 110kV UGC will be the man-hole type covers over the Joint Bays and the over-ground identification marker posts and marker plates.

UWF Grid Connection Access Roads: To provide access to Mountphilips Substation and the Joint Bay locations along the 110kV UGC, New Permanent Access Roads will be constructed. Permanent access will also include upgraded existing farm and forestry roads.

UWF Grid Connection Ancillary Works will support the construction of UWF Grid Connection and will include the construction of Temporary Access Roads along the 110kV UGC construction works areas; Permanent Site Entrances (including the provision of sightlines) at Mountphilips, Bealaclave and Knockcurraghbola Commons; Temporary Site Entrances at public road crossings along the 110kV UGC; installation of temporary and permanent watercourse crossing structures; construction and use of 3 No. Temporary Compounds, installation of drainage systems at Mountphilips Substation, around Temporary Compounds and along new UWF Grid Connection Access Roads; forestry felling; temporary and permanent hedgerow/tree removal; permanent hedgerow replanting; fencing; relocation of existing overhead electricity and telephone services and; storage of excavated materials at various locations within the construction works area boundary.

5.6.1.1.2. UWF Grid Connection: Construction & Operation

UWF Grid Connection Construction Phase: All elements of the whole UWF project will be constructed at the same time. Construction of UWF is expected to commence in 2018/2019 and will take approx. 12 months. Approximately 100 persons will be engaged in the pre-construction, main construction, cable jointing and commissioning works for the UWF Grid Connection. 1050 No. loads of concrete; 455 No. loads of aggregate; 59 No. loads of hard core; and 108 No. loads of surface dressing (public road sections) will be imported from Roadstone Killough, Co Tipperary and Bunratty, Co Clare and Shanballyedmond, Rear Cross. 22 No. loads of general building materials including geotextile, and 126 No. loads of electrical plant and equipment including lattice towers, control building doors and switching gear, will be imported to the site from various suppliers throughout Ireland and the EU.

UWF Grid Connection Operational Phase: Once commissioned and energised, the Grid Connection will be taken in charge by ESB Networks and the Mountphilips Substation and the Mountphilips – Upperchurch 110kV UGC will become part of the national electricity network. The new asset will be managed and operated by ESB Networks. Scheduled inspection and maintenance activities will be carried out by ESB Networks personnel (2 men crews) over a total of 13 days per year. Very infrequent planned maintenance or unplanned repairs may be required, if at all, during the lifetime of the UWF Grid Connection, it is expected that one crew with c.6 ESB Networks personnel would be required for 1 week – 2 weeks duration, depending on the nature of the repairs work. The Grid Connection will remain permanently in place as part of the national electricity network and thus decommissioning is not envisaged.

UWF Grid Connection use of Natural Resources: Construction Phase – There will be 39.1 hectares of **land** required for the construction works site. 1.3ha of **coniferous forestry** will be permanently felled. 45m of **hedgerow** and 30 No. of **trees** of varying maturity will be permanently removed to facilitate either a permanently widened entrance off the public road or a new permanent access road. These hedgerows and trees will be replaced immediately adjacent to the area. On a number of hedgerows, a specially designed bat crossing structure will be erected at new entrances. These structures will be timber frames with vegetation attached, which will provide a continuation of flight-line for bats during the works. 820m of hedgerows, which include trees of varying maturity, located close to works areas will be pruned to facilitate passage of machinery along works areas. c.700m of new hedgerow will be planted with locally sourced native species. **Water** required for welfare facilities will be brought onto site. Approximately 9,615m^3 of **topsoil**, 1,265m^3 of **peat**, 2,390m^3 of **subsoil** and 120m^3 of **rock** will be permanently excavated from the works areas. 660m^3 of spoil will also arise during excavations in public roads. 8,370m3 of the excavated material will be permanently stored along the 110kV UGC works area as linear berms and remainder (5,020m3) will be reinstated within the works area. In addition, up to 11,140m3 of soils will be temporarily excavated from the construction works area boundary, including from the cable trench and from the

footprint of any excavated temporary stone roads and will be temporarily stored, within the construction works area, to backfill, reinstate and landscape the works areas.

UWF Grid Connection use of Natural Resources: Operation Phase – The Land required will reduce considerably to just 4.2ha of land permanently changing use - mainly comprising the footprint of the Mountphilips Substation and the footprint of any new access roads which will provide access to the Joint Bays. No further **forestry felling**, **hedgerow** or **tree pruning or removal** will be required during the operational stage. Non-potable **water** requirements will be provided at the Mountphilips Substation via a rain water harvesting system, and drinking water will be brought onto site as needed. **No excavations of soils** will be required during the routine operation of the UWF Grid Connection. Planned maintenance or unplanned repairs, if any occur are likely to involve the re-opening of the underground chambers, at Joint Bays. This work which will result in very small volumes of crushed stone and sand being temporarily removed from the area directly over the joint bay covers, stored adjacent to the Joint Bay, and re-used to reinstate the top of the Joint Bay following the completion of the repairs.

UWF Grid Connection Emissions: Dust, construction machinery exhaust, noise, vibration and light will be emitted during the construction stage, negligible levels are associated with the operation and maintenance activities. During operation, Mountphilips Substation will emit **noise** however this is unlikely to be audible above the existing background noise levels at nearest residence, which is 385m distant. The operational sub-station and 110kV underground cable will be a source of very low frequency (50Hz) **electromagnetic fields.**

UWF Grid Connection Waste: Waste water from construction stage welfare facilities will be contained in self-contained units and emptied by a licenced facility. General and chemical waste will be segregated and stored in allocated tanks, bins, skips or areas at the Temporary Compounds, C1, C2 and C3. Waste will be collected by an appropriately licensed waste contractor. Any wastes which result from the construction of the UWF Grid Connection will be managed under a specific **Waste Management Plan**. During operation, there will be minimal general and chemical waste during the Operational Stage, with any waste taken offsite by ESBN personnel.

5.6.1.2. Element 3: UWF Replacement Forestry

An **application for an afforestation license** for UWF Replacement Forestry has been submitted to the Minister for Agriculture, Food and the Marine. This application is accompanied by an EIA Report.

The full **EIA Report including mapping and figures for UWF Replacement Forestry** is included with the planning application in Volume F: Reference Documents for Other Elements of the Whole UWF Project.

An extract from Volume F of the **detailed description** of the UWF Replacement Forestry (presented in a format similar to 5.2 to 5.5 above) along with **a copy of the accompanying figures** is included in Appendix 5.4: Description of Development (UWF Replacement Forestry).

A summary overview of UWF Replacement Forestry is provided hereunder.

5.6.1.2.1. Location and Characteristics of UWF Replacement Forestry

UWF Replacement Forestry relates to the planting with forestry, of 6ha of agricultural lands the purpose of which is to fulfil the replanting obligation which will arise from the felling of forestry for the development of the whole UWF project.

Located at Foilnaman townland, near Upperchurch, County Tipperary, 6 hectares (6ha) of agricultural grassland at will be planted with native woodland species, set in clusters of well-matched native species. There will be varied spacing created between the clusters according to Forest Service recommendations. A mixture of tall trees and understory shrubs will be planted, and the design includes wide ride-lines between deeper areas of core woodland. The ride-lines will create open spaces with tree-lined boundaries, which is much favoured by birds of prey during the day (e.g. hen harrier) and bats at night as hunting ground. A mixture of land cover – tall grasses, short grasses and scrub will be maintained under the planting and in the ride lines. Tree guards will be used to protect the saplings and young trees from rabbit damage. A livestock-proof fence will be erected around the perimeter of the planting.

The lands to be afforested are currently in two agricultural landholdings. A small watercourse, with an existing culvert crossing, runs through the centre. The existing riparian habitat along this watercourse will be enhanced through planting with hazel, alder and willow species and the entire afforestation land will be protected from livestock by the perimeter fencing.

There is a change of use required for an existing agricultural entrance to agricultural and forestry entrance which will remain in permanent use. This change of use is part of UWF Related Works – RW Ancillary Works.

The UWF Replacement Forestry will be designed and planted in accordance with the *Forest Service (2006) Information Note No. 5: Establishment, Design and Stocking Densities of New Native Woodland* and *Felling and Reforestation Policy published by the Forest Service (May 2017).*

5.6.1.2.2. UWF Replacement Forestry: Planting and Growth Stage

UWF Replacement Forestry Planting Stage: Tree planting will be carried out by 4 No. forestry professionals. Tree saplings, wooden fence posts and fencing wire and gates will be imported to the site by 4WD vehicle.

UWF Growth Stage: Once planted, the trees will go through numerous stages of growth from sapling, through to maturity, old age and eventual decay with natural regeneration occurring through the lifecycle of the native wood. Other than thinning activities and grass/scrub management, natural maturation, old age and regeneration, no other changes to the native woodland are expected. Felling is not envisaged.

Use of Natural Resources: 6ha of agricultural land will be planted with mixed species to create a native woodland, comprising tall trees and understory shrubs, along with wide ride-lines, and a mix of tall grasses, short grasses and scrub land cover maintained during the growth stage. This will enhance biodiversity in the area. New trees and shrubs will be set back from the watercourse which runs through the UWF Replacement Forestry site. The existing riparian habitat will be enhanced through the planting with hazel, alder and willow species and the lands will be protected from livestock by the perimeter fence. Planting will be carried out by hand using spades. Small localised patches of disturbed soil will occur at the sapling tree trunks.

Emissions – Planting and Growth Stage: Negligible.

Waste - Planting and Growth Stage - such as packaging, and excess planting materials will be generated in very small quantities and this waste will be removed at source and disposed of in an appropriate licensed facility.

5.6.1.3. Element 4: Upperchurch Windfarm

An overview description of already consented Upperchurch Windfarm (UWF) is provided hereunder.

An application for planning permission for Upperchurch Windfarm (Consented UWF) was made to Tipperary County Council in January 2013. The windfarm was permitted by Tipperary County Council in January 2014 and the permission was upheld by An Bord Pleanála in August 2014. The application was accompanied by an EIA Report (known as EIS at the time) and Natura Impact Statement. The full planning documents for consented UWF can be found in Volume F: Reference Documents for Other Elements of the Whole UWF Project.

5.6.1.3.1. Overview of the Location and Characteristics of Upperchurch Windfarm

UWF will comprise 22 wind turbines with an overall height up to 126.6 metres, 2 meteorological masts with an overall height of up to 80 metres, turbine foundation and crane hardstanding areas, access roads and an electrical substation.

The Upperchurch Windfarm site is located in the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnaman, Gleninchnaveigh, Coumnageeha, Coumbeg, Knocknamena Commons, Glenbeg and Seskin. This is an area 2km west of Upperchurch village and 18km to the west of Thurles, County Tipperary.

The 22 wind turbines, associated crane hardstandings and ancillary works will be constructed on a series of small hills ranging in elevation from 280m to 401m OD, set out generally over four areas. The substation will be constructed in Knockcurraghbola Commons and the turbines will be connected by underground cables to the substation. There will be two meteorological masts erected, one in Grousehall and a second in Knocknamena townlands. Ancillary Works will include borrow pits in Shevry, Knocknamena, Knockmaroe and Grousehall; 1 No. site entrance from the R503 Regional Road at Graniera and; 10 No. site entrances from local public roads, through and around the site, which will provide access to the windfarm.

A document, with a **detailed description of the Upperchurch Windfarm,** has been compiled from the original 2013 Upperchurch Windfarm EIS, from the Reply to Further Information, the additional information submitted during the planning process and mitigation measures and planning conditions attaching to the Grant of Permission, to reflect a description of the development as it is now permitted. This compilation document has been prepared in the same format as the current application Chapter 5, for ease of cross referencing. The compilation document can be found in Appendix 5.4: Complied Description of Upperchurch Windfarm.

The full planning documents for Upperchurch Windfarm can be found in Volume F: Reference Documents for Other Elements of the Whole UWF Project.

Upperchurch Windfarm (UWF) is comprised of the following parts:

- **Consented UWF Turbines** - 22 No. wind turbines of the three-bladed, tubular tower model, light grey in colour and an overall height to blade tip upto 126.6m. The turbines will be constructed on concrete bases with an adjacent hard-core hardstand area. There is no requirement for fencing of turbine areas. The turbines will be connected by underground cables to the Consented UWF Substation.
- **Consented UWF Substation** - 110kV substation compound which includes a control building, main transformer and other electrical equipment enclosed in a compound by a palisade fence. The substation will measure 64m x 41m.

- **Consented UWF Windfarm Roads** - 11.6km of windfarm access roads will comprise 8km of newly built 5m wide roads and 3.6km of existing farm roads which will require upgrading and widening (by an average of 2m).
- **Consented Ancillary Works** - The main items of ancillary works will include, 2 No. meteorological masts up to 80m in height; 11 No. site entrances; 1 No. stream crossing; site drainage system; 2 No. construction site compounds; 6 No. borrow pits from which most of the aggregate required will be won; forestry felling, hedgerow removal and reinstatement; excavation, storage and reinstatement of soils.

5.6.1.3.2. Upperchurch Windfarm: Construction & Operation

UWF Construction Phase: All elements of the whole UWF project will be constructed at the same time.

Construction of UWF is expected to commence 2018/2019 and will take approx. 12 months. Approximately 277 persons will be engaged in the civil, electrical, project management, legal and financial services, material supply and component deliveries for the windfarm. Approximately 950 No. loads of concrete; 15 No. loads of reinforcing steel and 5 No. loads of general building materials and 212 No. loads of electrical plant and equipment (abnormal size loads) will be imported to the site by HGV. The abnormal turbine loads will be transported from Foynes Port.

UWF Operational Phase: UWF has been granted permission to operate for 25 years from the date of commissioning of the wind turbines, whereupon there will then be an option to apply for continuance of use or decommission the plant and restore the site. There will be 8 permanent jobs created in operation and maintenance activities, legal, electricity sales and asset management during the operational phase.

UWF use of Natural Resources: 56.3 hectares of land within the construction works site will reduced to 6.4 ha during the operational phase; Approx. 108,000m^3 of excavated soils; 43,000m^3 of aggregate mostly won on-site and otherwise imported from local quarry at Shanballyedmond, Rear Cross; small amounts of potable and non-potable water, sourced at an existing well at the windfarm site offices in Site Compound No. 2; felling of 4.4 hectares of conifers; 960m of hedgerow removed.

UWF Emissions: Dust, construction machinery exhaust, noise, vibration and light will be emitted during the construction stage. There is no house within 200m of the construction works. During the **Operational Stage** there will be negligible dust, vehicle exhaust, vibration and light emitted. The turbines will emit noise during operation. Permitted noise emissions are prescribed by planning condition. The operational electrical plant will be a source of very low frequency (50Hz) electromagnetic fields but these will not be at levels to cause significant effects at the turbine locations, and no effects will occur at local residences.

UWF Waste: During construction, waste water from welfare facilities will be contained in self-contained units and emptied by a licenced facility or in the case of the Site Offices, will be treated in the existing septic tank. General and chemical waste will also arise from construction activities and processes. During operation, minimal general and chemical waste will arise on site. All waste will be stored in a designated and secure areas, for collection by an appropriately licenced operator. Any wastes which result from the construction, operation and decommissioning of the Windfarm will be managed under a specific Waste Management Plan.

5.6.1.4. Element 5: UWF Other Activities

Although UWF Other Activities do not require planning permission, they do form part of the whole UWF project and therefore are included in the cumulative evaluation. A **description of these activities,** along with **mapping and figures** is included in Appendix 5.6: Description of the UWF Other Activities.

An overview of UWF Other Activities is provided hereunder.

5.6.1.4.1. Location and Activities of UWF Other Activities

The **Haul Route Activities** will facilitate the transportation of turbine components to the Upperchurch Windfarm site and are located at various points on the national and regional road network along the UWF turbine component haul route between Foynes Port in County Limerick and junction of the R503 and R497 Regional Roads in Knockmaroe townland, County Limerick. Activities comprise the laying of matting over verges at up to 5 No. locations, removal and replacement of street furniture (mainly signposts) at 13 No. locations and the trimming of up to 960m of hedgerow/trees at up to 15 No. locations.

The **Upperchurch Hen Harrier Scheme** will enhance and protect habitat for hen harrier in the vicinity of Upperchurch Windfarm, in order to fulfil planning condition No.18, attaching to the windfarm. The Upperchurch Hen Harrier Scheme is located in Knockcurraghbola Commons, Coumnageeha, Foilnaman, Knockmaroe and Grousehall townlands on 128ha of agricultural lands between the Slievefelim to Silvermines SPA and the Upperchurch Windfarm. Activities associated with the Scheme includes once off activities such as planting of hedgerows and trees; enhancement of riparian corridors and scrub/wood areas; and the fencing off of watercourses and newly planted trees and shrubs. The Scheme also includes long-term farm management practices such as management of rush coverage, livestock grazing and the control of the use of lime, fertilizers and burning of gorse, amongst others. Nine local landowners are signed-up to the Scheme. Implementation involves a mix of initial once-off activities which will both create new habitat and protect and enhance existing habitat; and on-going farming practices which will result in the long term maintenance of hen harrier habitat.

Monitoring Activities will monitor the Whole UWF Project for compliance with the environmental protection measures and mitigation measures detailed in the UWF 2013 EIS and 2013 RFI (including the Construction Environmental Management Plan for Upperchurch Windfarm and the Ecological Management Plan for Upperchurch Windfarm); Planning Conditions attaching to the already consented UWF; and measures in the 2018 UWF Grid Connection EIA Report, the 2018 UWF Related Works EIA Report and the 2018 UWF Replacement Forestry EIA Report and associated UWF Grid Connection Environmental Management Plan and UWF Related Works Environmental Management Plans. Monitoring will also involve the supervision and recording of key construction activities, and monitoring of progress of land reinstatement.

Overhead Line Activities include re-sagging activities and fibre wrapping activities. The purpose of the re-sagging activities is to correct the tension of the existing overhead line, following the installation of the UWF Grid Connection End Masts, so that the lines are held within predefined tension parameters. The purpose of fibre wrapping is to provide a communication link to the newly installed Mountphilips Substation. The tension will be corrected on 2 no. Sections - i) between ESBN Angle Mast Structure No. 79 (c.200m south of Mountphilips substation) to New Mountphilips End Mast No. 1 and ii) between New Mountphilips End Mast No. 2 and ESBN Angle Mast Structure No. 90 (2.3 km north of Mountphilips substation). Wrapping the overhead line with fibre optic cable from Killonan ESBN substation (just east of Limerick City) to Mountphilips substation. The Overhead Line Activities will be carried out according to

industry standard method statements, including standard health & safety and environmental management systems.

5.6.1.4.2. UWF Other Activities: Construction & Operation

Timing: The **Haul Route Activities** will occur prior to commencement of turbine component haulage and reinstatement will occur immediately after the passage of all components. The initial once-off activities associated with the **Upperchurch Hen Harrier Scheme** such as permanent planting and fencing of newly planted areas and watercourses will be carried out during the same period as the construction of UWF and UWF Related Works. There will be pre-construction **Monitoring Activities** before UWF and UWF Related Works commence. **Overhead Line Activities** will take place at the same time as the construction of Mountphilips substation.

UWF Other Activities Construction Phase: Approximately 50 persons will be engaged in UWF Other Activities including haul route activities, landowners involved in the hen harrier scheme, environmental experts engaged in the monitoring schemes and ESB Crews involved in overhead line activities. There will be very little materials delivered to the activity sites, these will include deliveries of geotextile matting, trees and shrubs, fencing materials and specialist ESB equipment.

UWF Other Activities Operational Phase: The same **Haul Route Activities** as for the construction phase, will be required in the occasional event of a large component delivery to UWF, if required, during the operational phase. The farming practices required under the **Upperchurch Hen Harrier Scheme** will continue throughout the lifetime of UWF. **Monitoring** of the success of Upperchurch Hen Harrier Scheme will be carried out during the operational lifetime of UWF. Monitoring will also include operational planning conditions and Ecological Management Plan compliance.

Use of Natural Resources: No land use changes required. No water or welfare facilities required. No mechanical excavations required; all planting will be carried out by hand. For haul route activities, up to 960m of roadside boundary hedges/treelines will be trimmed, outside of the general bird breeding season. For the Hen Harrier Scheme, 2.2ha of trees, 1.4km of riparian habitat and 2.8km of new hedgerow will be enhanced or created during initial activities. In total 128 hectares of agricultural lands will be management for the benefit of hen harrier.

There will be negligible **Emissions** from vehicles transporting personnel and any general **Waste** arising on-site will be removed by the crew themselves during the **construction** and **operational phase** of these Other Activities**.**

5.6.1.5. Cumulative Locational Context of all the Elements

The majority of the whole UWF project is located in County Tipperary with some minor activities along the Upperchurch Windfarm turbine component haul route and on the Killonan to Nenagh 110kV overhead line, in County Limerick (these activities are part of Element 5: UWF Other Activities).

The UWF Related Works is predominately located adjacent to and overlaps with Other Elements of the Whole UWF Project, in particular the consented Upperchurch Windfarm per:

- The majority of the Internal Windfarm Cabling overlaps the Consented UWF Roads,
- The Realigned Windfarm Roads will provide alternative access to Consented UWF Turbines,
- The Haul Route Works and Telecom Relay Pole are located in the immediate vicinity of various parts of the Upperchurch Windfarm
- The UWF Related Works overlap and are adjacent to the UWF Grid Connection and the Upperchurch Windfarm in Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola Crownlands,
- Haul Route Works are located adjacent to Haul Route Activities (UWF Other Activities) in the Knocknabansha/Knockcurraghbola Commons area.

Relevant Volume C3 EIAR Figures:

Figure CE 1.2: UWF Related Works and the Other Elements of the Whole UWF Project in the Upperchurch Windfarm area.

Figure CE 1.3: UWF Related Works and the Other Elements of the Whole UWF Project in Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola Crownlands.

5.6.2. 4Secondary Projects

The development of the UWF Related Works is not expected to result in any secondary or consequential development.

In relation to the Other Elements of the Whole UWF Project, the addition of Mountphilips Substation (UWF Grid Connection) will add a new high voltage electrical substation in the Newport area. This may facilitate new connections to the Mountphilips substation in the future. There are no new connections planned at present.

5.6.3. Description of Other Projects and Activities

A cumulative evaluation of the effects of the subject development together with the Other Elements of the Whole UWF Project and Other Projects or Activities is presented in the Environmental Factor topic chapters.

Other Projects or Activities in the area were scoped using geographical and time-frame boundaries and conceptual site model exercises, see Appendix 2.3: Scoping of Other Projects or Activities. The results of this scoping exercise is presented in Table 5-12, where Other Projects or Activities which have been scoped in for cumulative evaluation are listed in the left hand column of the matrix table, and the relevant Environmental Factor topic is identified in grey shading in the matrix.

Table 5-12: List of Other Projects or Activities included in the Environmental Factor Cumulative Evaluation

Project *(These projects are identified on Figure CE 2.1: Other Projects or Activities Scoped In for Cumulative Evaluation in the Environmental Factor topic chapters)*	**Population**	**Human Health**	**Biodiversity**	**Land**	**Soils**	**Water**	**Air**	**Climate**	**Built Services**	**Roads & Traffic**	**Cultural Heritage**	**Landscape**
Existing Killonan to Nenagh 110kV Overhead Line							■		-			
Existing Shannonbridge – Killonan 220kV Overhead Line							■					
Consented Bunkimalta Windfarm	■	■	■			■						
Consented Castlewaller Windfarm			■		■		■					
Existing Milestone Windfarm (includes permitted turbine at Inchivara) currently under construction											■	■
Operational Windfarms in the Republic of Ireland								■				
Existing Communication Structures - Foilnaman Mast - Cummermore Communications Pole											■	■
Consented Project – Newport Distributor Road, Newport			■			■						
Consented Project - Industrial warehouse Units at Thurles			■									
Existing/consented Project - Thurles Regional Water Treatment Works			■									
Consented Gortnahalla Turbine			■									
Killuragh Digester Plant			■									
Housing Development in Doon and Annacotty			■									
Agricultural Developments - Milk Milking Parlour in Cappamore, Milking Parlour in Lisnagry, Slatted Sheds and Stores in Pallasgreen, Slatted Shed in Gortussa.			■									
Activity – Forestry			■									■
Activity – Agriculture			■									■
Activity –Turf-cutting			■		■							

A brief overview of each of the above listed projects is provided below. The location of each project in relation to the elements of the Whole UWF Project is identified on Figure CE 2.1: Other Projects or Activities Scoped In for Cumulative Evaluation in the Environmental Factor topic chapters.

5.6.3.1. Existing Killonan to Nenagh 110kV Overhead Line

A high voltage (110kV) overhead line which runs between Killonan Station and Nenagh ESB substation (County Tipperary). The existing line is located to the west of the UWF Grid Connection and does not pass over the route of the 110kV UGC. The new Mountphilips Substation will be connected to this line via two new End Masts in farmland, west of the substation compound.

5.6.3.2. Existing Shannonbridge – Killonan 220kV Overhead Line

A high voltage (220kV) overhead line which runs between Shannonbridge ESB substation in County Offaly and Killonan ESB substation in County Limerick. A section of the line passes close to the UWF Grid Connection 110kV UGC in the townlands of Coole and Mountphilips.

5.6.3.3. Consented Bunkimalta Windfarm

The Bunkimalta Windfarm is a consented 16-turbine windfarm, located on Coillte lands, c.2.5km to the north of the UWF Grid Connection at Bunkimalta, Bauraglanna, Lackabrack, Knockfune and Foilduff at, Keeper Hill, Co. Tipperary.

Bunkimalta Windfarm will comprise 16 wind turbines, each having a rated electrical output of approximately 2,500 - 3,000 kilowatts, access tracks, a fenced Electrical Transformer Station comprising a single-storey Control Building and Substation, an effluent treatment system, three anemometer masts, repository areas, borrow pits and all associated site works, above and below ground. Each wind turbine will comprise a tower up to a maximum of 100 metres high, with a diameter of about 4 metres at the base. Three blades, up to a maximum of 50 metres in length, will be attached.

The Bunkimalta Windfarm will connect to the National Grid via an already consented underground grid connection to the existing Nenagh Substation, on the outskirts of Nenagh town.

The Bunkimalta Windfarm could be constructed during the same period as the UWF Grid Connection and the Whole UWF Project. Bunkimalta Windfarm, when built, will be operational during the operational stage of the Whole UWF Project.

An Environmental Impact Statement and Natura Impact Statement accompanied the planning application 13510035.

5.6.3.4. Consented Castlewaller Windfarm

The Castlewaller Windfarm is a 16-turbine windfarm, comprising 16 wind turbine generators (each with a maximum hub height of 100m, maximum rotor diameter of 90m, and with a total tip height of 145m), one permanent meteorological mast, 2 borrow pits, a sub-station including a control building, new internal access roads, upgrading of existing internal access roads, expansion of drainage system, turbine hardstands, wastewater holding tank, underground cables and ancillary works which is located along part of the 110kV UGC route in Castlewaller townland.

An Environmental Impact Statement and Natura Impact Statement accompanied the planning application 11/51/0251 for Castlewaller Windfarm.

Castlewaller Windfarm has not as yet secured a grid connection offer to connect to the National Grid from either Eirgrid or E.S.B Networks and therefore is not likely to be in construction at the same time as the construction of the Whole UWF Project.

5.6.3.5. Existing Milestone Windfarm

Milestone Windfarm is a consented 6-turbine windfarm located adjacent to the southwest of the consented Upperchurch Windfarm with 5 No. turbines consented under planning ref: 12510385 at Knockcurraghbola Commons, Knockcurraghbola Crownlands, Graniera, Shevry and 1 No. turbine consented under planning ref: 1410 at Inchivara and Knockduff. When constructed, Milestone Windfarm will comprise of wind turbines each with a maximum tip height of 126m, along with new access tracks, and electrical substation, a borrow pit and associated works. The grid connection associated with the Milestone Windfarm is towards the south at ESBN Cauteen Station, to be cabled along the public road network. An Environmental Impact Statement accompanied the planning applications for Milestone Windfarm – Ref: 12510385 & 1410.

Milestone Windfarm is currently under construction with construction works expected to be completed before the commencement of the construction of the subject development or any of the other elements of the Whole UWF Project. Therefore there will be no overlap of construction periods.

Part of the landholding associated with the Milestone Windfarm occurs within one of the landholdings associated with the 110kV UGC element of the UWF Grid Connection, in Knockcurraghbola Commons townland.

5.6.3.6. Operational Windfarms in the Republic of Ireland

The Republic of Ireland has a generating capacity of 2,909.66 MW based on 233 windfarms.

5.6.3.7. Existing Communication Structures

Foilnaman Mast: An existing communications mast comprising a 30m steel lattice mast structure at Knockmaroe townland, in the vicinity of the UWF Related Works/Upperchurch Windfarm site.

Cummermore Communications Pole: An existing communications structure comprising a 20m support pole, c.2km to the southwest of the Upperchurch Windfarm, and within 4km of the UWF Related Works (Telecom Relay Pole). This existing pole carries radio aerials and a communications dish, together with associated equipment, cabling, gantry pole, GPS timing antenna, cabinet and fencing. Planning Ref: 14600313

5.6.3.8. Consented Project – Newport Distributor Road, Newport

Consented public road development at Newport, County Tipperary, comprising the demolition of two habitable dwellings and the provision of a distributor road between the R503 and local county road (Murroe Road) and associated site works including footpaths, lighting, cycle tracks and drainage, at Tullow, Newport County Tipperary The road development is within the Newport River catchment and also located upstream of the Lower River Shannon SAC. Planning Ref: 07511157.

5.6.3.9. Consented Project – Industrial Warehouse Units at Thurles

The construction of 1 No. Light Industrial/Warehousing building (gross floor area 2360.6sq.m.) at Bawntameena, Nenagh Road, Thurles, along with a roundabout and access Road from Nenagh Road (R498) complete with necessary improvement works and road markings, a car park and loading areas and ancillary

works; in addition the construction of a foul water pumping station and all associated works. Planning ref: 16600037.

5.6.3.10. Consented Project - Thurles Regional Water Treatment Works

The construction of a water treatment plant at Bohernacrusha, Killeenyarda, Holycross and outfall to the River Suir. The water treatment plant will consist of a water treatment and administration building, sludge dewatering building, ESB sub-station, generator & oil tank enclosure, raw water balancing tank, clear water tanks, sludge balancing tank, sludge thickening and sludge holding tank, washwater tank, sludge skip and emergency sludge storage area, chemical storage tanks, washwater storage tank and all associated site development and site excavation works above and below ground. Planning Ref: 16600877.

5.6.3.11. Consented Gortnahalla Turbine

Single wind generator with a maximum output set at 500kw, hub height 65m at Gortnahalla, near Upperchurch, Co Tipperary. Planning Ref: 12510368.

5.6.3.12. Killuragh Digester Plant

Development of a digester plant, associated ABP building and associated site works to process farm slurry and other organic material to provide renewable energy and fertilizer, in Killuragh, Pallasgreen, Co Limerick. Planning Ref: 111066.

5.6.3.13. Housing Development in Doon and Annacotty

Two housing developments: Construction of 25 no. houses consisting of 5 no. 4 bed detached dwellings, 20 no. 3 bed semi-detached dwellings, a bored well, entrance and roads together with associated site works and services at Bottle Hill, Doon, Co Limerick, Planning Ref: 16530; and Construction of 48 dwellings at Annacotty & construction of 240 dwellings in three areas/lots at Walkers Road, Annacotty, Co Limerick, Planning Ref: 137026 and 137094.

5.6.3.14. Agricultural Developments

Agricultural developments include a milk Milking Parlour in Cappamore, Co Limerick (Planning Ref: 15255), a Milking Parlour in Lisnagry, Co Limerick (Planning Ref: 15194), Slatted Sheds and Stores in Pallasgreen, Co Limerick (Planning Ref: 17133), and a Slatted Shed in Gortussa, Dundrum Co Tipperary (Planning Ref: 14600343).

5.6.3.15. Activities – Forestry, Agriculture

Agriculture and forestry are the predominant land uses in the area of the Whole UWF Project.

5.6.3.16. Activity – Turf-Cutting

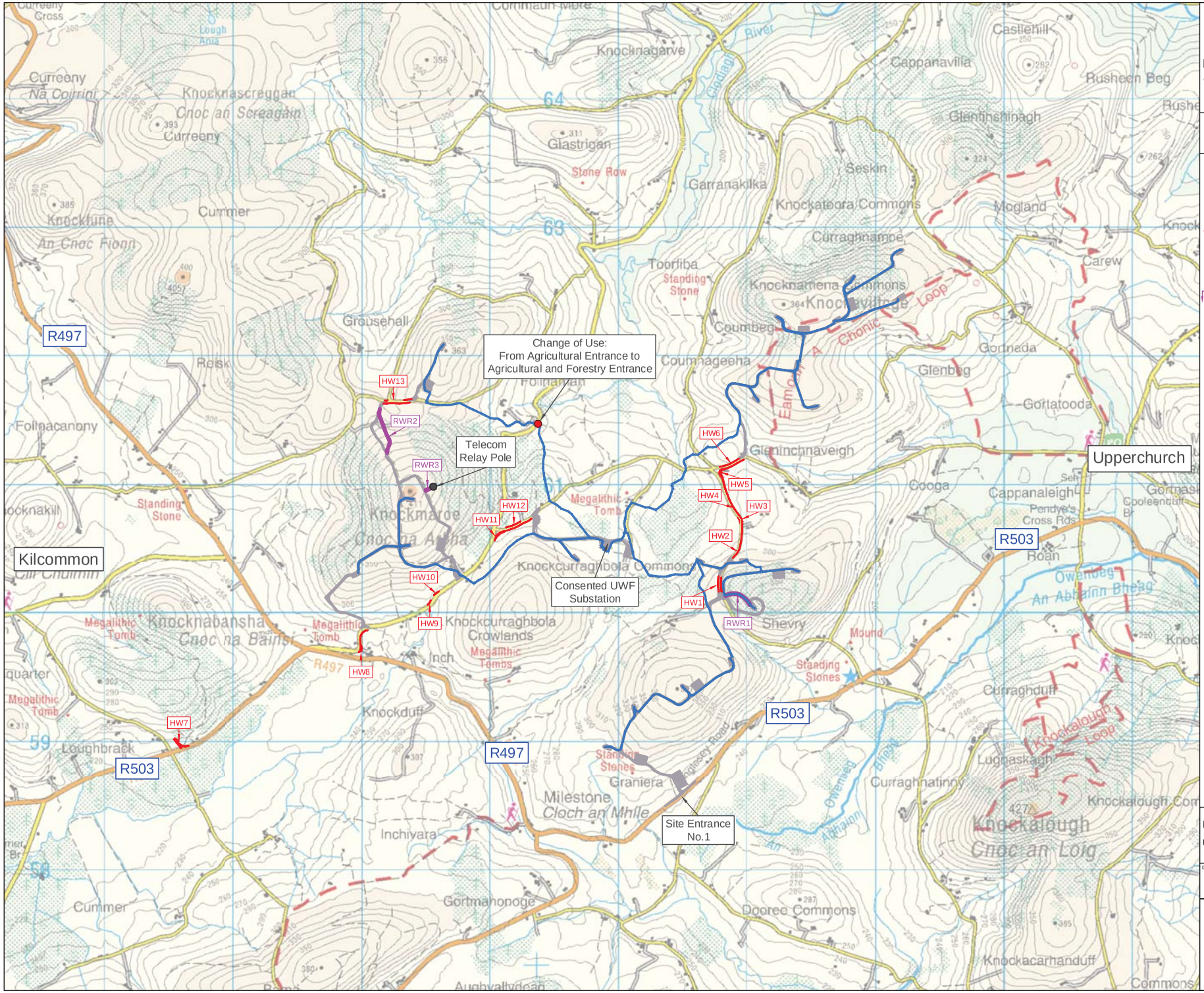
Turbary (rights to cut turf) exists at Bleanbeg Bog immediately to the north of the UWF Grid Connection (110kV UGC) in the Castlewaller area.

The above projects and activities are included in the cumulative evaluations in the Environmental Topic chapters – Chapters 6 to 17. The relevant Environmental Factor topic is identified on Table 5-12.

Appendix to Chapter 5: Description of Development (UWF Replacement Forestry)

Appendix 5.4: Description of Development (UWF Related Works)

Figures and Mapping



Title:
Figure RW 5.1

Location of UWF Related Works
on OSI Discovery Mapping

Map Number:
Map 1 of 1

Legend:

- Haul Route Works
- HW1 — Haul Route Works Numbers (HW1 - HW13)
- Realigned Windfarm Road
- RWR1 — Realigned Windfarm Road Numbers (RWR1 - RWR3)
- Internal Windfarm Cabling
- Telecom Relay Pole
- Upperchurch Windfarm (UWF)
- R503 — Regional Road Number

N

REFERENCE DOCUMENTS

Project:
UWF Related Works (RW)

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AB	JB	19-Feb-18	A3

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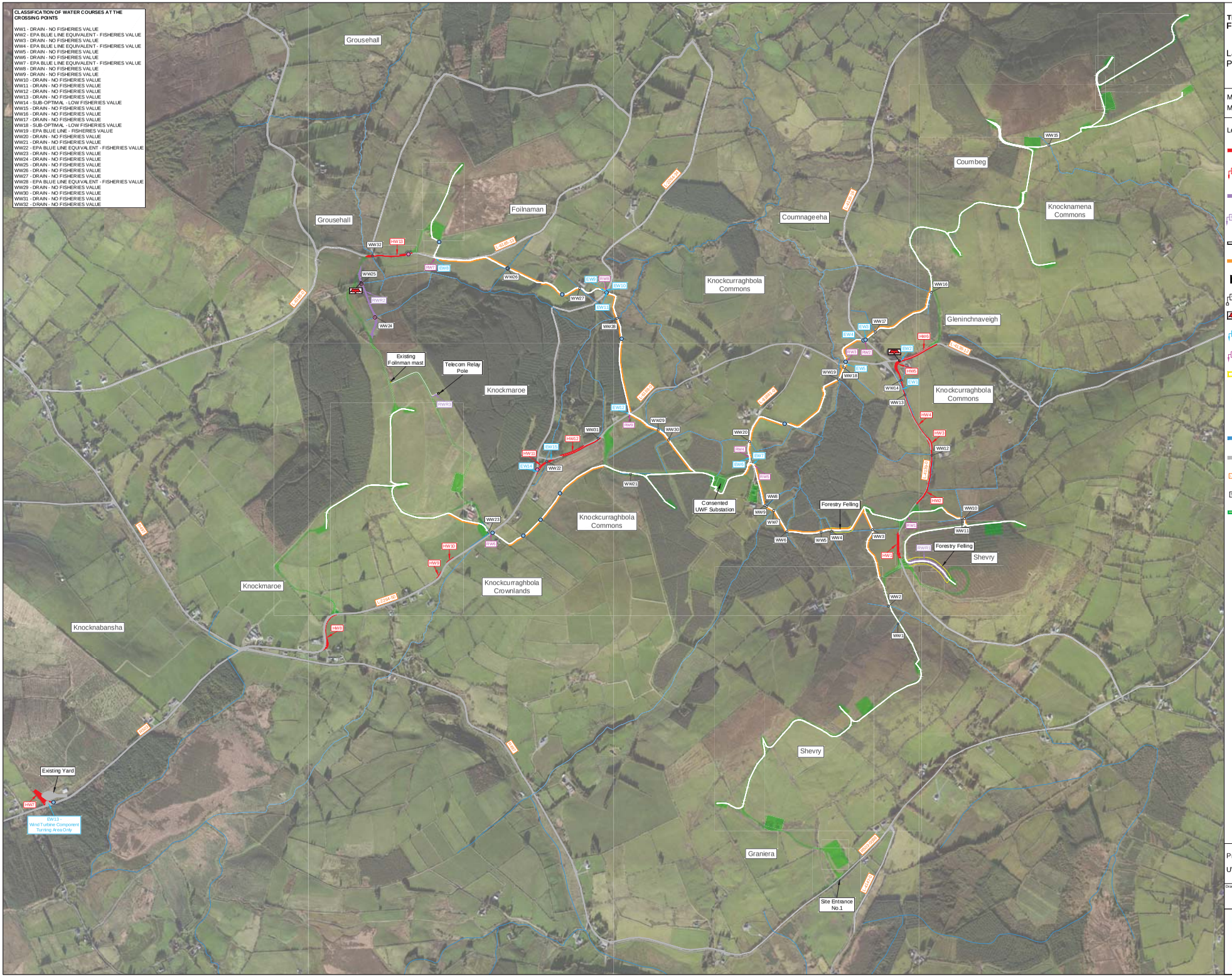
CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS
WW1 - DRAIN - NO FISHERIES VALUE
WW2 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
WW3 - DRAIN - NO FISHERIES VALUE
WW4 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
WW5 - DRAIN - NO FISHERIES VALUE
WW6 - DRAIN - NO FISHERIES VALUE
WW7 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
WW8 - DRAIN - NO FISHERIES VALUE
WW9 - DRAIN - NO FISHERIES VALUE
WW10 - DRAIN - NO FISHERIES VALUE
WW11 - DRAIN - NO FISHERIES VALUE
WW12 - DRAIN - NO FISHERIES VALUE
WW13 - DRAIN - NO FISHERIES VALUE
WW14 - SUB-OPTIMAL - LOW FISHERIES VALUE
WW15 - DRAIN - NO FISHERIES VALUE
WW16 - DRAIN - NO FISHERIES VALUE
WW17 - DRAIN - NO FISHERIES VALUE
WW18 - SUB-OPTIMAL - LOW FISHERIES VALUE
WW19 - EPA BLUE LINE - FISHERIES VALUE
WW20 - DRAIN - NO FISHERIES VALUE
WW21 - DRAIN - NO FISHERIES VALUE
WW22 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
WW23 - DRAIN - NO FISHERIES VALUE
WW24 - DRAIN - NO FISHERIES VALUE
WW25 - DRAIN - NO FISHERIES VALUE
WW26 - DRAIN - NO FISHERIES VALUE
WW27 - DRAIN - NO FISHERIES VALUE
WW28 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
WW29 - DRAIN - NO FISHERIES VALUE
WW30 - DRAIN - NO FISHERIES VALUE
WW31 - DRAIN - NO FISHERIES VALUE
WW32 - DRAIN - NO FISHERIES VALUE
Grousehall
Foilnaman
Coumnageeha
Coumbeg
Knocknamena Commons
Knockcurraghbola Commons
Gleninchnaveigh
Knockmaroe
Knockcurraghbola Crownlands
Knocknabansha
Shevry
Graniera
Existing Foilnman mast
Telecom Relay Pole
Consented UWF Substation
Forestry Felling
Existing Yard
EW13 - Wind Turbine Component Turning Area Only
Site Entrance No.1
Title:
Figure RW 5.2
Layout of UWF Related Works on Aerial Photography Mapping
Map Number:
Map 1 of 1
Legend:
Haul Route Works
Haul Route Works Numbers (HW1 - HW13)
Realigned Windfarm Road
Realigned Windfarm Road Numbers (RWR1 - RWR3)
Internal Windfarm Cabling
Temporary Access Roads
Telecom Relay Pole
Water Crossings
Bat Crossing Locations
Site Entrance
Road Crossing (RW1 - RW9)
Forestry Felling
Temporary hedge/tree removal & pruning
Permanent hedge/tree removal
Watercourse
Public Road
Public Road Number
Townlands
Upperchurch Windfarm (UWF)
REFERENCE DOCUMENTS
N
Project:
UWF Related Works (RW)
Drawn by: AB
Checked by: JB
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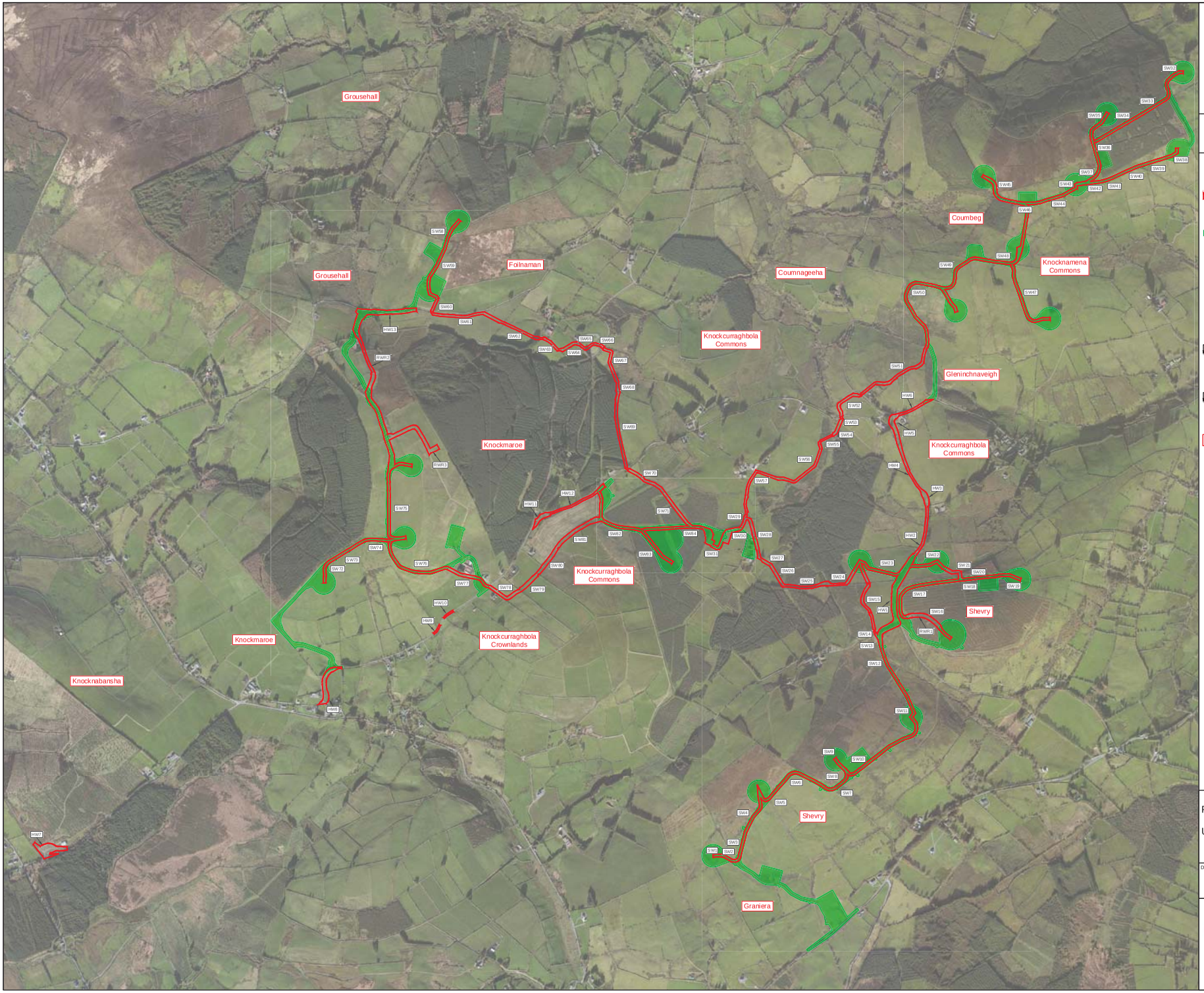

Title:
Figure RW 5.3

UWF Related Works Construction Works Area Boundary

Map Number:
Map 1 of 1

Legend:

- Construction Works Area
- Upperchurch Windfarm (Land requirement during construction phase)
- SW3 — Section numbers for Internal Windfarm Cabling (SW1 - SW84)
- HW2 — Section numbers for Haul Route Works (HW1 - HW13)
- RWR1 — Section numbers for Realigned Windfarm Roads (RWR1 - RWR3)
- Shevry — Townlands

N

Project:
UWF Related Works (RW)

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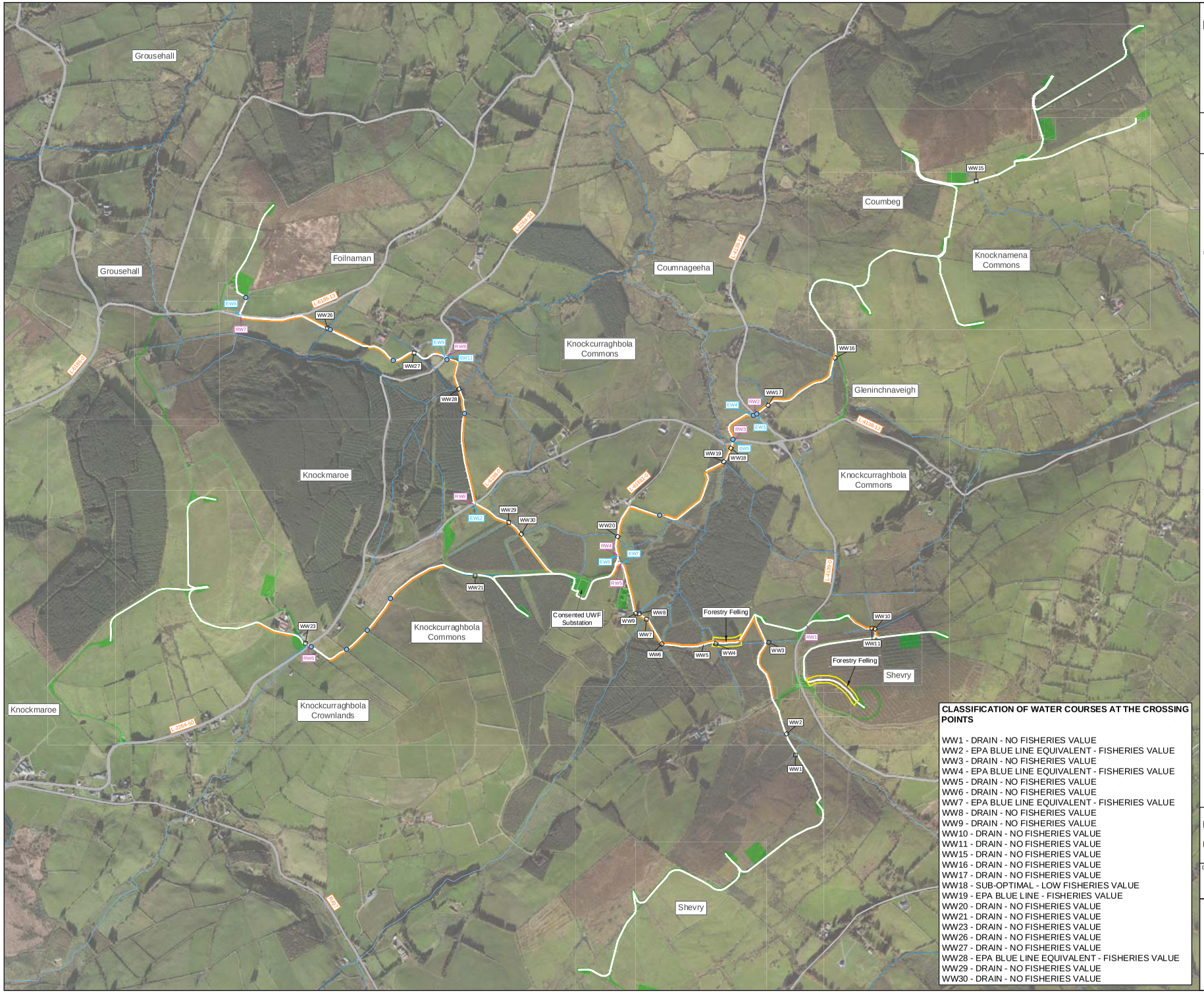

CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

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WW2 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
WW3 - DRAIN - NO FISHERIES VALUE
WW4 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
WW5 - DRAIN - NO FISHERIES VALUE
WW6 - DRAIN - NO FISHERIES VALUE
WW7 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
WW8 - DRAIN - NO FISHERIES VALUE
WW9 - DRAIN - NO FISHERIES VALUE
WW10 - DRAIN - NO FISHERIES VALUE
WW11 - DRAIN - NO FISHERIES VALUE
WW15 - DRAIN - NO FISHERIES VALUE
WW16 - DRAIN - NO FISHERIES VALUE
WW17 - DRAIN - NO FISHERIES VALUE
WW18 - SUB-OPTIMAL - LOW FISHERIES VALUE
WW19 - EPA BLUE LINE - FISHERIES VALUE
WW20 - DRAIN - NO FISHERIES VALUE
WW21 - DRAIN - NO FISHERIES VALUE
WW23 - DRAIN - NO FISHERIES VALUE
WW26 - DRAIN - NO FISHERIES VALUE
WW27 - DRAIN - NO FISHERIES VALUE
WW28 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
WW29 - DRAIN - NO FISHERIES VALUE
WW30 - DRAIN - NO FISHERIES VALUE

Title:
Figure RW 5.4

Layout of Internal Windfarm Cabling on Aerial Photography Mapping

Map Number:
Map 1 of 1

Legend:

- Internal Windfarm Cabling
- Temporary Access Roads
- WW6 Water Crossings
- EW6 Site Entrance Numbers
- RW2 Road Crossing Numbers
- Forestry Felling
- Temporary hedge/tree removal & pruning
- Watercourse
- Public Road
- L-2166-0 Public Road Number
- Shevry Townlands
- Upperchurch Windfarm (UWF)

N

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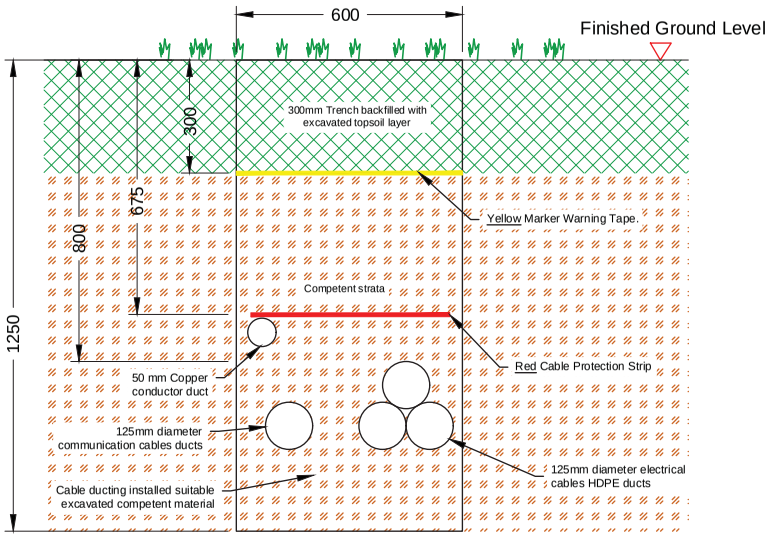
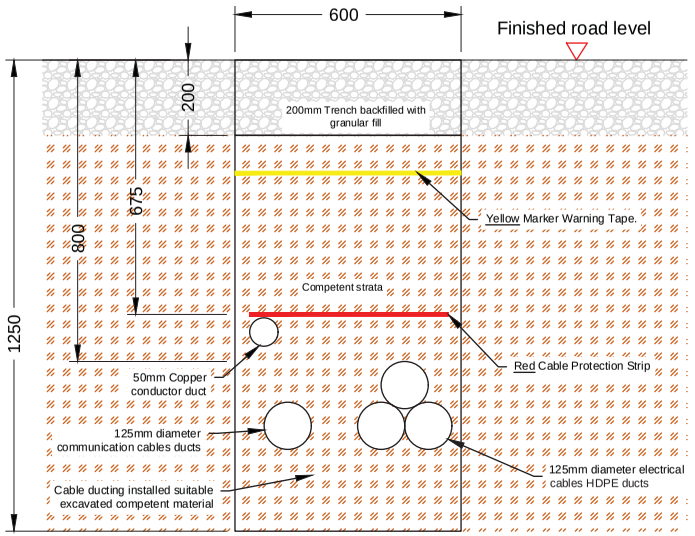
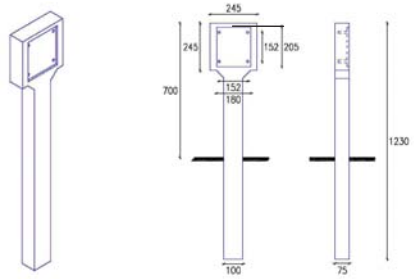


33kV CABLES TRENCH - TYPICAL SECTION THROUGH AGRICULTURAL LANDS AND FORESTRY LANDS



33kV CABLES TRENCH - TYPICAL SECTION THROUGH REALIGNED WINDFARM ROADS OR CONCENTED UWF WINDFARM ROADS



3D View **Front Elevation** **Side Elevation**

TYPICAL MARKER POST AND MARKER PLATE DIMENSIONS

Title:

Figure RW 5.5

Cross Sections of Internal Windfarm Cables Trench

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

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UWF Related Works (RW)

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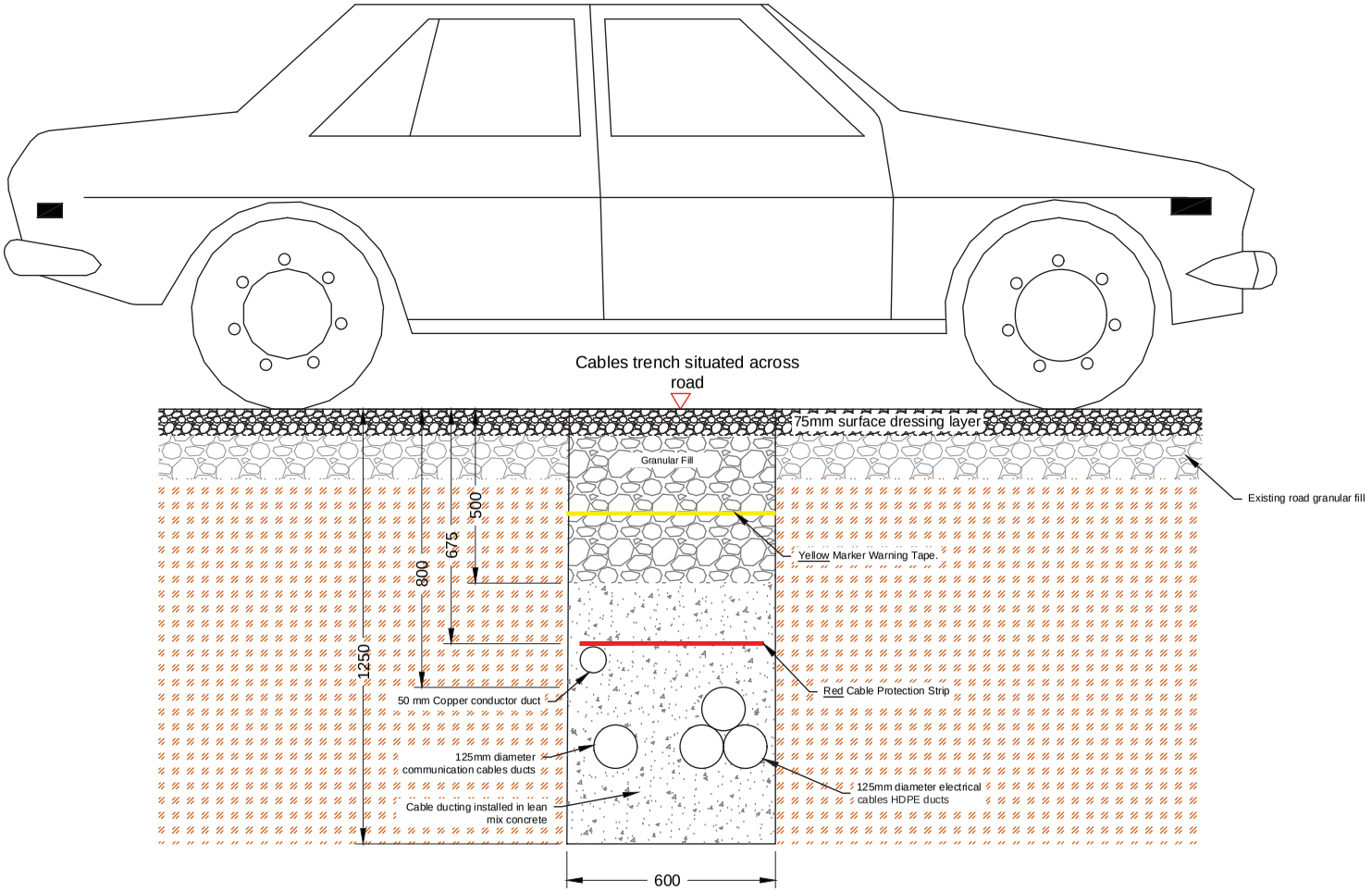

33kV TRENCH ACROSS PUBLIC ROADS (RW1 TO RW9)

Title:

Figure RW 5.6

Cross Section of Internal Windfarm Cabling in Public Road Pavement

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

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Title:
Figure RW 5.7

Layout of Realigned Windfarm Roads on Aerial Photography Mapping

Map Number:
Map 1 of 1

Legend:

- Realigned Windfarm Road
- Realigned Windfarm Road Numbers (RWR1 - RWR3)
- Water Crossings
- Bat Crossing Locations
- Forestry Felling
- Permanent hedge/tree removal & pruning
- Watercourse
- Public Road
- Public Road Number
- Townlands
- Upperchurch Windfarm (UWF)

N

REFERENCE DOCUMENTS

Project:
UWF Related Works (RW)

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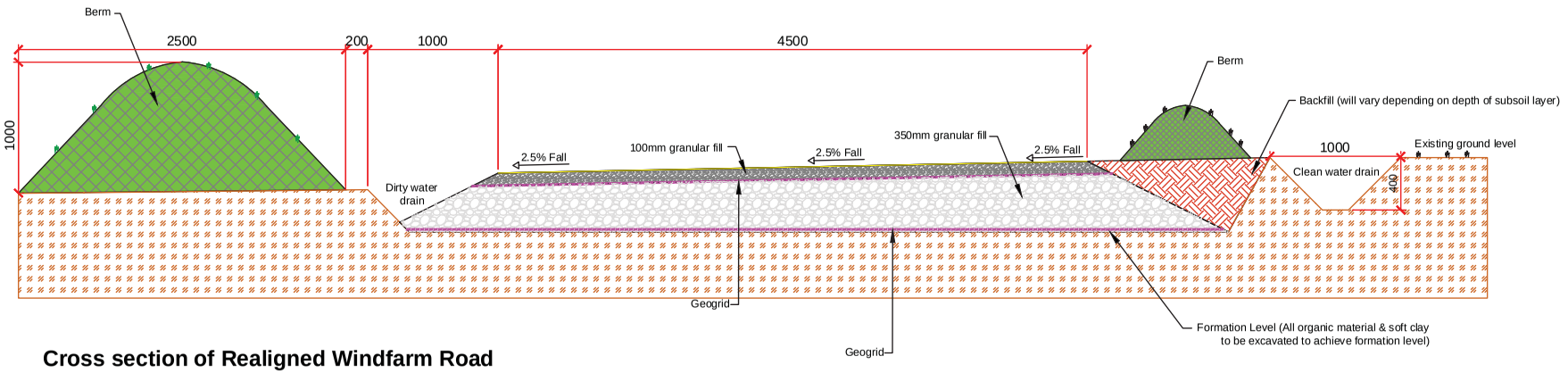

Cross section of Realigned Windfarm Road

Title:

Figure RW 5.8

Cross Section of Realigned Windfarm Road

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

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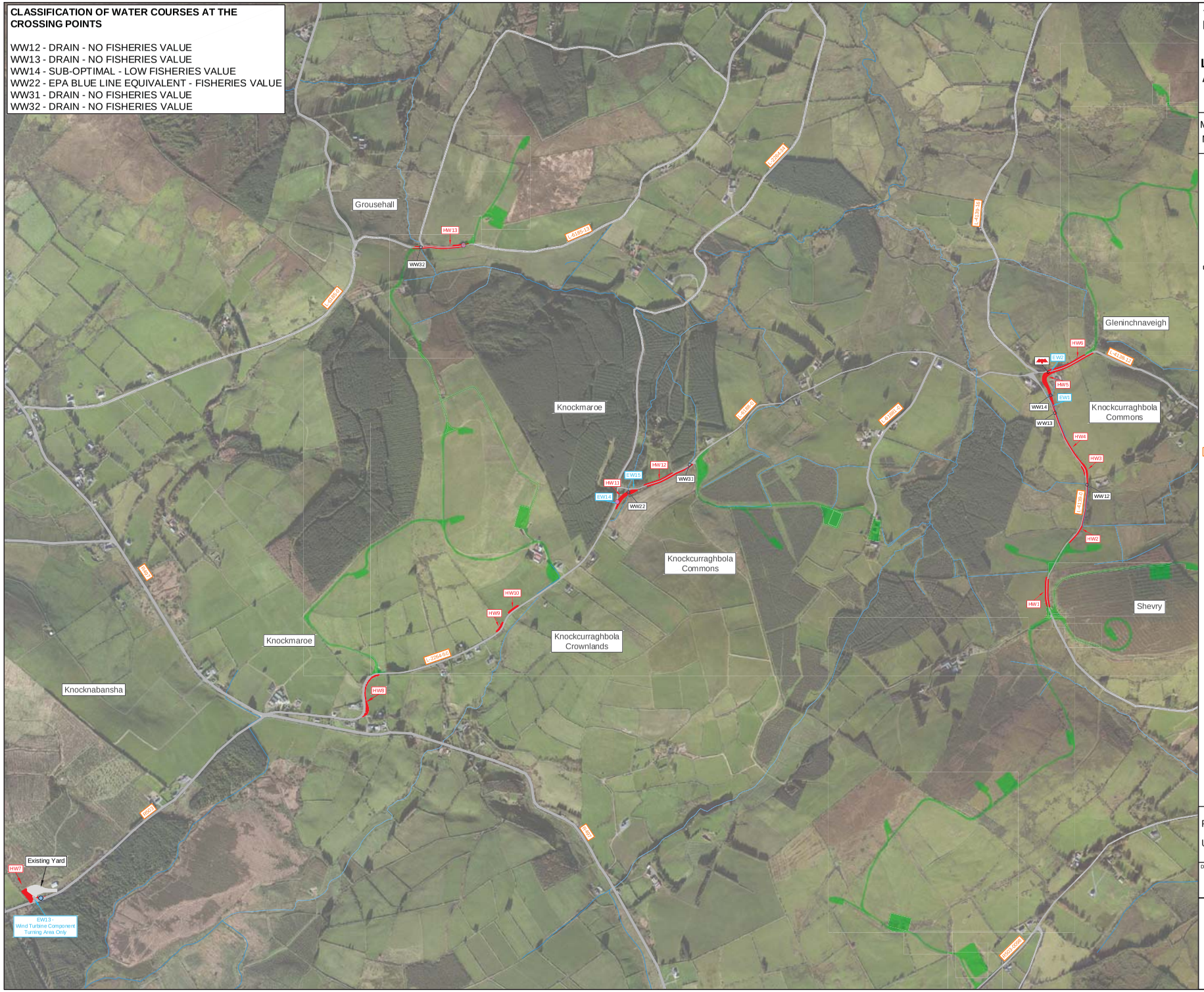

Title:
Figure RW 5.9

Layout of Haul Route Works on Aerial Photography Mapping

Map Number:
Map 1 of 1

Legend:

- Haul Route Works
- Haul Route Works Numbers (HW1 - HW13)
- Water Crossings
- Bat Crossing Locations
- Site Entrances
- Temporary hedge/tree removal & pruning
- Permanent hedge/tree removal
- Watercourse
- Public Road
- Public Road Number
- Townlands
- Upperchurch Windfarm (UWF)

N

REFERENCE DOCUMENTS

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UWF Related Works (RW)

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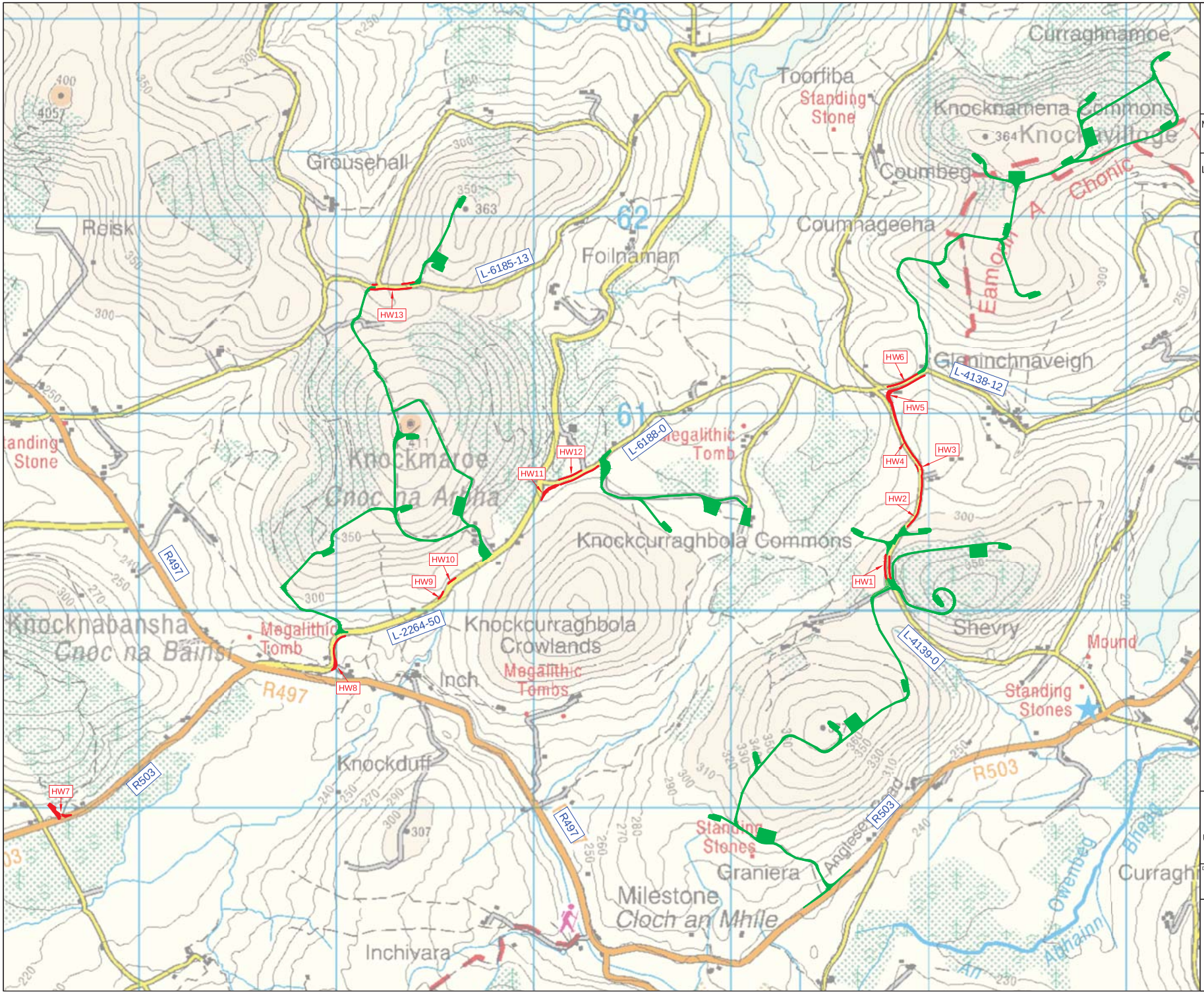

Title:
Figure RW 5.10

Location and Layouts of Haul Route Works (Overview and Maps 1 to 3)

Map Number:
Map Overview

Legend:

- HW6 — Haul Route Works ID
- Haul Route Works
- Upperchurch Windfarm
- R503 — Public Road Numbers

N

Project:
UWF Related Works (RW)

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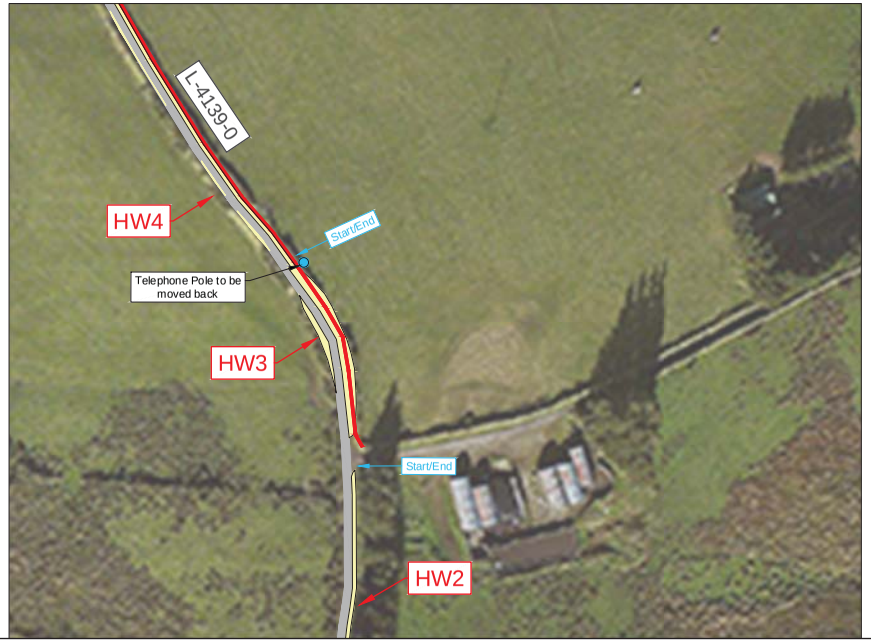

Title:

Figure RW 5.10

Location and Layouts of Haul Route Works (Overview and Maps 1 to 3)

Map Number:
Map 1 of 3

Legend:

- Move Telephone Pole
- Road Widening
- Public Road
- Temporary Removal of Roadside Boundary
- L-4139-0 Public Road Number
- Upperchurch Windfarm

N

Project:
UWF Related Works (RW)

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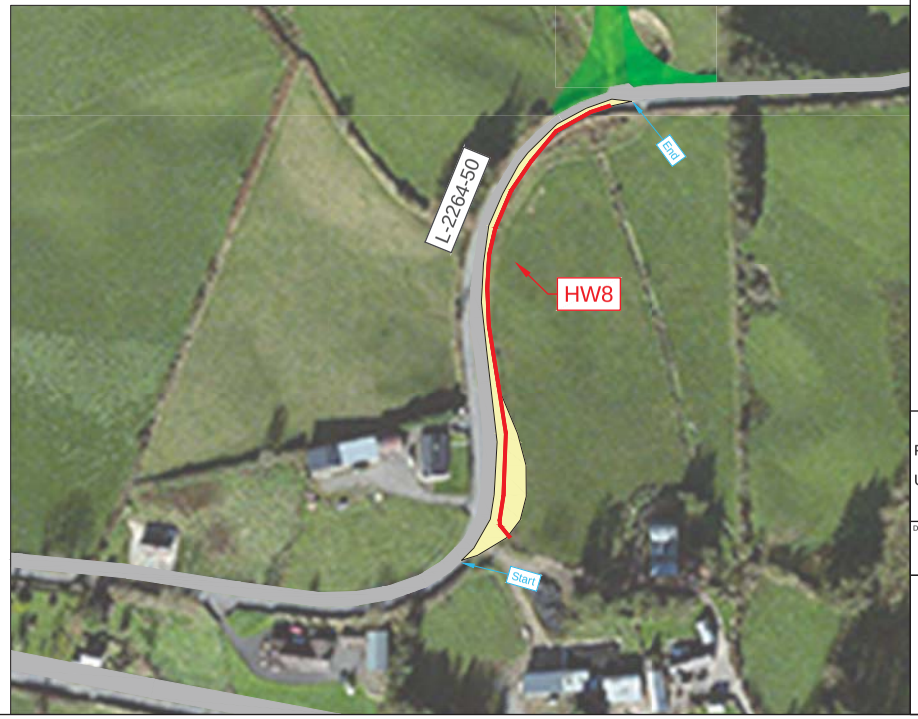

Title:
Figure RW 5.10

Location and Layouts of Haul Route Works (Overview and Maps 1 to 3)

Map Number:
Map 2 of 3

Legend:

- Move Telephone Pole
- Road Widening
- Public Road
- Temporary Removal of Roadside Boundary
- L-4139-0 Public Road Number
- Upperchurch Windfarm

N

Project:
UWF Related Works (RW)

Drawn by:	Checked by:	Date:	Sheet Size:
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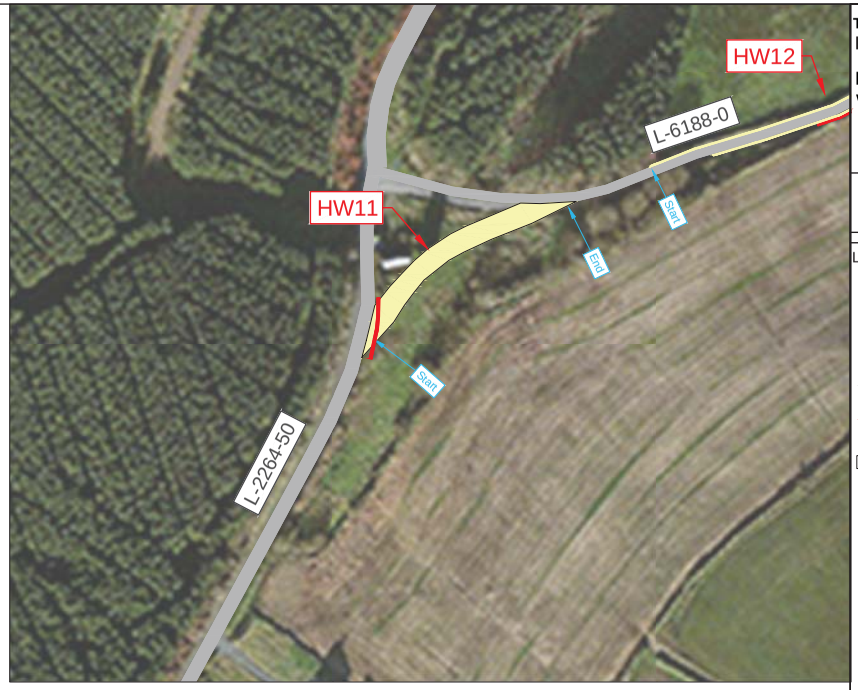
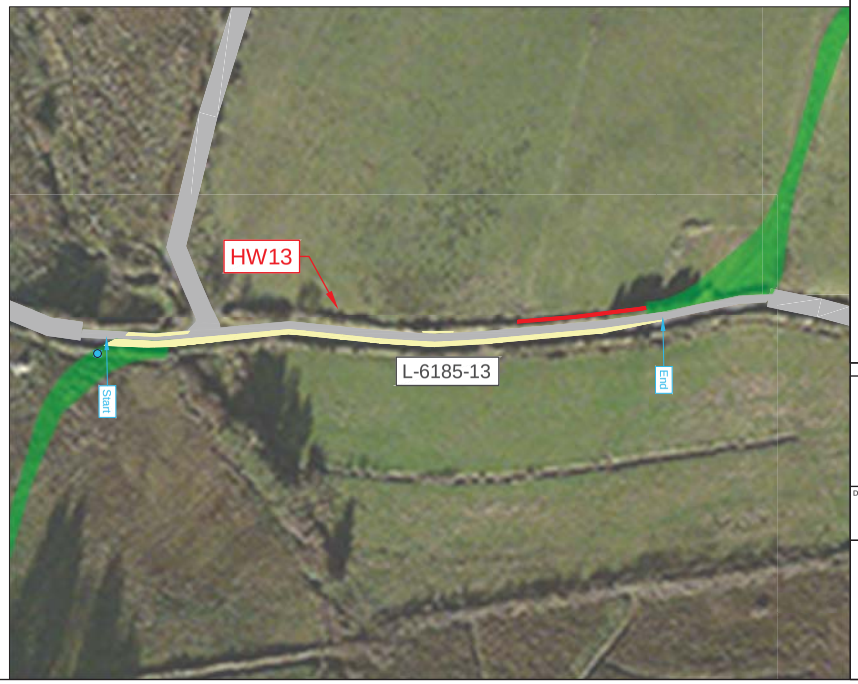
REFERENCE DOCUMENTS









Title:
Figure RW 5.10

Location and Layouts of Haul Route Works (Overview and Maps 1 to 3)

Map Number:
Map 3 of 3

Legend:

- Move Telephone Pole
- Road Widening
- Public Road
- Temporary Removal of Roadside Boundary
- L-4139-0 Public Road Number
- Upperchurch Windfarm

N

REFERENCE DOCUMENTS

Project:
UWF Related Works (RW)

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MOB: +353 83 8805644

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Title:

Figure RW 5.11

Location of the Telecom Relay Pole on Aerial Photography Mapping

Map Number:
Map 1 of 1

Legend:

- Telecom Relay Pole and Compound
- Realigned Windfarm Road (RWR3)
- Public Road
- L-2166-0 Public Road Number
- Knockmaroe Townland
- Upperchurch Windfarm (UWF)

N

REFERENCE DOCUMENTS

Project:
UWF Related Works (RW)

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AB	JB	19-Feb-18	A3

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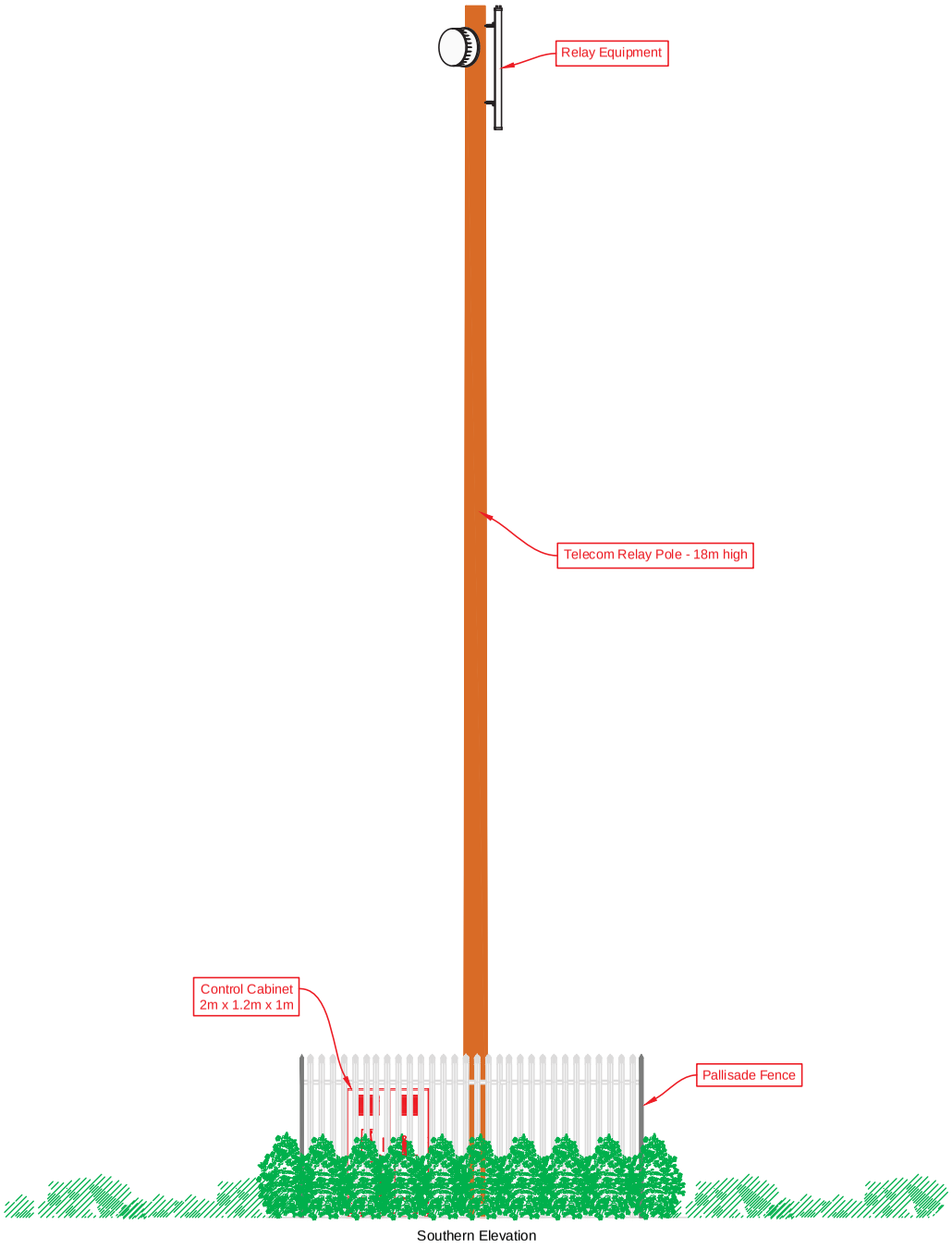
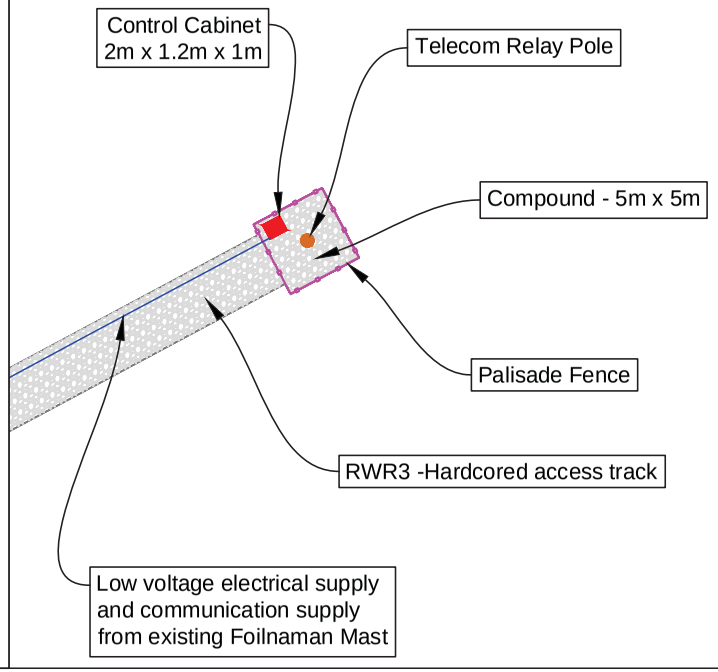


Southern Elevation





Title:

Figure RW 5.12

Plan and Elevation of Telecom Relay Pole and Compound

Map Number:

N/A

Note :
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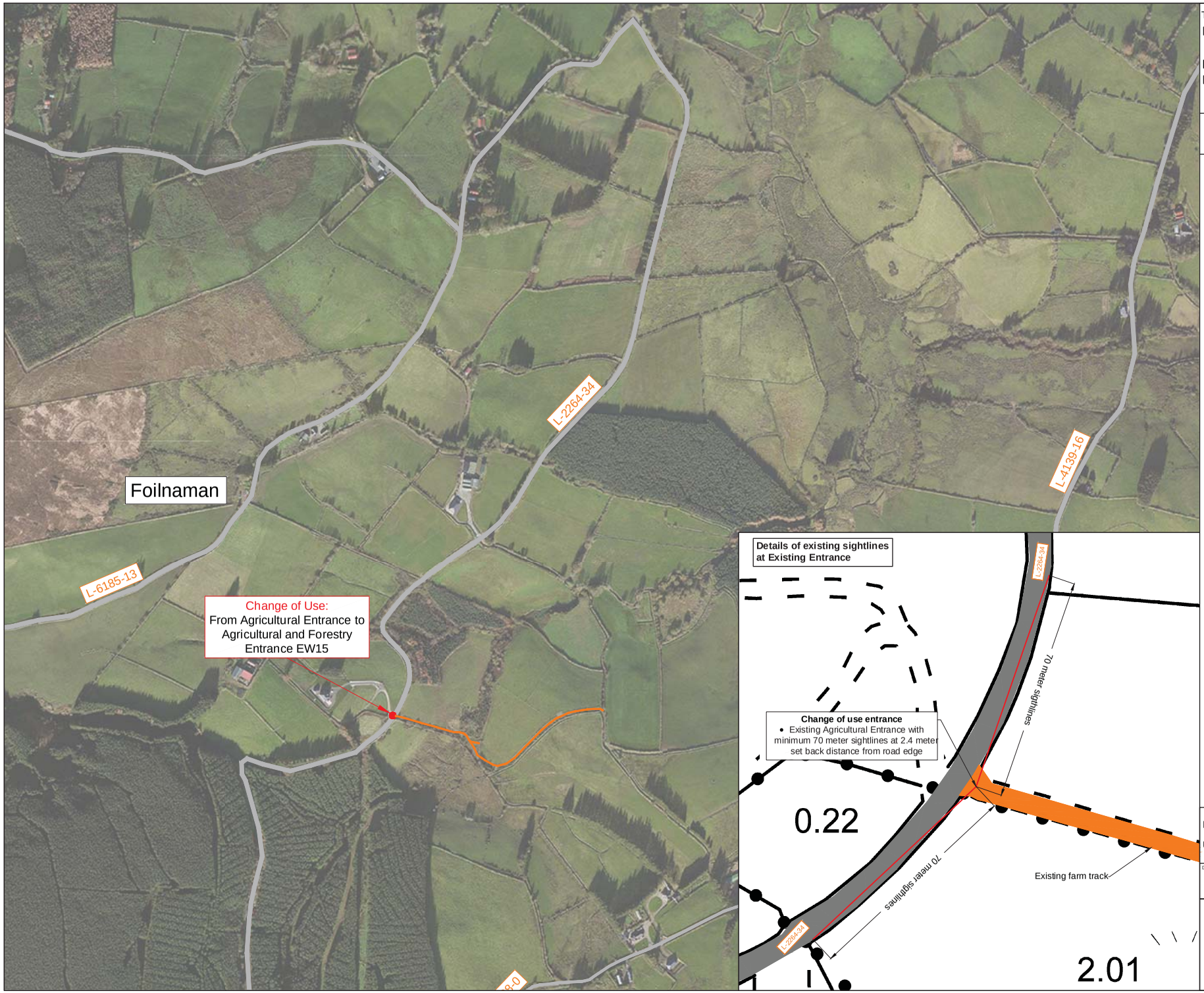

Title:

Figure **RW 5.13**

Location of "Change of Use at Existing Entrance" (including sightlines)

Map Number:
Map 1 of 1

Legend:

- Location of the change of use from Agricultural Entrance to Agricultural and Forestry Entrance
- Public Road
- Existing farm track
- Public Road Number
- Townland
- Upperchurch Windfarm (UWF)

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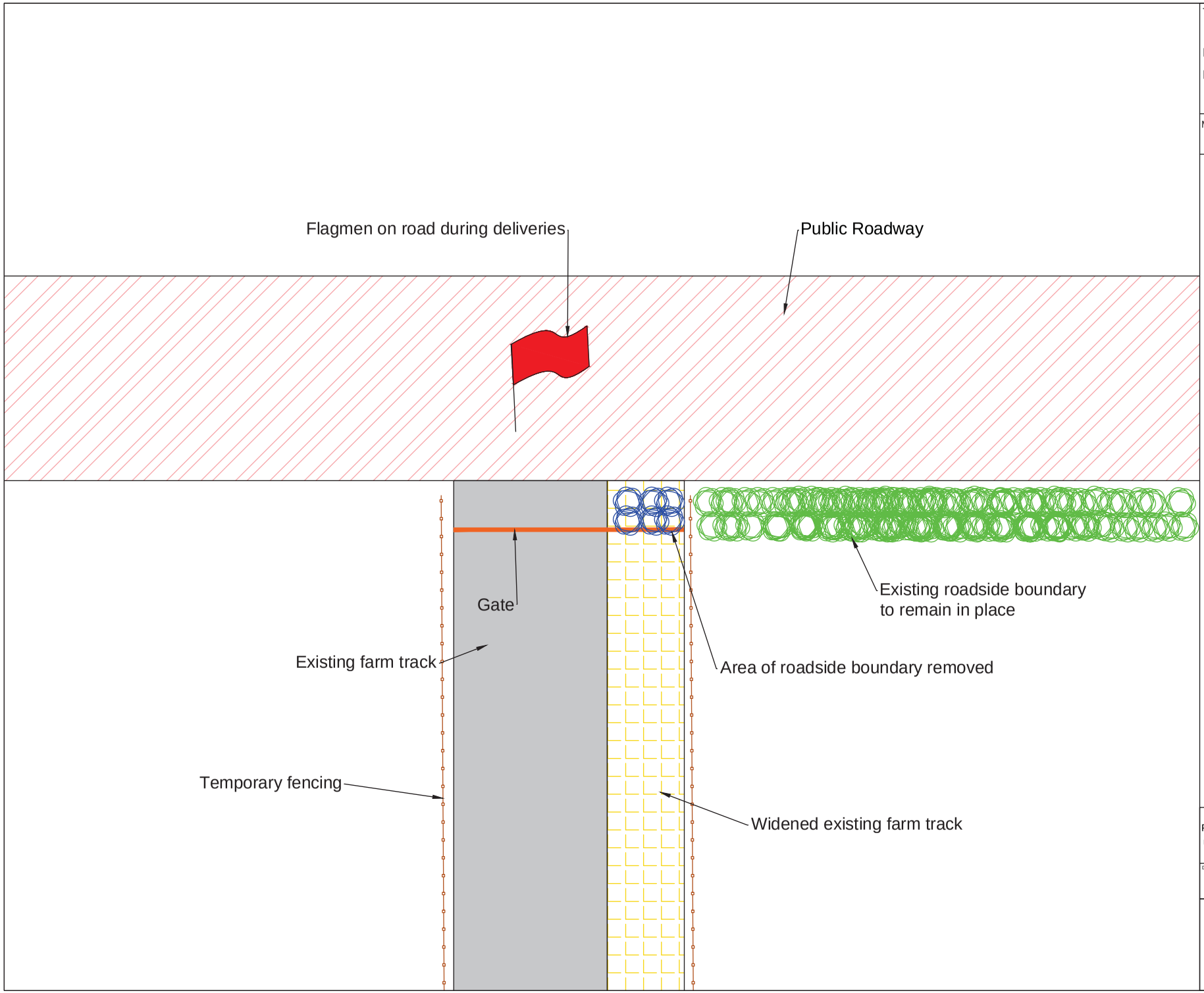

Title:

Figure RW 5.14

Plan View of Typical Temporary Site Entrance

Map Number:

N/A

Note :
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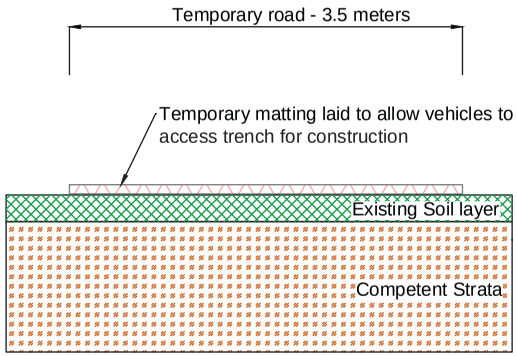
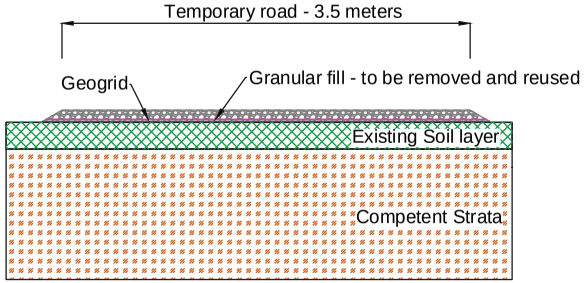
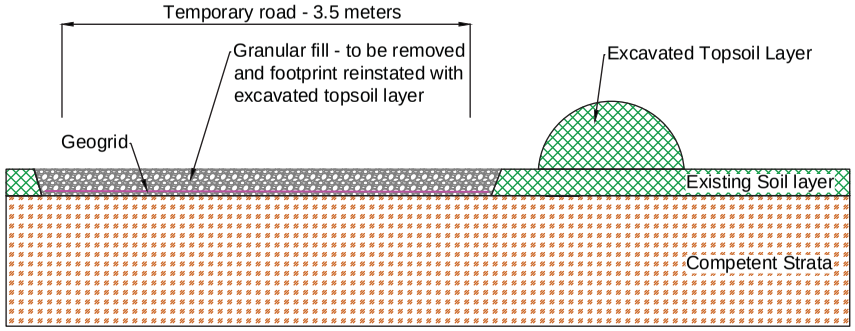


Cross Section of temporary access road - Matting



Cross Section of temporary access road - Floating road



Cross Section of temporary access road - Excavate and fill

Title:

Figure RW 5.15

Cross Section of Temporary Access Roads

Map Number:

N/A

Note :
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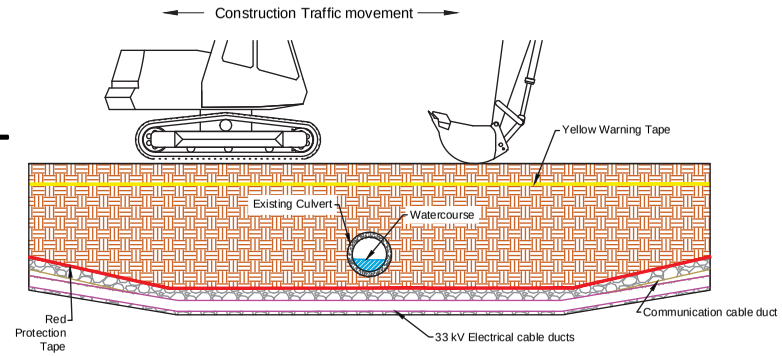
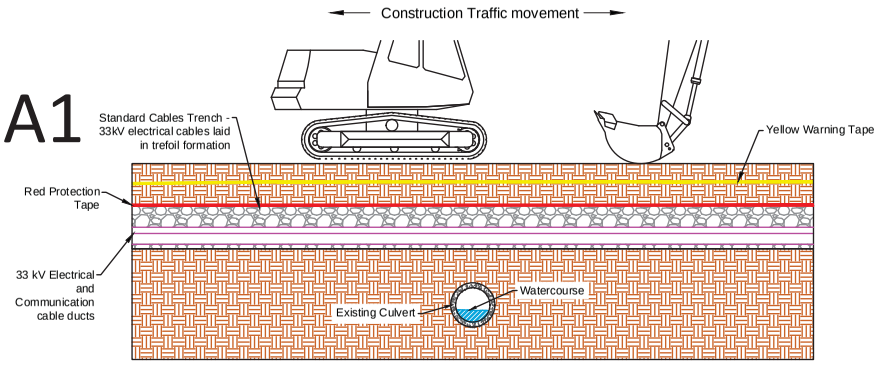
A1



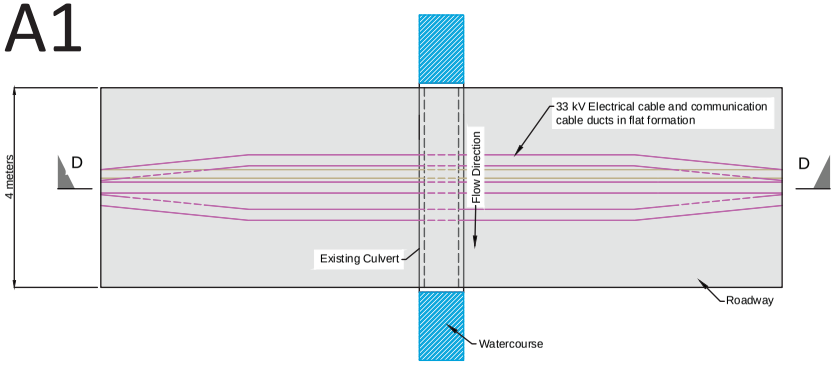
Cross Section D - D of watercourse crossing type A1 - Cables trench under existing structure

A1



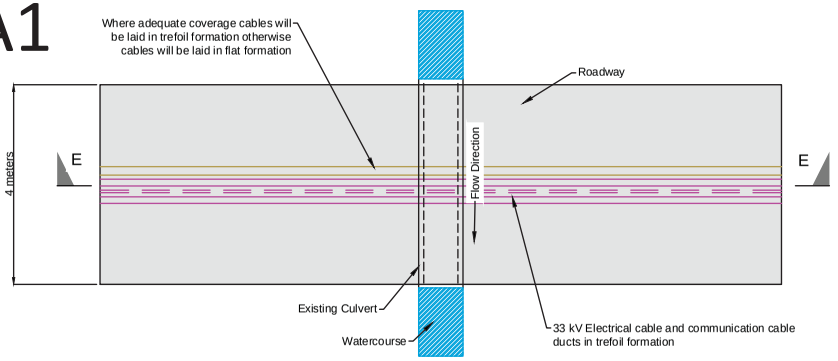
Cross Section E - E of watercourse crossing type A1 - Cables trench above existing structure

A1



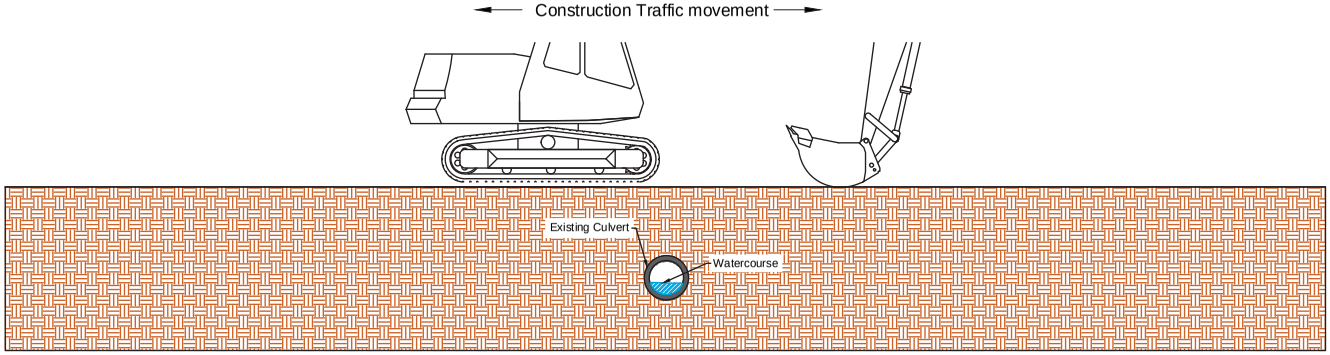
Plan View of watercourse crossing type A1 - Cable ducts laid in flat formation under existing structure
Excavation within 500mm of structure will be done by hand.
(No Instream works required)

A1



Plan View of watercourse crossing type A1 - Cable ducts laid in trefoil formation over existing structure
Excavation within 500mm of structure will be done by hand.
(No Instream works required)

A2



Cross Section of watercourse crossing type A2 - Traffic Movement only over structure (No instream works required)

Title:

Figure RW 5.16

Watercourse Crossing Type A1 & A2 - UWF Related Works at Existing Crossing Structure

Note :
Drawings not to scale. For illustration purposes only

Watercourse Crossing Type A1 (Total 5)

Class 4 - Drain - No Fisheries Value: WW6, WW11, WW23, WW29, WW30

Description of Crossing Type A1

- Existing crossing structure
- No Instream Works
- Cable and Traffic crossing
- No works to existing watercourse crossing structure
- 33kV Cables and Ducting installed over or under existing structure

Watercourse Crossing Type A2 (Total 1)

Class 4 - Drain - No Fisheries Value: WW32

Description of Crossing Type A2

- Existing crossing structure
- No Instream Works
- Traffic crossing only
- No works to existing watercourse crossing structure
- No Cables or Ducting installed

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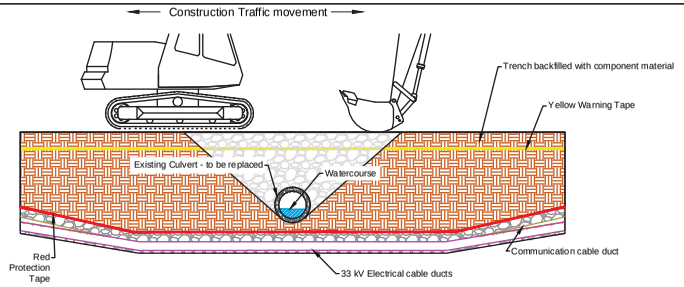
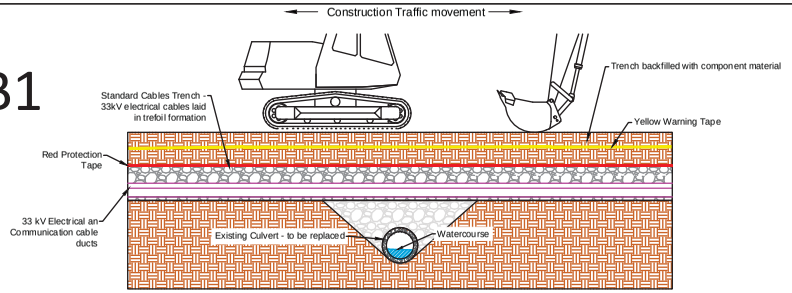
B1



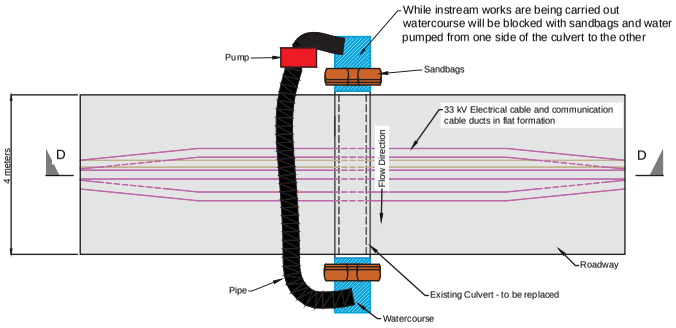
Cross Section D - D of watercourse crossing type B1 - Cables trench under replaced structure

B1



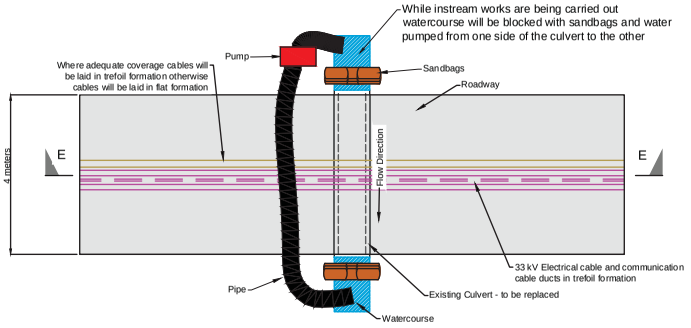
Cross Section E - E of watercourse crossing type B1 - Cables trench over replaced structure

B1

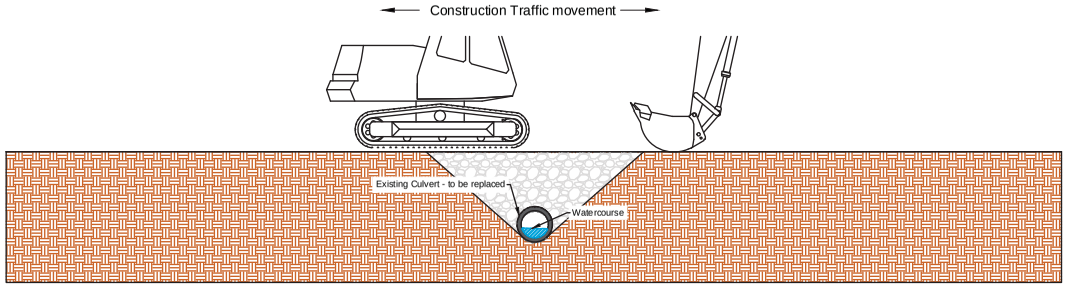


Plan View of watercourse crossing type B1 - Cable ducts laid in flat formation under replaced structure

B1

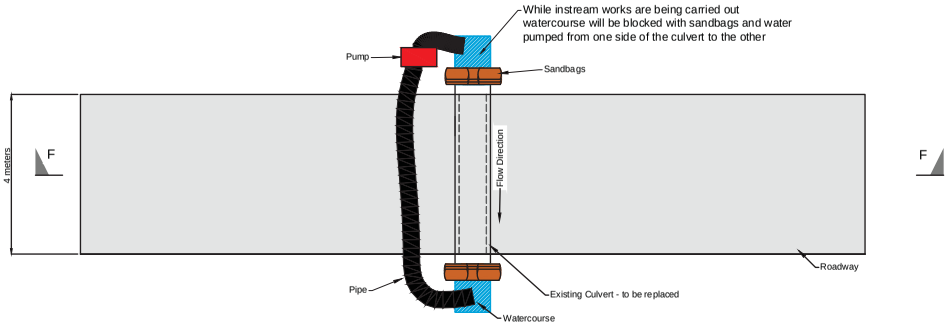


Plan View of watercourse crossing type B1 - Cable ducts laid in trefoil formation over replaced structure



Cross Section F - F of watercourse crossing type B2 - Construction Traffic crossing replaced existing structure

B2



B2

Plan view of watercourse crossing type B2 - Construction Traffic crossing replaced existing structure

Note:

The damming and over-pumping method will typically be carried out at watercourses where a permanent crossing structure is being installed or where an existing culvert is being replaced.

All permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be at least 900mm in diameter regardless of the anticipated flood flow. 900mm culverts will be set into the river bed to a depth of 300mm and 1200mm culverts will be set in 500mm.

Title:

Figure RW 5.17

Watercourse Crossing Type B1 & B2 - UWF Related Works at Replaced and/or widened Crossing Structure

Note :
Drawings not to scale. For illustration purposes only

Watercourse Crossing Type B1 (Total 1)

Class 4 - Drain - No Fisheries Value: WW21

Description of Crossing Type B1

- Existing crossing structure
- Instream Works
- Cable and Traffic crossing
- Replacement of existing watercourse crossing structure
- 33kV Cables and Ducting installed over or under replaced existing crossing structure

Watercourse Crossing Type B2 (Total 2)

Class 4 - Drain - No Fisheries Value: WW12, WW31

Description of Crossing Type B2

- Existing crossing structure
- Instream Works
- Traffic crossing only
- Replacement of existing watercourse crossing structure
- No Cables or Ducting installed

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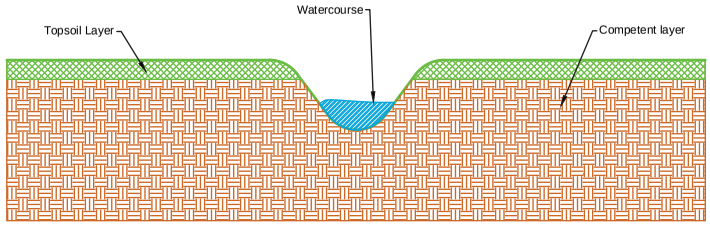
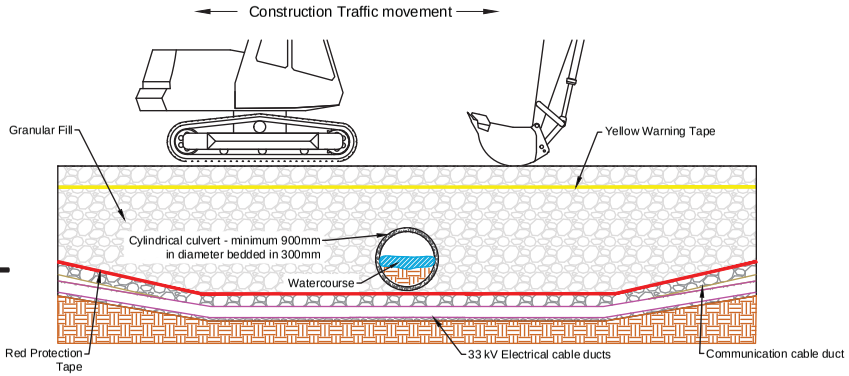
C1



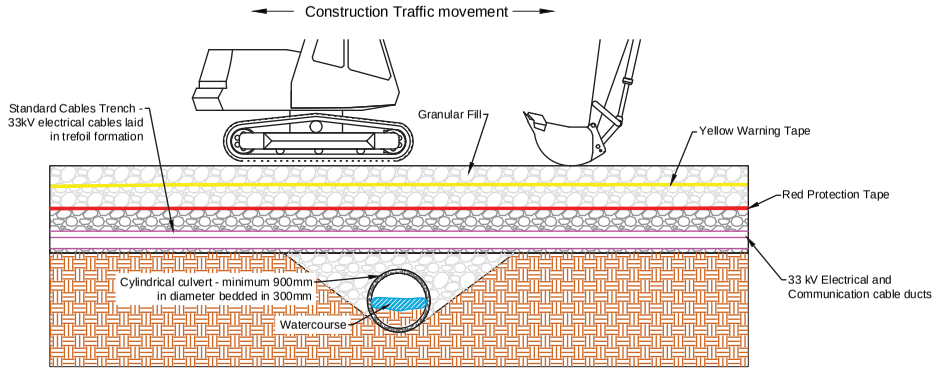
Cross Section View D - D of watercourse crossing C1 - Existing watercourse

C1



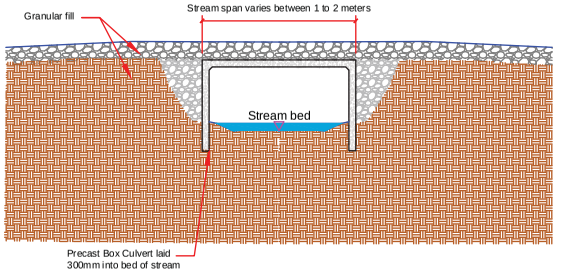
Cross Section View of watercourse crossing types C1 - Cables trench under new permanent crossing structure

C1

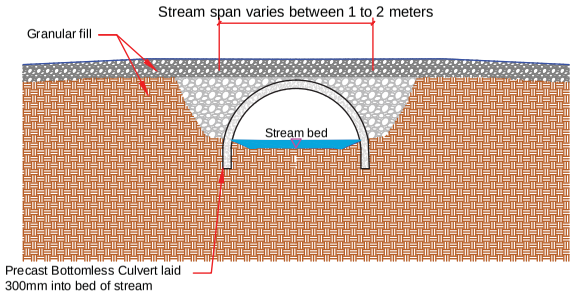


Cross Section View of watercourse crossing C1 - Cables trench over new permanent crossing structure

(Watercourse dammed and over-pumped)



Permanent Crossing structure - Bottomless Box Culvert



Permanent Crossing structure - Bottomless Box Culvert

Note:

The damming and over-pumping method will typically be carried out at watercourses where a permanent crossing structure is being installed or where an existing culvert is being replaced.

All permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be at least 900mm in diameter regardless of the anticipated flood flow. 900mm culverts will be set into the river bed to a depth of 300mm and 1200mm culverts will be set in 500mm.

Title:

Figure RW 5.18

Watercourse Crossing Type C1 - New Permanent Structure

Note :
Drawings not to scale. For illustration purposes only

Watercourse Crossing Type C1 (Total 5)

Class 2 - EPA Blue Line Equivalent - Fisheries Value: WW4

Class 4 - Drain - No Fisheries Value: WW1, WW15, WW,24, WW25

Description of Crossing Type C1

- No existing crossing structure
- Instream Works
- Cable and Traffic crossing
- Installation of New Permanent watercourse crossing structure
- 33kV Cables and Ducting installed over or under new permanent watercourse crossing structure

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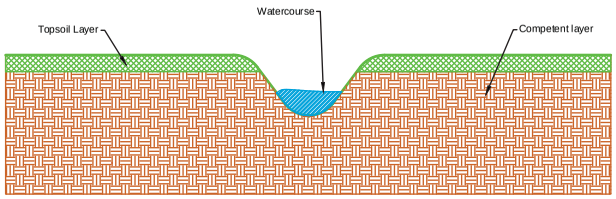
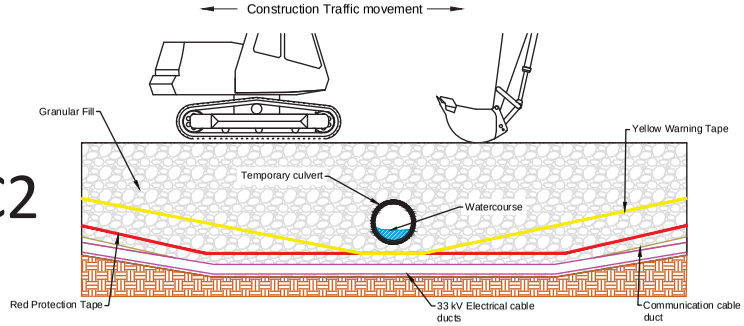
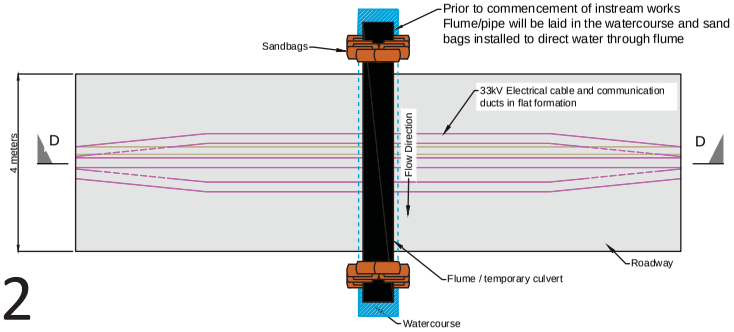
C2



Cross Section View D - D of watercourse crossing C2 - Existing watercourse



Cross Section View D - D of watercourse crossing types C2 -
Cables trench under new temporary crossing structure



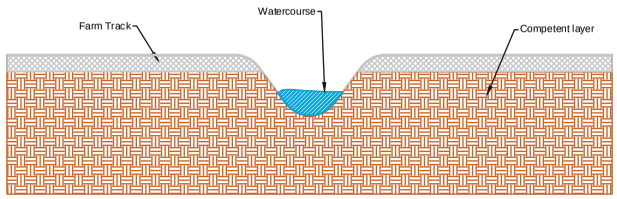
Plan View of watercourse crossing C2 - Cables trench under new temporary crossing structure

(Watercourse dammed and flume installed during instream works)

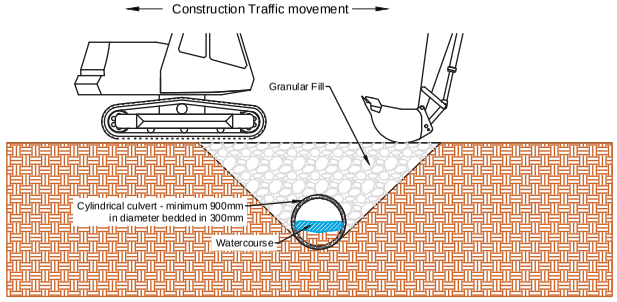
Note:

The flume/pipe watercourse crossing method will typically be used where a temporary watercourse crossing structure is proposed.

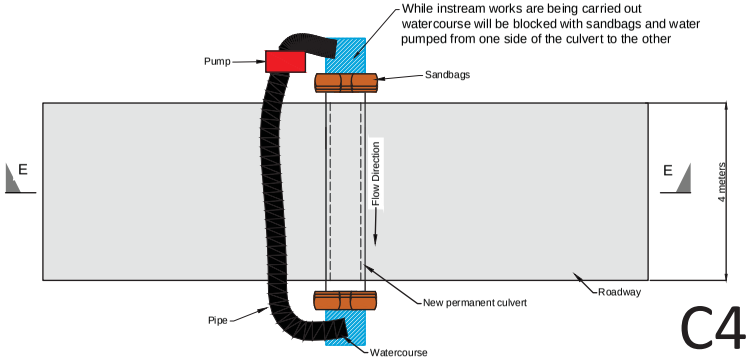
C4



Cross Section View D - D of watercourse crossing W90 - Existing watercourse



Cross Section View E - E of watercourse crossing types C4 -
Traffic over new permanent crossing structure



Plan of watercourse crossing types C4 - Traffic over new permanent crossing structure

(Watercourse dammed and over pumped during instream works)

Note:

The damming and over-pumping method will typically be carried out at watercourses where a permanent crossing structure is being installed or where an existing culvert is being replaced.

All permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be at least 900mm in diameter regardless of the anticipated flood flow. 900mm culverts will be set into the river bed to a depth of 300mm and 1200mm culverts will be set in 500mm

Title:

Figure RW 5.19

Watercourse Crossing Type C2 - New Temporary Structure & Watercourse Crossing Type C4 - New Permanent Structure

Note :
Drawings not to scale. For illustration purposes only

Watercourse Crossing Type C2 (Total 5)

Class 2 -EPA Blue Line Equivalent - Fisheries Value: WW7

Class 4 - Drain - No Fisheries Value: WW5, WW8, WW16, WW27

Description of Crossing Type C2

- No existing crossing structure
- Instream Works
- Cable and Traffic crossing
- Installation of New Temporary watercourse crossing structure
- 33kV Cables and Ducting installed under new temporary watercourse crossing structure

Watercourse Crossing Type C4 (Total 3)

Class 2 - EPA Blue Line Equivalent - Fisheries Value: WW22

Class 3 - Sub-Optimal - Low Fisheries Value: WW14

Class 4 - Drain - No Fisheries Value: WW13

Description of Crossing Type C4

- No existing crossing structure
- Instream Works
- Traffic crossing only
- Installation of New Permanent watercourse crossing structure
- No Cables or Ducting installed

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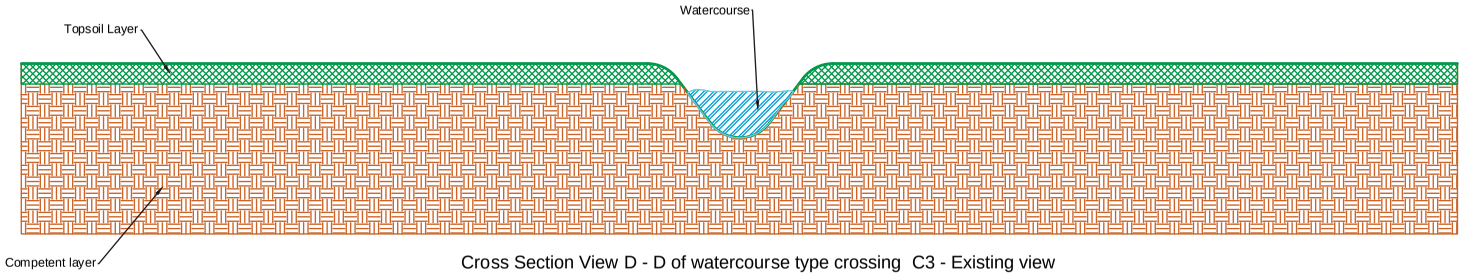
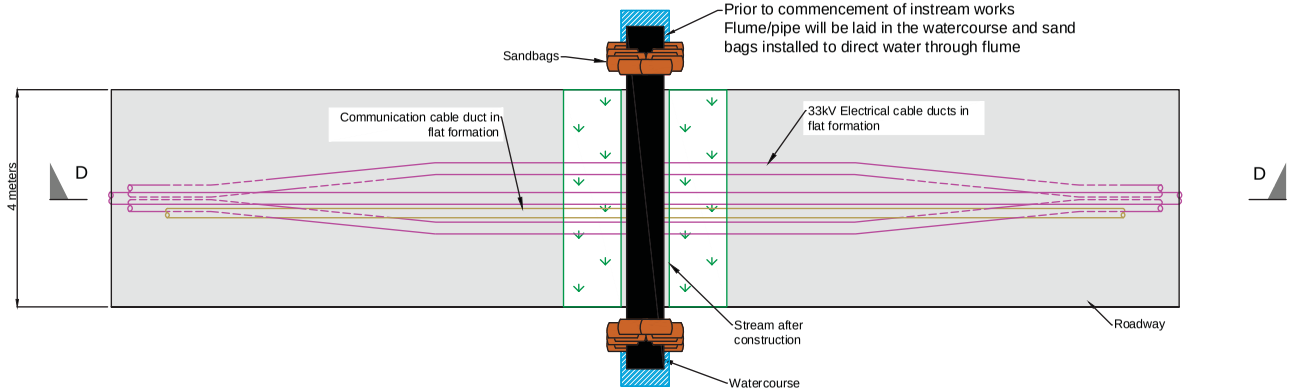
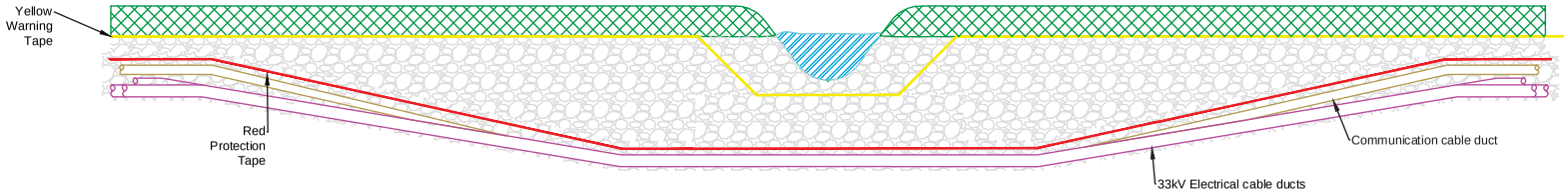


Cross Section View D - D of watercourse type crossing C3 - Existing view



Plan View of watercourse crossing type C3 - Cables trench across watercourse

(Watercourse dammed and over-pumped)



Cross Section D - D of watercourse crossing type C3 - Cables trench across watercourse

Note:

The damming and over-pumping method will also be used at cable-only crossings where flows are very low at the time of the proposed crossing works.

The flume/pipe watercourse crossing method will also be used or at cable-only crossings where flows are too large to be managed by the dam and over pump method at the time of the proposed crossing works.

Title:

Figure RW 5.20

Watercourse Crossing Type C3 - Internal Windfarm Cable trench and ducting only

Note :
Drawings not to scale. For illustration purposes only

Watercourse Crossing Type C3 (Total 9)

Class 1 - EPA Blue Line - Fisheries Value: WW19

Class 2 - EPA Blue Line Equivalent - Fisheries Value: WW28

Class 3 - Sub-Optimal - Low Fisheries Value: WW18

Class 4 - Drain - No Fisheries Value: WW3, WW9, WW10, WW17, WW20, WW26

Description of Crossing Type C3

- No existing crossing structure
- Instream Works
- Cable crossing only
- No watercourse crossing structure required
- 33kV Cables and Ducting installed under watercourse

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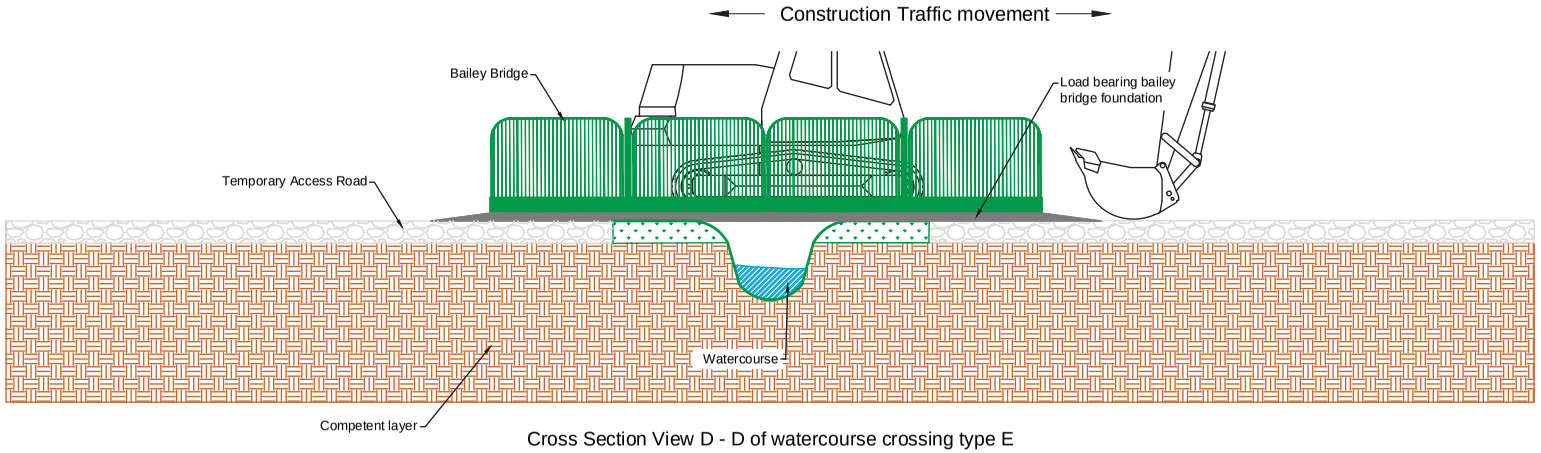
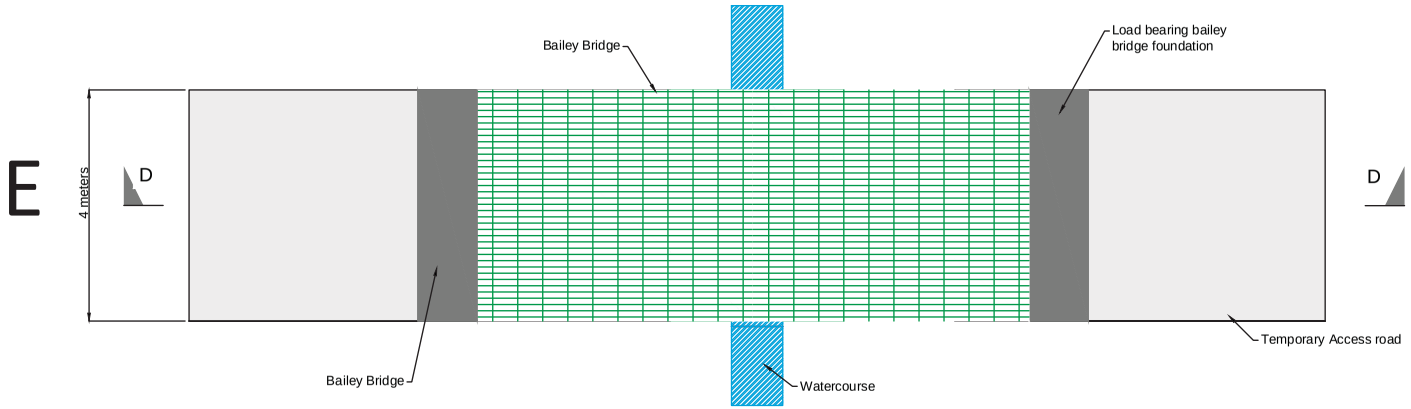
E



Cross Section View D - D of watercourse crossing type E
Bailey Bridge - (No Instream Works)

E



Plan View of watercourse crossing type E
Bailey Bridge - (No Instream Works)

Title:

Figure RW 5.21

Watercourse Crossing Type E - Plan and Cross Section Views of Bailey Bridge

Note :
Drawings not to scale. For illustration purposes only

Watercourse Crossing Type E

Used at C type water crossings where required

Description of Crossing Type E

- No existing crossing structure
- No instream Works
- Traffic crossing only
- No Cables or Ducting installed

REFERENCE DOCUMENTS

Project:
UWF Related Works (RW)

Drawn by:	Checked by:	Date:	Sheet Size:
CB	JB	11-Feb-18	A3

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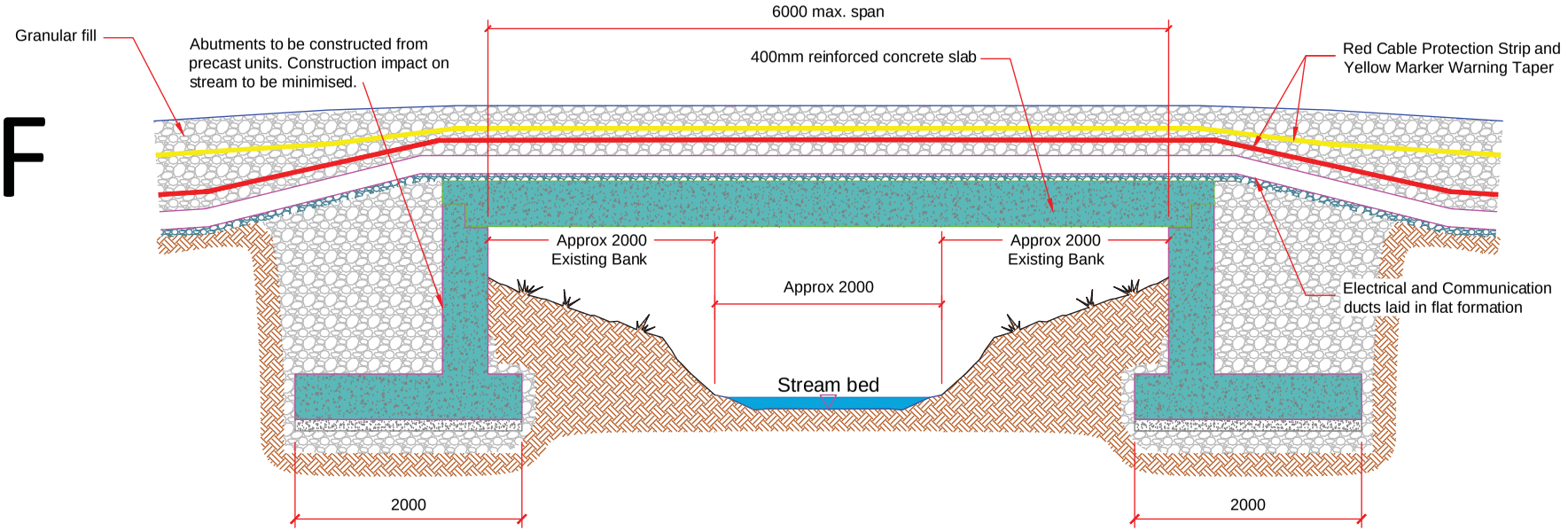
F

Note:
Slab to be designed to withstand all vehicular traffic loading.

Permanent Crossing structure - Clear span bridge



Title:
Figure RW 5.22

Watercourse Crossing Type F - New permanent clear-span bridge

Map Number:
N/A

Note :
Drawings not to scale. For illustration purposes only

Watercourse Crossing Type F (Total 1)

Class 2 - EPA Blue Line Equivalent - Fisheries Value: WW2

Description of Crossing Type F

- No existing crossing structure
- No Instream Works
- Internal Windfarm Cabling installed over watercourse using the consented UWF Clear span bridge
- Cable and Traffic crossing

REFERENCE DOCUMENTS

Project:
UWF Related Works (RW)

Drawn by:	Checked by:	Date:	Sheet Size:
CB	JB	11-Feb-18	A3

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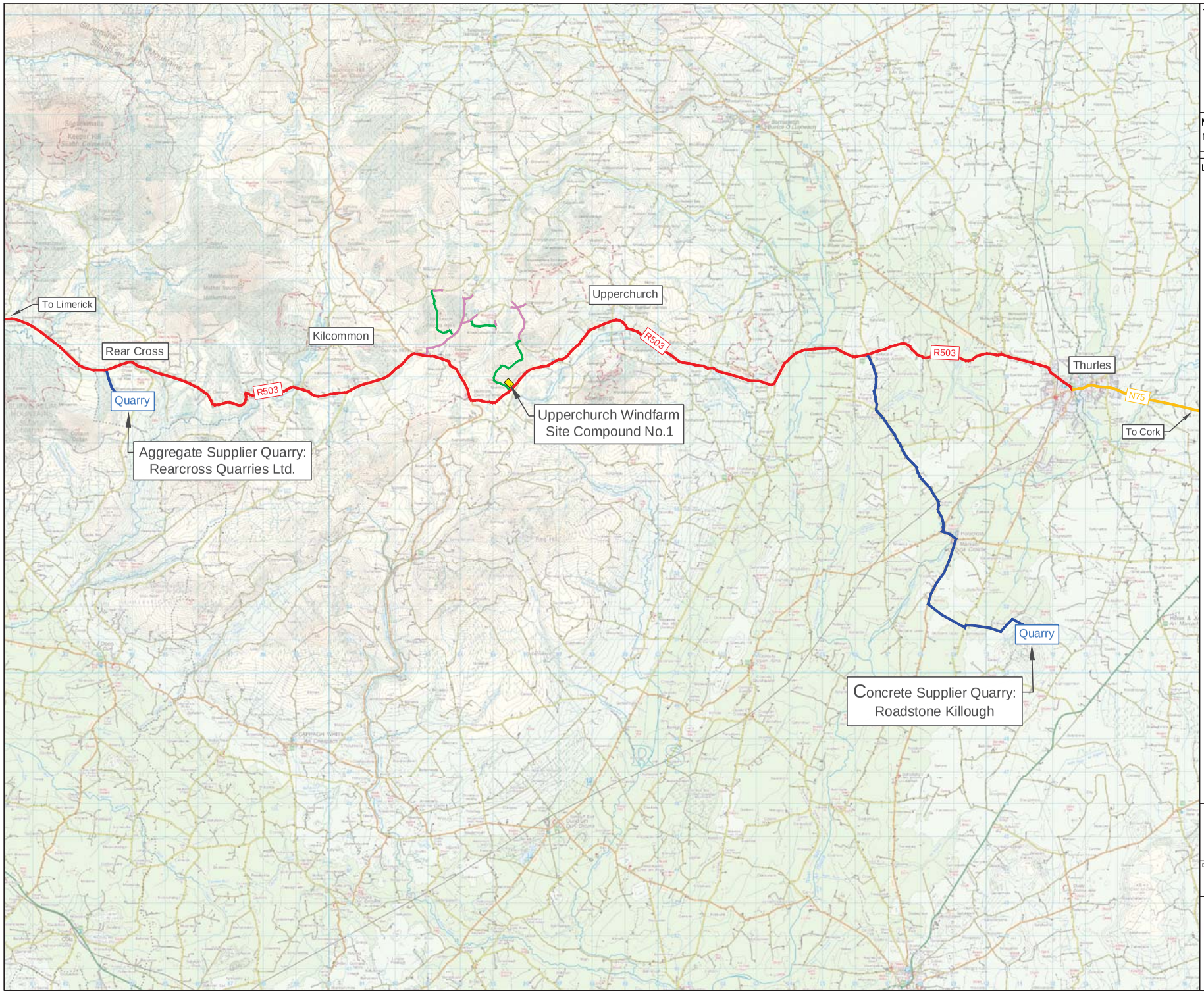

Title:

Figure RW 5.23

Haul Routes for Delivery of Aggregate, Concrete and Other Materials to UWF Site Compound No.1

Map Number:

Map 1 of 1

Legend:

- Haul Route from Local Quarries to the R503
- Regional Road R503
- National Road N75
- Upperchurch Windfarm Site Compound No.1
- Local Roads used to access the UWF Related Works Areas
- Consented UWF Roads used to access the UWF Related Works Areas

REFERENCE DOCUMENTS

Project:

UWF Related Works (RW)

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AB	JB	19-Feb-18	A3

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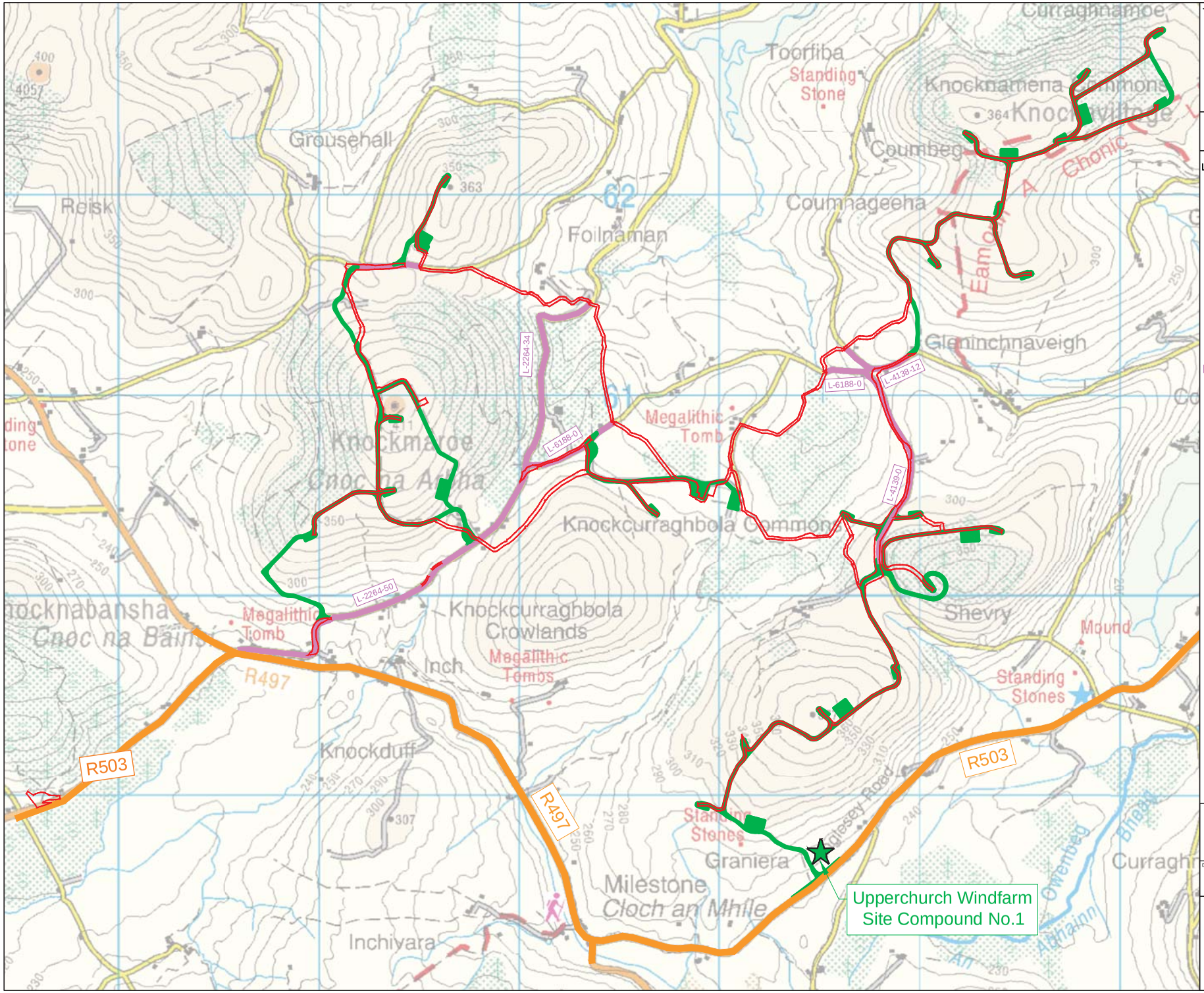

Title:

Figure RW 5.24

Haul Routes from UWF Site Compound No.1 to Construction Works Areas

Map Number:
Map 1 of 1

Legend:

- UWF Related Works Construction Works Area
- Haul Route along local roads from the R503 or the Upperchurch Windfarm Site Compound No.1 to the UWF Related Works Areas
- Consented UWF Roads
- Upperchurch Windfarm Site Compound No.1
- Regional Road
- L-4138-12 Public Road Number

N

REFERENCE DOCUMENTS

Project:
UWF Related Works (RW)

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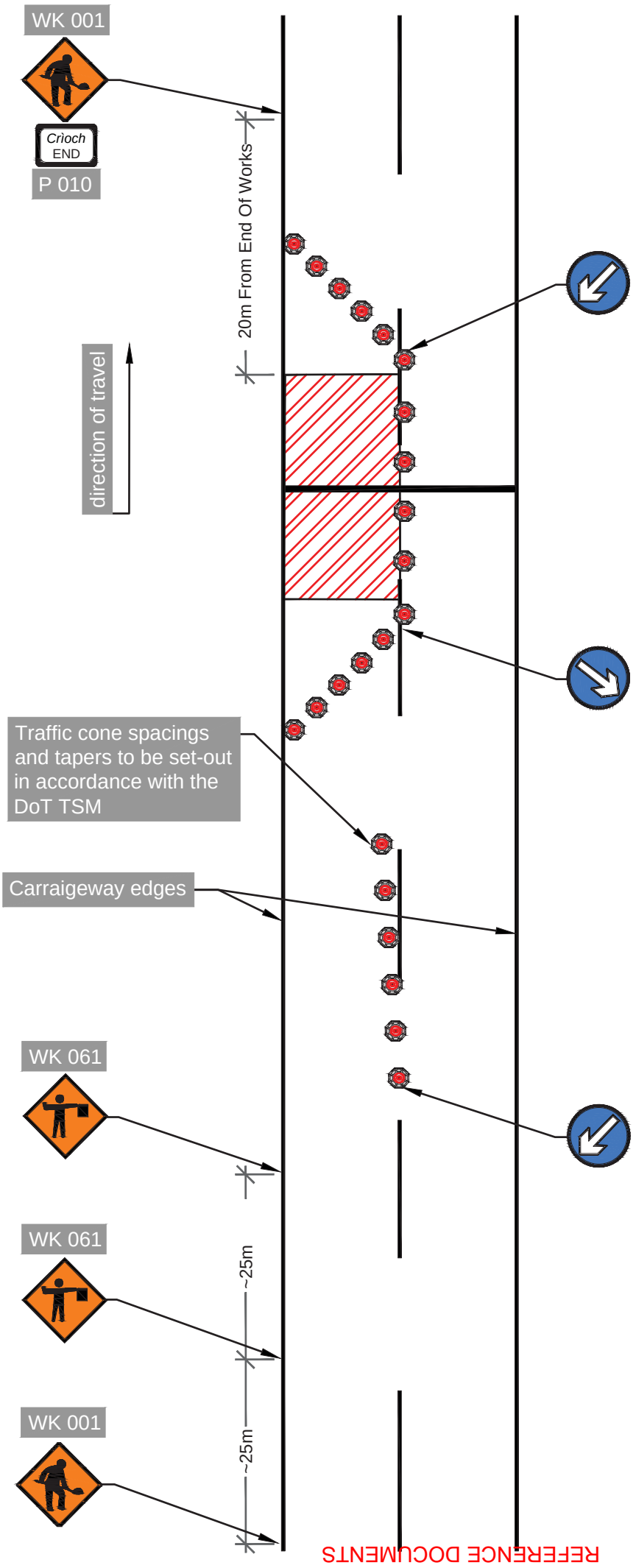

REFERENCE DOCUMENTS

Title:

Figure RW 5.25

Advance Warning Signage for Half Lane Closures

Designed in conjunction with

NRB consulting engineers

Note: This drawing is not to scale

Department of Transport Traffic Signs Manual (DoT TSM)

Project:

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Title:

Figure RW 5.26

Operational Stage Land Use Change

Map Number:
Map 1 of 1

Legend:

- Agricultural Lands to New Permanent Road
- Forestry to Permanent Road
- Forestry to Forestry Firebreak

N

REFERENCE DOCUMENTS

Project:
UWF Related Works (RW)

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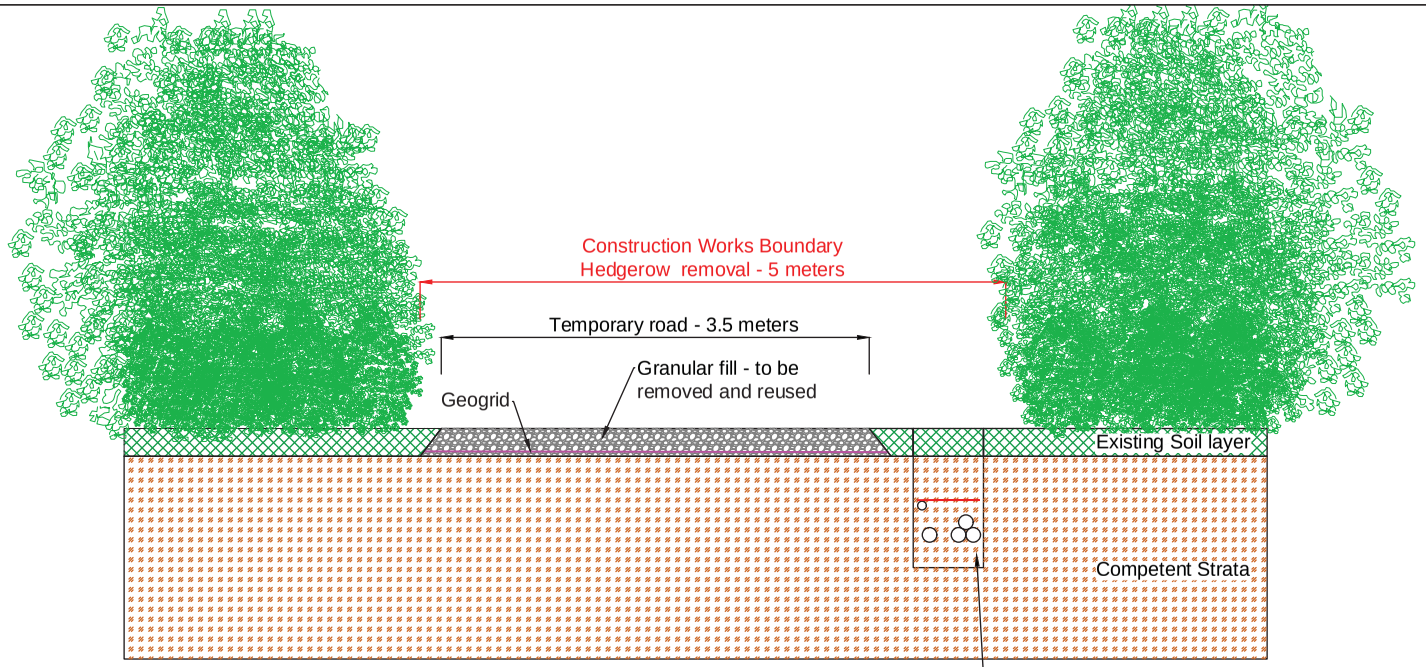
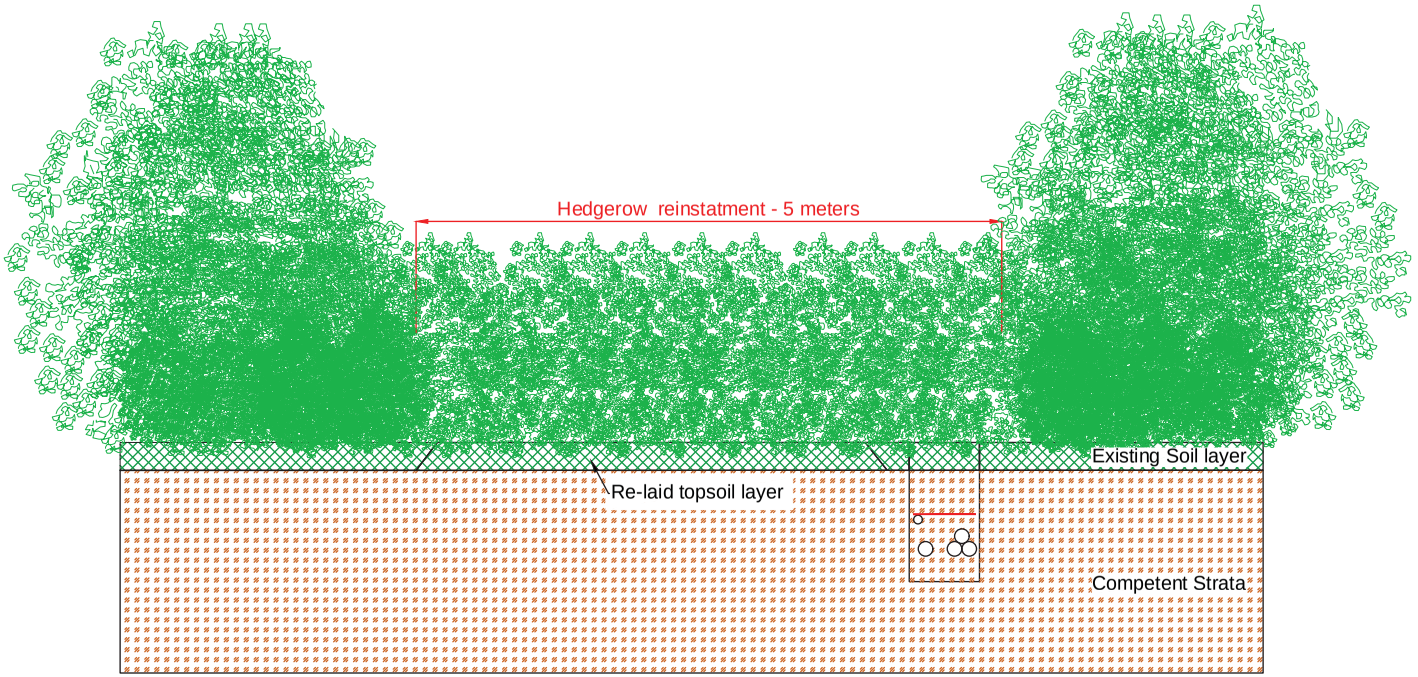


Cross Section of Hedgerow Removal and temporary access road - Construction Phase



Cross Section of Hedgerow Reinstatement and temporary access road - Post Construction

Title:

Figure RW 5.27

Cross Section of Hedgerow Removal and Reinstatement

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

REFERENCE DOCUMENTS

Designed in conjunction with

Inis

Project:

UWF Related Works (RW)

Drawn by:	Checked by:	Date:	Sheet Size:
CB	JB	11-Feb-18	A3

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Appendix to Chapter 5: Description of Development (UWF Replacement Forestry)

Appendix 5.5: Compiled Description of Upperchurch Windfarm

The data and descriptions in this appendix have informed Chapter 5: Description of Development (UWF Replacement Forestry) of the EIA Report. The information presented in this Appendix 5.5 is outlined below and the relevant element(s) of the Whole UWF Project are also identified.

Appendix	Title	Relevant EIAR
A.5.5	Complied Description of Upperchurch Windfarm	Upperchurch Windfarm

Appendix to Chapter 5: Description of Development

Appendix 5.5: Compiled Description of Upperchurch Windfarm

A5.5 - 5.1 Introduction to Appendix 5.3

An application for planning permission for Upperchurch Windfarm (UWF) was made to Tipperary County Council in January 2013. The windfarm was permitted by Tipperary County Council in January 2014 and the permission was upheld by An Bord Pleanála in August 2014. The application was accompanied by an EIA Report (known as EIS at the time) and Natura Impact Statement. The full planning documents for consented UWF can be found in **Volume F: Whole UWF Project Reference Documents.**

This Compiled Description of Upperchurch Windfarm, has been compiled from information in the original 2013 UWF EIS, in the 2013 Reply to Further Information, in the additional information submitted during the planning process and planning conditions attaching to the Grant of Permission, in order to present a description of the development, in the final form, as has been granted permission. This compilation chapter has been prepared in the same format as the Description of the Development chapters (Main EIA Report Chapter 5's) for the UWF Grid Connection, the UWF Related Works and the UWF Replacement Forestry in particular Sections 5.2, 5.3, 5.4 and 5.5. For ease of cross referencing the number system used here is also the same, i.e. A5.3-5.2, A5.3-5.3 etc. Figures and drawings are included at the end of this compilation document, and are as submitted as part of the consented Upperchurch Windfarm Planning Application.

The data and descriptions in this appendix have informed the environmental factor evaluations in the EIAR Main Report, in relation to the evaluation of cumulative effects of the subject development together with the other elements of the Whole UWF Project and with other existing or consented projects or activities.

Upperchurch Windfarm (UWF) is described in this compilation chapter, in the following order:

Appendix 5.5 Sections	Section Heading	Relevant Individual Project Element
A5.5-**5.2**	Characteristics of Upperchurch Windfarm (UWF)	Upperchurch Windfarm
A5.5-**5.3**	Life Cycle Stages of the UWF The durations and timing, main activities, personnel and material requirements for both the construction and operation stages. Any changes to the Project, such as decommissioning.	
A5.5-**5.4**	The use of natural resources, emissions and production of wastes for each stage.	
A5.5-**5.5**	The vulnerability of the Project to major accidents and natural disasters.	
A5.5-**5.6**	Figures and Mapping	

List of Figures for Appendix 5.3

Figure UWF-1: Location of Upperchurch Windfarm
Figure UWF 2: Wind Turbine Elevation
Figure UWF 3: Electrical Substation Compound Elevation View
Figure UWF 4: Proposed Internal Roads Details
Figure UWF 5: Site Entrance No. 1 (Graniera, R503)
Figure UWF 6: Turbine Component Haul Route

A5.5 - 5.2 Characteristics of Upperchurch Windfarm

Upperchurch Windfarm (UWF) will comprise 22 No. wind turbines, 2 No. meteorological masts, 22 No. turbine foundation and crane hardstanding areas, site roads and an electrical substation.

A5.5- 5.2.1 Purpose of Upperchurch Windfarm (UWF)

These 22 No. wind turbines will produce 150 million kWh of green electricity, capable of supplying 23,000 houses in the region. The production of 150million kW/h per annum of green electricity will avoid the emission of 128,118 tonnes of greenhouse gases per annum which would have resulted from generating the same amount of electricity by fossil fuel plant. Unlike conventional power sources, the creation of electricity from the wind does not pollute the physical environment; it creates no contribution to climate change or acid rain and emits no radiation or nuclear waste.

A5.5- 5.2.2 Location and overview description of UWF

The Upperchurch Windfarm site is located in the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnaman, Gleninchnaveigh, Coumnageeha, Coumbeg, Knocknamena Commons, Glenbeg and Seskin. This is an area 2km west of Upperchurch village and 18km to the west of Thurles, County Tipperary.

The windfarm and ancillary works will be constructed on a series of small hills ranging in elevation from 280m to 401m OD, set out generally over four areas. The electrical substation will be constructed in Knockcurraghbola Commons and the wind turbines will be connected by underground cables to this substation. There will be two meteorological masts erected, one in Grousehall and a second in Knocknamena townlands. Ancillary Works will include borrow pits in Shevry, Knocknamena, Knockmaroe and Grousehall; 1 No. site entrance from the R503 Regional Road at Graniera; and 10 No. site entrances from local public roads, through and around the site, which will provide access to the windfarm.

Relevant Figures (contained at the end of this Appendix 5.3)

Figure UWF-1: Location of Upperchurch Windfarm

A5.5- 5.2.3 Characteristics of UWF

Upperchurch Windfarm comprises:

- Consented UWF Turbines
- Consented UWF Substation
- Consented UWF Roads
- UWF Ancillary Works

Note: "Consented" prefixes each part of the already consented Upperchurch Windfarm in order to clearly identify the already consented elements of the whole windfarm project, throughout the project documents.

A5.5-5.2.3.1 Consented UWF Turbines

Planning Permission has been received to develop 22 No. wind turbines of the three-bladed, tubular tower model, light grey in colour not exceeding an overall height of 126.6 metres and a hub height of 81.6 metres. The turbines will be constructed on concrete bases, 225m^2 in plan, with an adjacent concrete hardstand of 1040m^2 in plan area. There is no requirement for fencing of turbine areas. The turbines will be connected by underground cables to the Consented UWF Substation.

Relevant Figures (contained at the end of this Appendix 5.3)

Figure UWF 2: Wind Turbine Elevation

A5.5-5.2.3.2 Consented UWF Substation

Planning Permission has been received to build an electrical substation at the windfarm, comprising an 110kV substation compound which includes a control building, main transformer and an end–mast enclosed in a compound by a palisade fence. The substation will measure 64m x 41m and will be 2624m^2 in plan area.

Relevant Figures (contained at the end of this Appendix 5.3)

Figure UWF 3: Electrical Substation Compound Elevation View

A5.5-5.2.3.3 Consented UWF Roads

Planning Permission has been received to build 11.6km of windfarm access roads, comprising 8km of newly built, 5m wide roads and 3.6km of existing farm roads which will require upgrading and widening (average by 2m widening).

Relevant Figures (contained at the end of this Appendix 5.3)

Figure UWF 4: Proposed Internal Roads Details

A5.5-5.2.3.4 Consented UWF Ancillary Works

A5.3 -5.2.3.4.1 Meteorological Masts

Planning Permission has been received to erect two meteorological masts with wind measuring equipment attached, not exceeding a height of 80 metres. One mast is permitted in Grousehall and the second in Knocknamena townlands.

A5.3 -5.2.3.4.2 UWF Site Entrances

Planning Permission has been received to develop 1 No. site entrance from the R503 Regional Road at Graniera, which is the main site entrance (No.1) and; 10 No. site entrances from Local Roads, through and around the site, which will provide access to the Consented UWF Roads and thereon to the wind turbines and substation.

Site Entrance No.1 at Graniera is an existing field gate on Regional Road R503. This entrance will be widened to satisfy the sightline requirements as set out in Table 10.1 of the North Tipperary County Development Plan 2010 (as amended).

During the operation phase, the other entrances from the Local Roads throughout the site will be used for operation and maintenance traffic, which will mainly be four wheel drive vehicles and vans. Site Entrance No.1 will be closed, except in the very occasional event of a replacement of a major component or for decommissioning the windfarm.

Relevant Figures (contained at the end of this Appendix 5.3)

Figure UWF 5: Site Entrance No. 1 (Graniera, R503)

A5.3 -5.2.3.4.3 Watercourse Crossing

The Upperchurch Windfarm site drains into streams that form the upper reaches of the Turraheen, Owenbeg, Clodiagh and Aughvana Rivers. One stream crossing will be required on the UWF site, to the north of Turbine No.4. Planning Permission has been received to construct a new permanent clear span bridge or bottomless culvert at this crossing point.

A5.3 -5.2.3.4.4 Drainage System

The Sediment and Erosion Plan, detailed in Appendix 15-I of the 2013 EIS, described the drainage measures which will be implemented during construction of UWF. The drainage plan will control erosion, minimise disturbance to the current hydrological regime and minimise suspended sediment loading to watercourses during construction.

Access tracks will be provided with drainage ditches to collect surface water runoff from the tracks and to ensure that road foundations are protected from standing water. Surface water drains will also be provided around hardstandings, foundations and the compound. Upslope drains will be constructed so as to keep clean water separate from runoff that may be contaminated by sediment. This is standard practice in the control of sediments in windfarm construction. Sediment traps will be used to ensure that all water discharged is clean.

A5.3 -5.2.3.4.5 UWF Site Compounds

Permission has been received to develop 2 No. site compounds, to be used during the construction phase of UWF. The location of these two site compounds is identified on **Figure UWF 1**.

Site Compound No. 1, will be the main site compound and is proposed for 170m inside of Site Entrance No. 1 (at Graniera). All construction and deliveries vehicles will access the site at Site Entrance No. 1. All vehicles will be fully clear of the public road before stopping at the compound. The compound will comprise sign-in hut; main site offices; parts storage area; employee/visitor parking; induction office; canteen (including self-contained fresh water tank and waste water tank); drying room; toilet cabin unit (including self-contained effluent tank and water storage tank); wheel wash area with siltation pond for wheel wash wastewater; concrete wash in a designated bunded and impermeable truck wash area with siltation pond for settling out of solids; and a bunded fuel storage area. Following construction, Site Compound No.1 and associated facilities will be removed and the area will be appropriately reinstated.

Site Compound No. 2 is proposed for an area around an unoccupied house, yard and outhouses, belonging to one of the windfarm landowners, in the centre of the site and 155m east of the windfarm sub-station compound. It is intended as a convenience area in the centre of the site. This smaller compound will comprise car parking and parts storage sheds. The unoccupied house will be converted to an office space, canteen and toilet facility for the windfarm construction personnel. This house already has water (ground water from a well) and sanitary facilities (septic tank).

A5.3 -5.2.3.4.6 UWF Site Office

Following construction, Site Compound No. 2 will be retained for use by the maintenance personnel for the operational phase of the Upperchurch Windfarm.

A5.3 -5.2.3.4.7 Borrow Pits

There are six borrow pits identified on the Upperchurch Windfarm site which will be used to quarry stone for the construction. Post construction, borrow pits will be backfilled and covered with topsoil and reseeded. The finished levels will follow the natural contours of the ground to prevent ponding and maintain the natural surface water flow. Depressions will be avoided to ensure surface water ponding does not occur.

A5.3 -5.2.3.4.8 Forestry Felling

Prior to construction, clear-felling of 4.4 hectares of conifer plantation will be required to facilitate the construction the proposed windfarm and associated infrastructure.

A5.3 -5.2.3.4.9 Hedgerow Removal

Approximately 980m of hedgerow along field boundaries will be removed as part of the construction of Upperchurch Windfarm infrastructure. 360m relates to suitable bat foraging habitat. To mitigate this loss of habitat, an equivalent amount of new hedgerow will be planted.

A5.3 -5.2.3.4.10 Fencing

The Consented UWF Substation will be fenced according to ESB regulation. There is no requirement for fencing of turbine areas as access can only be gained to the towers through a steel door which is locked at all times. There will be some agricultural fencing erected on the UWF site where required by the landowners and any existing fencing along farm boundaries will be restored.

During construction, buffer zones will be fenced off to protect environmental features, such as Recorded Monuments and watercourses. Sediment ponds will also require perimeter fencing and signage to ensure that there are no health and safety risks.

A5.3 -5.2.3.4.11 Storage of Excavated Material

Approximately 28,000m^3 of topsoil and peat will be excavated as part of the construction of UWF.

Temporary engineered deposition areas will be designated and designed to hold temporary stockpiles which will be located away from drains and watercourses. Soil will be formed into bunds along the access roads and around the crane hardstand areas. These bunds will be constructed to a maximum height of 1.0m with a width at base of 3.0m and side slopes of 2:1. Bunds and stockpiles at risk of erosion, will be protected by silt trapping apparatus such as a geo-textile silt fences to prevent contaminated runoff.

A5.5- 5.2.4 Environmental Project Measures which are part of the Consented UWF

The consented Upperchurch Windfarm includes a number of mitigation and management measures which will prevent likely significant effects occur to the receiving environment. These measures will be implemented through two separate Environmental Management Plans for the UWF; one for the construction stage and one for the early operational stage. A copy of these Plans was submitted with the 2013 RFI documents.

The Construction Environmental Management Plan will include:

- Surface Water Management Plan
- Ecological Management Plan
- Waste Management Plan
- Traffic Management Plan
- Construction Phase Environmental Monitoring Schedule
- Environmental Management Procedures (EMP) for:
    - Site Environmental Training and Awareness Procedure
    - Environmental Emergency Response Plan
    - Wheel Wash and Dewatering Procedure
    - Concrete Control Procedure
    - Fuel and Oil Management Plan
    - Surface Water management Plan
    - Traffic Management Plan
    - Protection of Archaeological and Cultural Heritage
    - Management of Excavation and Spoil
    - Management of Borrow Pits
    - Waste Management Plan
    - Air, Dust and Noise Management Plan
    - Site Reinstatement Procedure (post construction)
    - Monitoring and Auditing Procedure
    - Environmental Accidents, Incidents and Corrective Actions Procedure
    - Environmental Complaints Procedure
    - Environmental Monitoring Committee Procedure

The Early Operational Phase Environmental Management Plan will include:

- Ecological Management (Post Construction)
- Operation Phase Environmental Monitoring Schedule
- Environmental Management Procedures (EMP) for:
    - UWF-EMP-OP-1: Monitoring and Auditing Procedure
    - UWF-EMP-OP-2: Site Reinstatement Procedure (post construction)
    - UWF-EMP-OP-3: Procedure for Ecological Management (Post Construction)

The following planning conditions, which formed part of the 2014 Grant of Permission will be included, as relevant, in the Environmental Management Plans:

- Condition-1: The development shall be carried out and completed in accordance with the plans and particulars lodged with the application.
- Condition-2: All environmental mitigation measures set out in the Environmental Impact Statement, Natura Impact Statement and associated documentation shall be implemented in full.
- Condition-6: Prior to commencement of construction, details of the phasing of the construction works shall be agreed with the National Parks and Wildlife Service.
- Condition-10: The construction works shall be carried out in accordance with construction details submitted to the planning authority, including the Construction Management Plan.
- Condition-11: Wind Turbine noise arising from the development shall not exceed stated levels.
- Condition-12: Wind Turbine shadow flicker arising from the development shall not exceed stated levels.
- Condition-13: In the event that the development causes interference with telecommunications signals, effective measures shall be introduced to minimise interference.
- Condition-15: The management of drainage and surface water during the construction stage shall be in accordance with the details submitted in the Construction Management Plan, the Ecological Management Plan and the Environmental Management Plan. Furthermore revised drawings shall be submitted to the planning authority prior to commencement showing compliance with condition 15 regarding fuel storage, designated refuelling areas, wheel wash areas and concrete wash areas.
- Condition-16: There shall be no new provision for discharge of foul effluent on site without a prior grant of planning permission.
- Condition-17: Prior to construction between mid-March and mid-August, a survey for breeding hen harriers shall be carried out. Taking account of the results of this survey, no construction works shall be carried out within the above period within 500m of a pre nesting breeding site, except with the written approval of the National Parks and Wildlife Service.
- Condition-18: The Ecological Management Plan submitted shall be implemented in full. A timescale of enhancement of foraging areas, rush management, hedgerows enclosures and trees and land management shall be agreed with the planning authority following consultation with the National Parks and Wildlife Service prior to commencement. A programme of ongoing surveys and monitoring in years 2 and 3 after commencement of the operation of the turbines shall be submitted and agreed in writing with the planning authority following consultation with the National Parks and Wildlife Service prior to commencement.
- Condition-19: Details as outlined in the Ecological Management Plan shall be implemented. A timescale for implementation shall be submitted and agreed in writing with the planning authority following consultation with the National Parks and Wildlife Service prior to commencement.
- Condition-20: The developer shall facilitate the archaeological appraisal of the site and shall provide for the preservation, recording and protection of archaeological materials or features. This will allow for an onsite archaeologist, in consultation with the National Monuments Service and the National Museum of Ireland, to monitor groundworks and stop works in the event of any archaeological features or objects being uncovered during excavation works, and will ensure that any features or objects uncovered will be correctly recorded and/or preserved, in consultation with the National Monuments Service and the National Museum of Ireland.

- Condition-21: Mitigations measures submitted for the protection of water quality shall be implemented in full and according to best practice guidelines. The works shall be supervised as set out in the Construction Management Plan. In the event of a water pollution incident or damage the relevant authorities shall be immediately notified and works cease until authorized to continue. A programme of hydrographic monitoring shall be carried out over a period commencing pre-construction and concluding in year 3 of the operational phase of the development.
- Condition-23: The developer shall lodge a cash deposit/bond to secure the reinstatement of public roads that may be damaged by the transport of materials to the site.

A5.5 - 5.3 Life Cycle Stages of Upperchurch Windfarm

A5.5- 5.3.1 Construction Stage of Upperchurch Windfarm

A5.5-5.3.1.1 Duration & Timing

The construction timetable is detailed in Table 1 below;

Table 1: Duration and timing of the construction of the Upperchurch Windfarm

Activities	Duration	Timing of Activities
• Civil works • Delivery and erection of wind turbines • Electrical works • Commissioning of the electrical works.	6 months	Projected Start Date: 2018/2019
• Electrical Works 1. (carried out in conjunction with the civil works)	4 months	
• Turbine Erection and commissioning 2. (turbines are normally installed when the majority of the civil works are completed)	16 weeks	

A5.3 -5.3.1.1.1 Construction Hours of Work

Normal construction times will be 07.00 to 19.00hrs Monday to Friday and 08.00 – 16.30hrs on Saturdays.

A5.3 -5.3.1.1.2 Scheduling of Works

To protect residential amenity, surface water quality and biodiversity, the following timing or scheduling of works will be implemented according to planning conditions No. 6 and No. 17 per;

Condition No. 6: Prior to commencement of construction, details of the phasing of the construction works shall be agreed in writing with the planning authority, following consultation with the National Parks and Wildlife Service. **Reason**: In the interest of the protection of the environment.

Condition No. 17: Prior to the carrying out of any construction works between mid-March and mid-August, a survey for breeding hen harriers shall be carried out by a competent, experienced ornithologist. The survey will cover the area within 500 metres of the works to be carried out during the above period. It will be the responsibility of the ornithologist to ensure that the survey methodology is sufficient to ensure that a hen harrier breeding site is not overlooked. Taking into account the results of this survey, no construction works shall be carried out within the above period within 500 metres of a pre nesting breeding site and/or nest, except with the written approval of the National Parks and Wildlife Service. **Reason:** In the interest of the protection of the environment and of the habitat of the hen harrier species.

A5.5-5.3.1.2 Construction Personnel

During the construction stage, c.277 persons will be engaged in the civil, electrical, project management, legal and financial services, material supply and component deliveries for UWF, approximately 100 people will work on-site during construction.

A5.3 -5.3.1.2.1 Construction Personnel Welfare Facilities

Welfare facilities will be available at Site Compound No. 1 (adjacent to Site Entrance No. 1) and Site Compound No. 2 (in the centre of the site).

A5.5-5.3.1.3 Construction Stage Activities

The Construction stage of the windfarm will include the following activities

- Clearance and construction of hard-core area for temporary compound and mobilisation of site offices including bunded area for fuel and diesel tanks.
- Construction of new access roads and hardstandings including installation of drainage per the Surface Water Management Plan.
- Installation of meteorological mast.
- Excavation of the turbine bases and storage of soil locally for backfilling and re-use.
- Place blinding concrete to turbine bases. Fix reinforcing steel and anchorage system for turbine tower section. Construct shuttering and fix any ducts to be cast in. Pour and cure concrete for turbine bases. Excavate cable trenches; lay cables and backfill.
- Erect towers, nacelles and blades.
- Complete earthings to towers and complete backfilling to foundations.
- Construction of substation compound, install the electrical and telecom plant, test and commission the plant.
- Provide any gates, landscaping and signage and complete any site works outstanding.
- Reinstate the site including removal of the two temporary compounds; reinstatement and landscaping of the two temporary compound hardstands; reinstatement of road verges (use of soil); reinstatement of any temporary construction hardstands; reinstatement of the site borrow pits and; replacement and renewal of hedgerows.
- Provision of the as-constructed tip heights and co-ordinates of the turbines and wind monitoring mast to the planning authority and the Irish Aviation Authority.

A5.5-5.3.1.4 Use of Machinery and Equipment

The machinery, equipment and tools to be used during construction are listed on Table 2.

Table 2: Construction Machinery, equipment and tools

Construction Machinery	Equipment and Tools
30-50T Excavators; Low ground pressure excavators (Bogmaster); Mobile cranes for construction; Cranes (1 main, 1 assist) Erection 120t to 800t; Dump trucks; Tractors and trailers; 12t Rollers; Crushers; Screener;	Rebar/shuttering/ precast units/concrete pipe/box culverts Double contained fuel bowsers; Diesel powered generators; and Water bowsers Hand tools Silt traps, silt fences Spill Kits Fencing Materials – post and wire

A5.5-5.3.1.5 Use of Hydrocarbons

The plant and equipment that will be used during the construction stage will be run on hydrocarbons. Mobile equipment will require regular refuelling from a fuelling station which will be located in a designated impermeable bunded area, drained through an oil interceptor at Site Compound No.1 (adjacent to Site Entrance No. 1).

A5.5-5.3.1.6 Other Facilities - Fuel Storage

According to **Planning Condition No. 15**: The management of drainage and surface water during the construction stage of the development shall be in accordance with the details submitted in the Construction Management Plan, the Ecological Management Plan and Environmental Management Plan.

Furthermore:

(a) all oils and fuels shall be stored in an area bunded to 110% of the total volume of stored oils and fuels,

(b) Re-fuelling or machine servicing shall take place only within designated impermeable bunded areas, which shall be drained through an oil interceptor,

(c) a wheel wash shall be provided within the site, near the entrance to the public road, and

(d) an appropriately sized facility shall be provided on site for concrete washings.

Revised drawings showing compliance with these requirements shall be submitted to, and agreed in writing with, the planning authority prior to commencement of development.

Reason: In the interest of maintaining water quality.

Site Compound No. 1 will contain all the facilities listed from (a) to (d) above. Hydrocarbon use and storage during construction will be managed under a Fuel and Oil Management Plan.

A5.5-5.3.1.7 Imported Construction Materials

The materials identified in Table 3 will be imported onto UWF site.

Table 3: Quantities, type and source of construction materials

Materials	Quantity	Likely Source of Materials
Aggregate (crushed stone)	4,010 No. loads.	Most expected to be won on-site with some capping stone grades imported from the local quarry at Shanballyedmond, Rear Cross
Reinforcing Steel (rebar)	15 No. loads	Various Irish Suppliers
Concrete	950 No. loads	Roadstone Killough, Co Tipperary
General building materials	5 No. loads	Various Irish Suppliers
Electrical plant and Switchgear	14 No. loads	EU Various Suppliers
Turbine towers	66 No. loads	Via Foynes Port
Turbine Nacelles	44 No. loads	Via Foynes Port
Turbine Blades	66 No. loads	Via Foynes Port
Generators, gearboxes and transformers	22 No. HGV loads	Via Foynes Port

Relevant Figures (contained at the end of this Appendix 5.3)

Figure UWF 6: Turbine Component Haul Route

A5.5-5.3.1.8 Construction Stage: Traffic Management

The Appointed Contractor will prepare a detailed Traffic Management Plan prior to the works commencing. This Plan will be finalised in agreement with the Gardaí and the Local Authority.

A5.3 -5.3.1.8.1 Construction Stage: Material and Delivery Traffic Management

Aggregate and Concrete

HGV loads of aggregate, concrete and public road dressing will be delivered directly to construction works areas. These HGVs will travel to the works areas using both the regional and local road networks, on specified haul routes. These haul routes have been agreed with the Area Roads Engineer.

Other Construction Material

Other materials, such as ducting, geotextile and other construction materials, will be transported to the Upperchurch Windfarm Site Compound No.1. From this point the construction vehicles will access the full site using newly built windfarm roadways, upgraded farm and forestry tracks and site entrances from the Local Road network within the site area.

A5.5- 5.3.2 Operational Stage of Upperchurch Windfarm

A5.5-5.3.2.1 Duration and Timing of Operational Stage

The duration and timing of the operational stage of the Upperchurch Windfarm, as per Condition 4 of the Grant of Permission (PL.22.243040) is set out in Table 4;

Table 4: Duration of Operation Stage

Description	Duration & Timing
Operating Upperchurch Windfarm	25 years from the date of commissioning of the wind turbines (Condition 4)

A5.5-5.3.2.2 Operational Personnel

There will be 8 permanent jobs created in operation and maintenance activities, legal, electricity sales and asset management relating to UWF. Four maintenance personnel will be employed at the windfarm site to service, maintain and monitor the turbines for operational safety and performance.

A5.3 -5.3.2.2.1 Welfare Facilities

Following construction, Site Compound No. 2 will be retained for use by the maintenance personnel for the operational phase of the Upperchurch Windfarm. The unoccupied house will be converted to an office space, canteen and toilet facility for the maintenance personnel. This house already has water (ground water from a well) and sanitary facilities (septic tank).

A5.5-5.3.2.3 Operational Activities

UWF will be maintained in good working order throughout the operational stage. The operational stage will involve:

- Daily remote monitoring of wind turbine performance by the owner's operator,
- Visits by maintenance crews to carry out scheduled and unscheduled maintenance and repairs,
- Occasional replacement of major components,
- Monitoring and surveying of sensitive aspects of the local environment, and the establishment of the Upperchurch Hen Harrier Scheme, as set out in Appendix 5.6: Description of the UWF Other Activities.

A5.5-5.3.2.4 Use of Machinery and Equipment

The machinery and equipment listed in Table 5 will be used during the operational stage.

Table 5: Use of Machinery and equipment during the Operation Phase

Machinery	Equipment	Materials
• Light 4-wheel drive vehicle • Cranes and hoists for major component replacement and repairs	• Specialist electrical and mechanical tools • Testing equipment	• Replacement turbine parts • Replacement electrical or communication parts

A5.5-5.3.2.5 Use of Hydrocarbons

A small volume of hydrocarbons will be used on the windfarm during operational activities and is limited to the diesel or petrol fuel used by the site vehicles and machinery and any mobile generators used. Mechanical oils and grease will be used during maintenance of the turbine and electrical equipment. These will be brought on-site and receptacles removed by the O&M personnel.

A5.5-5.3.2.6 Welfare & Other Facilities

Site Compound No. 2 with a car parking area, parts storage sheds and a refurbished house (which includes already existing provisions for sanitary facilities) will be retained for use as the Upperchurch Windfarm Site Office during the operational phase. There will be no requirement for fuel storage during the operational stage, with any fuels being brought onto site as required.

A5.5- 5.3.3 Changes to the Upperchurch Windfarm

In the Grant of Permission (PL.22.243040), Condition 4 outlines the duration of operation of the windfarm, and potential for decommissioning at the end of the operational period, and Condition 22 outlines the requirements for decommissioning of the Upperchurch Windfarm:

Condition 4: The permission shall be for a period of 25 years from the date of the commissioning of the wind turbines. The wind turbines and related ancillary structures shall then be decommissioned and removed unless, prior to the end of the period, planning permission shall have been granted for their retention for a further period.

Condition 22: On full or partial decommissioning of the wind farm, or if the wind farm ceases operation for a period of more than one year, the wind monitoring mast, the turbines concerned and all decommissioned structures and equipment shall be removed, and foundations removed or covered with soil to facilitate re-vegetation, all to be completed to the written satisfaction of the planning authority within three months of decommissioning or cessation of operation.

A5.5-5.3.3.1 Decommissioning Activities (if required)

Decommissioning will involve the removal of all the turbines, removal of the above ground turbine foundation elements and covering the hardstanding areas with topsoil and reseeding. Any roads or hardstands that are not required by the landowner for farm use, can be covered with topsoil and reseeded also. There is a significant amount of soil in the roadside bunds, excavated for road construction and drainage. This topsoil will be used to infill associated roadside drainage for elements being removed and the remaining soil will be used for hardstands and foundations. The topsoil will be replaced to re-establish the original depth and to match the original surface contours where possible. To minimise the environmental impact, the access roads of UWF were designed to use and upgrade suitable existing agricultural tracks. At the decommissioning stage the access roads can be removed, however it is expected that they will be retained in situ as an integral part of the infrastructure for use by the landowner as farm tracks. If it is decided at the time of decommissioning that tracks are to be removed, the underlying material will be treated to relieve compaction and / or to promote re-vegetation. This may include the careful manipulation of the soil or building up ground levels with additional topsoil.

Cabling will be isolated and left in-situ underground. The substation compound includes an ESB control room and a windfarm owned control room. It is most likely that the substation will remain after the wind farm site is reinstated. Any equipment associated with the wind farm side of the substation will be electrically isolated and removed off site and disposed of appropriately. If at the decommission stage the planning authority requests the substation is screened, a stand of conifer trees can be planted around the substation.

The wind farm infrastructure is predominantly located in areas of improved agricultural grassland. Any reseeding of lands will be agreed with the landowner to ensure consistency with the surrounding land uses. In areas of felled forestry, acid and wet grass land, heath and bog, these areas will be allowed to naturally revegetate and be managed for nature conservation purposes. Monitoring of the reinstated areas will be undertaken following the completion of decommissioning works to confirm the successful reinstatement of the vegetation, the turbine foundation and hardstand areas and possibly the access tracks. A monitoring period, of two years, will allow for the observation of the reestablishment of the flora. This will ensure remedial action is taken as necessary, which may include further reseeding as required.

A5.5 - 5.4 Use of Natural Resources Emissions and Waste

A5.5- 5.4.1 Use of Natural Resources

The resources which will be imported onto the Upperchurch Windfarm site or which will be obtained from within the site during the development of the Upperchurch Windfarm are described below.

To facilitate the evaluation of the use of natural resources for the whole UWF project, the information on the Use of Resources for the Upperchurch Windfarm is presented in the same format as the Use of Natural Resources for UWF Grid Connection, UWF Related Works, UWF Replacement Forestry and UWF Other Activities.

A5.5-5.4.1.1 Use of Resources: Land

In order to safely accommodate the construction works and construction traffic, the land requirement for the construction of the Upperchurch Windfarm is greater than for the operation of the Upperchurch Windfarm.

In total Upperchurch Windfarm works will take place on 56.3 hectares of land within construction works areas, as follows; 12.8ha of farm roads, 33.7ha of agricultural land, 9.8ha of forestry land. The use of the lands by the landowner will be controlled during construction for safety reasons.

Following construction, the lands within the construction works areas will be returned to the landowner for their own use with the exception of 6.4ha of lands at the hardstandings areas associated with the Consented UWF Turbines, the Consented UWF Substation and the meteorological masts, and the keyhole felled areas of forestry around the Consented UWF Turbines. Of these 6.4ha of lands; 2.6ha of agricultural lands and 3.5ha of forestry lands will change use to utility for the duration of the operation of the Upperchurch Windfarm; 0.3ha of agricultural land will permanently change use to utility at the Consented UWF Substation. Of the lands returned to use by the landowner; 2.3ha of these lands will change use from agricultural lands (1.5ha) or forestry lands (0.8ha) to access road.

6.1ha of lands associated with the hardstandings areas at the Consented UWF Turbines, the meteorological masts, and the keyhole felled areas of forestry around the Consented UWF Turbines will be returned to agricultural use (2.6ha) and forestry use (3.5ha).

A5.5-5.4.1.2 Use of Resources: Biodiversity

A5.3 -5.4.1.2.1 Field Boundaries – Earthen Banks/Hedgerow/Trees

In total 980m of hedgerow/field boundaries will be removed to facilitate the construction of the UWF, of which 360m of hedgerow will be removed from works areas for the protection of bats. In order to provide alternative bat and bird habitat and **equivalent length of new hedgerow** will be planted, with native species, to mitigate this loss of habitat. Existing hedgerows in poor condition will be planted with native species to increase their ecological value.

A5.3 -5.4.1.2.2 Forestry Felling

In total 4.4 hectares of coniferous forestry will be permanently felled, under a felling license from the Forest Service. Forestry felling will be carried out prior to the construction works beginning and outside of the bird breeding season. No further forestry felling will be required during the operational stage.

A5.5-5.4.1.3 Use of Resources: Water

A5.3 -5.4.1.3.1 Potable Water and Non-Potable Water

Bottled drinking water will be imported and stored in the canteen at Site Compound No.1. At Site Compound No.2, drinking water will be drawn from the existing well associated with the old house.

Non-potable water for hand washing or toilet flushing will be imported to Site Compound No.1 from a local municipal supply and stored in water holding tanks for the toilet and wash facilities. Non-potable water will be sourced from the existing well associated with the old house at Site Compound No.2.

Operational stage water requirements are limited to potable and non-potable water, both of which will be available at the Upperchurch Windfarm Site Office at Site Compound No.2, which is an existing dwelling which will be refurbished to accommodate the windfarm worker's welfare facilities. The decommissioning stage water requirements will be similar to the Operational Stage and will be provided at the Upperchurch Windfarm Site Office.

A5.3 -5.4.1.3.2 Dewatering of Excavations

It is likely that groundwater will need to be pumped from turbine excavations, mostly during very wet weather. De-watering, if required, will be carried out using mobile diesel generator water pumps. Water will be settled in a settlement pond and silt trap, before being released to the surrounding downslope vegetation. Dewatering will only be carried out at a flow rate that is within the capacity of the sediment pond.

A5.5-5.4.1.4 Use of Resources: Soils

A5.3 -5.4.1.4.1 Excavated Soils

Construction of UWF will result in the removal of soil, subsoil, peat and rock in parts of the site in order to facilitate the construction of access roads, crane hard standings, substation compound and turbine bases. Approximately c.25,500m^3 of topsoil, c.79,600m^3 of subsoil and c.2,900m^3 of peat will be excavated from the works areas. It is estimated that up to 43,000m^3 of rock will be excavated from the on-site borrow pits to construct the Upperchurch Windfarm Roads and hardstanding areas.

A5.3 -5.4.1.4.2 Permanent Storage

It is estimated that up to 52,000m^3 of soils will be permanently stored in bunds along Consented UWF Roads and at Consented UWF Turbines hardstanding areas and around the met mast areas.

A5.3 -5.4.1.4.3 Temporary Storage

The remaining excavated material will be temporarily stored, within the construction works area. Topsoil, subsoil and rock will be stored separately, with as much surface vegetation left intact on the topsoil layer as possible. The excavated material will be used to backfill, reinstate and landscape the works areas.

A5.3 -5.4.1.4.4 Imported Rock

If additional rock to that won on the Upperchurch Windfarm site (higher grade for road capping for example) then this will be imported from the local Rear Cross Quarry.

A5.3 -5.4.1.4.5 Operational/Decommissioning Stage

No excavations of soils will be required during the routine operation of the Upperchurch Windfarm or during the decommissioning stage. The foundations will be left in situ to avoid disturbance of the lands. The soils stored in the bunds alongside Consented UWF Roads and at Consented UWF Turbines hardstands will be used to reinstate the turbine hardstanding areas, met mast areas.

A5.5- 5.4.2 Upperchurch Windfarm: Emissions

The emissions associated with the Upperchurch Windfarm are described below.

To facilitate the evaluation of emissions associated with the whole UWF project, the information on Emissions for UWF is presented in the same format as the Emissions associated with UWF Grid Connection, UWF Related Works, UWF Replacement Forestry and UWF Other Activities.

A5.5-5.4.2.1 Emissions

A5.3 -5.4.2.1.1 Dust

Dust may arise during the construction stage, due to the transportation of aggregate to the Upperchurch Windfarm site, the movement of excavated material within the site and from stored excavated materials at the works areas, particularly during dry and windy weather. The potential for dust emissions and the effect on Air Quality has already been assessed by the An Board Pleanála Inspector. In the Inspector's Report 2014 no significant impacts to Air quality were identified and any dust impacts considered 'temporary in nature and confined to the immediate area'.

Excavations on UWF, and therefore dust emissions, during the operation or decommissioning stages will be negligible and will be limited to the roads and turbine hardstanding areas.

A5.3 -5.4.2.1.2 Vehicle Exhausts

During construction**, o**perating machinery used during the construction stage will be run on hydrocarbons and will emit nitrogen dioxide and other greenhouse gas emissions during their operation. The potential for fugitive emissions from site machinery and increased traffic has already been assessed by the An Board Pleanála Inspector. In the Inspector's Report 2014 no significant impacts to Air quality are identified and any vehicle emission impacts are considered 'temporary in nature and confined to the immediate area'.

During operation, the presence of vehicles on UWF, and therefore nitrogen dioxide and other greenhouse gas emissions, during operation is negligible with a light four wheel drive vehicle used on site by maintenance crews, and occasionally the use of cranes and HGV's delivering replacement parts.

A5.3 -5.4.2.1.3 Noise

During construction, heavy machinery and vehicles which will be used at works areas during the construction stage will emit noise during their operation, noise will also be emitted from certain construction activities such as excavation or rock breaking or by mobile generators which may be used at work areas. The potential for noise emissions effects during the construction stage has already been assessed by the An Board Pleanála Inspector. The Inspector's Report 2014 states 'exceedance of permitted levels will occur during the construction phase … but I note that there is no house within 200m of the construction works'.

During operation, the Consented UWF Turbines will emit noise during their operation. An evaluation of the likely noise impact of the Consented UWF Turbines has already been carried out by a competent expert, in accordance with methodology described in ETSU-R-97, Assessment and Rating of Noise from Wind Farms. The potential for noise emissions effects during the operational stage has already been assessed by the An Board Pleanála Inspector. The Inspector's Report 2014 states that 'the development will impact in relation to noise as there will be a rise in noise levels from the current ambient noise levels associated with a rural area for many of the houses and sensitive receptors in the general and study area. The level of increase will however be within permitted levels for the most part even in a worst case scenario.'

During decommissioning: Very low levels from dismantling activities and reinstatement works, no effects expected to local residents due to the low levels combined with the distances to nearest residences.

A5.3 -5.4.2.1.4 Vibration

Construction works, including excavations and the use of heavy machinery will cause low levels of ground vibration. The potential for vibration effects has already been appraised in the Revised Vibration Impact Assessment, 2013 EIS, where it state: 'Once operational there will be no significant sources of vibration' from UWF.

Once operational there will be no significant sources of vibration from UWF. There will be no sources of vibration during the decommissioning works.

A5.3 -5.4.2.1.5 Light

Construction activities will only be conducted during daylight hours. Therefore no lights are required at construction works areas at the Upperchurch Windfarm.

During operation, the turbines will be fitted with red coloured intermittent lighting. The potential for disturbance and collision effects on bats has already been evaluated in the EIS 2013, and considered 'not significant'.

All decommissioning activities will take place during daylight hours, no requirement for lights.

A5.3 -5.4.2.1.6 Electromagnetic Radiation:

No emissions of electromagnetic radiation will occur during the construction or decommissioning stages.

Operational Stage; Low frequency electrical and magnetic fields (EMF) will be present anywhere electricity is generated, distributed or used and therefore these fields are a common occurrence in everyday life. The operational Consented UWF Turbines will be a source of very low frequency (50Hz) electromagnetic fields. Electromagnetic radiation emissions will not be at levels to cause significant effects at the turbine locations, and no effects will occur at local residences.

A5.5- 5.4.3 Upperchurch Windfarm: Waste

The wastes which will arise at UWF are described below. The greatest potential for waste occurs during the Construction stage of the windfarm. Wastes which result from the construction, operation and decommissioning of UWF will be managed under a Waste Management Plan.

A5.5-5.4.3.1 Waste Water

During construction, self-contained toilets, with integrated waste water storage tanks, will be provided for construction workers at Site Compound No.1, Waste from toilets will be taken from site on a regular basis by approved contractors and disposed of in an authorised facility in accordance with best practice. At Site Compound No 2. an existing septic tank will be used to treat waste water at Site Compound No.2. .

During operation, Toilet facilities for operational personnel will be provided at the permanent Site Office (identified as Site Compound No.2 during construction). Waste water will be treated in the existing septic tank associated with the building.

Toilet facilities for decommissioning personnel will be provided at UWF Site Office (identified as Site Compound No.2 during construction). Waste water will be treated in the existing septic tank associated with the building.

A5.5-5.4.3.2 General Waste and Chemical Waste

Construction phase waste may consist of hard-core, stone, concrete, steel reinforcement, shuttering timber and unused oil and diesel. Wastes will be segregated and stored in the allocated tanks, bins, skips or areas at Site Compound No.1. The Appointed Contractor must finalise all storage areas and organise the relevant licensed contractors for the appropriate waste collections. The Appointed Contractor will ensure all permits and licences are in place and maintain relevant copies in the site office.

Very small quantities of chemical waste may be generated during the construction stage, this waste is limited to solid waste oil, such as oily rags. Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling. The Appointed Contractor will ensure all permits and licences are in place and maintain relevant copies in the site office.

Wastes arising during the operating phase include but are not limited to lubricating oils, cooling oils and packaging from spare parts. The containment and disposal of such oils will be carried out in a safe manner by an approved contractor. Such operations will be carried out in accordance with the Waste Management (Hazardous Waste) Regulations, 1998 (as amended). The remaining wastes will all be removed from UWF and reused, recycled or disposed of in an authorised facility in accordance with best practice.

Wastes arising during decommissioning will include packaging, turbine and transformer oils and some fiberglass. All waste generated during the decommissioning phase will be taken off the UWF site and disposed of appropriately.

A5.5-5.4.3.3 Arisings

No arisings will occur, as the construction of UWF will not involve the excavation of the public road network.

A5.5-5.4.3.4 Decommissioned Windfarm Components

The electrical components and the decommissioned turbines can be sold as second hand plant, because these components have a designed life in excess of the wind farm planning permission; i.e. greater than 25 years. If they are not sold as s/h working plant then all steel and electrical plant can be recycled.

The blades are mainly made up of composite materials, which can be incinerated for electricity generation/direct heat or disposed of in landfill. Production methods for the blades in modern turbines principally involves the use of epoxy composites. This method helps to reduce emissions from organic solvents, thus appreciably reducing impact on the environment at the production and disposal stage.

General and hydrocarbon wastes generated during the decommissioning phase will be taken off site and disposed of in an appropriately licenced facility.

Welfare facilities for decommissioning personnel will be available at the Windfarm Site Offices at formerly Construction Site Compound No. 2.

A5.5 - 5.5 The Vulnerability of UWF to Major Accidents and Natural Disasters

Major accidents or natural disasters which have the potential to affect the Upperchurch Windfarm are described hereunder. The vulnerability (exposure and resilience) of the UWF to major accidents and disasters and the risk of these accidents or disasters is classified according to the *Guide to Risk Assessment in Major Emergency Management* (DoEHLG, 2010).

A5.5- 5.5.1 Vulnerability to Major Accidents

It is clear from the EIA Directive that 'major accident' mainly applies to notified Seveso establishments which operate under the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015, where Dangerous Substances are identified in Schedule 1.

The consented Upperchurch Windfarm **is not vulnerable to Major Accidents**, due to the minimal volumes of the Dangerous Substances which will be used, limited to small volumes of diesel fuel used by vehicles during the construction and operation of the windfarm, and small volumes of oils and grease used during turbine maintenance. Furthermore there are no Seveso sites in proximity to the UWF, the closest being Grassland Agro in Limerick and MSD (pharmaceutical) in Kilsheelan, near Clonmel, Co Tipperary.

A5.5- 5.5.2 Vulnerability to Natural Disasters (High Winds, Land slippage, Flooding)

Natural disasters which could potentially affect the Upperchurch Windfarm include land slippage and flooding. The likelihood of these natural disasters occurring is discussed below, with likelihood of the natural disaster occurring rated according to the DoEHLG 2010 Guidelines. The risk classification tables are included in Appendix 2.2: EIAR Descriptive Terminology.

A5.5-5.5.2.1 High Winds

In recent years, high wind events including hurricane force winds, have become more frequent in Ireland, and have resulted in major damage and loss of life. However, it is considered that the Upperchurch Windfarm is **not vulnerable to high wind events**, as the wind turbines which will be installed at the Upperchurch Windfarm will all be the highest specification turbine (IEC Class 1A turbines), and will easily tolerate hurricane force winds. Due to the design of the windfarm (Class 1A turbines), it is considered that windfarm the likelihood of an accident occurring due to high winds is **Extremely Unlikely**.

A5.5-5.5.2.2 Land-Slippage

It is considered that the Upperchurch Windfarm is **not vulnerable to land slippage**. During site investigations for the 2013 EIS, geotechnical surveys undertaken at the windfarm site, all parts of the site were examined, no stress indicators were identified and there is no evidence of historical peat slides in the area. The conclusions of the 2013 EIS were that there is a very low risk of slippage or landslides on the Upperchurch Windfarm site because of the stable sub-surface ground conditions and the absence of any significant peat coverage. Furthermore, the windfarm infrastructure is not considered vulnerable to land slippage due to the construction of the infrastructure in competent ground. Therefore it is considered that the likelihood of land slippage disaster occurring on the windfarm site is **Extremely Unlikely**

A5.5-5.5.2.3 Flooding

In recent years, high rainfall events and subsequent flooding have become more frequent in Ireland. Where complete the Catchment Flood Risk Assessment and Management (CFRAM)[1] OPW Flood Risk Assessment Maps are now the primary reference for flood risk planning in Ireland and supersede the Preliminary Flood Risk Assessment Maps (PFRA) maps. CFRAM mapping is not currently available for the area of the Upperchurch Windfarm site and therefore the PFRA maps have been examined and these show that all of the construction works areas and permanent infrastructure (roads, turbine hardstands, substation compound) are located in Flood Zone C (Low Risk) – where the probability of flooding is low (less than 0.1% or 1 in 1,000). Therefore it is considered that the likelihood of flooding disaster affecting the Upperchurch Windfarm site is **Unlikely.**

A5.5- 5.5.3 Consequences of Natural Disasters Occurring

The consequence of the impact if the event occurs is described here.

Due to the low number of personnel working on-site at any one location, the consequence of any high wind, flooding or land slippage events, if they did occur, is considered to be **Limited**.

Due to the low number of people living or working locally, the consequence of any high wind, flooding or land slippage events, if they did occur, is also considered to be **Limited.**

The consequences to water quality due to land slippage or flooding could be **Serious** due to the widespread effects and extended duration of sedimentation effects in downstream watercourses.

A5.5- 5.5.4 Overall Risk

When the likelihood and the consequence of a potential high wind, land slippage or flooding event occurring is applied to the risk matrix from the DoEHLG 2010 guidelines, a broad indication of the critical nature of each risk can be determined.

In relation to on-site personnel and other people in the locality, a high wind, land slippage or flooding event would be classed a 'normal emergency' - based on a likelihood rating of Extremely Unlikely and a consequence rating of Limited.

In relation to downstream water quality, due to the higher level of effect (Serious) on water quality a land slippage or flooding event could be a major emergency. According to the DoEHLG 2010 guidelines, both flooding and landslip events would be at the lowest extreme of 'major emergency'.

A5.5-5.5.4.1 Mitigation Measures

The installation of the highest specification IEC Class 1A turbines at the Upperchurch Windfarm wite will ensure that high wind events do not cause turbine failure at the site.

No measures are required for land slippage risk. In relation to flooding, no instream works are required for the windfarm, with a clearspan bridge being constructed over the 1 no. stream onsite. In addition, flood

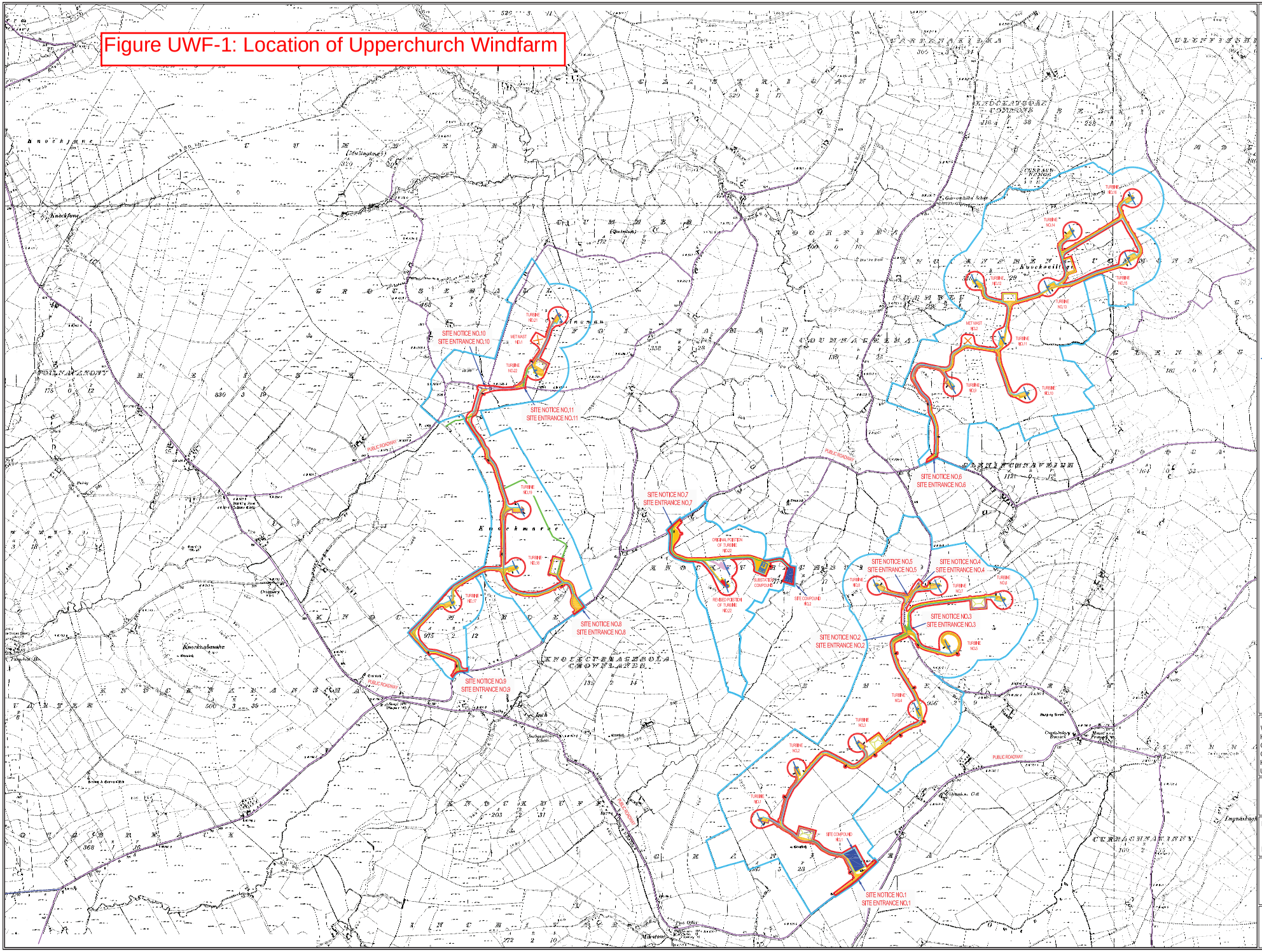
[1] *CFRAM is Catchment Flood Risk Assessment and Management. The national CFRAM programme commenced in Ireland in 2011, and is managed by the OPW. The CFRAM Programme is central to the medium to long-term strategy for the reduction and management of flood risk in Ireland.*

attenuation measures are built into the project through drainage system design, these measures will prevent any increase in discharge rates and associated flooding risk, downstream of the windfarm.

Should a disaster occur, unconnected to the project but in the locality – the above mitigation measures already designed into the project will ensure that the project will not make the consequences of the event worst. In addition the presence of the project will not increase the likelihood of such an event occurring.

A5.5 - 5.6 Figures and Mapping

Figure UWF-1: Location of Upperchurch Windfarm



TITLE:
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DRAWING: **SCALE: 1:10560**

SITE LOCATION SHOWING REVISED LOCATION OF T22

DRAWING NUMBER:
UWF-PA1RFI-07

DATE: 24/11/2013

Drawn by:
Jack Brett
Ecopower Developments Ltd
Slon Road, Kilkenny
Telephone: 056 7750140

OS Licence Number: EN 0022613

Map Sheet Numbers: TY033, TY034, TY039, TY040
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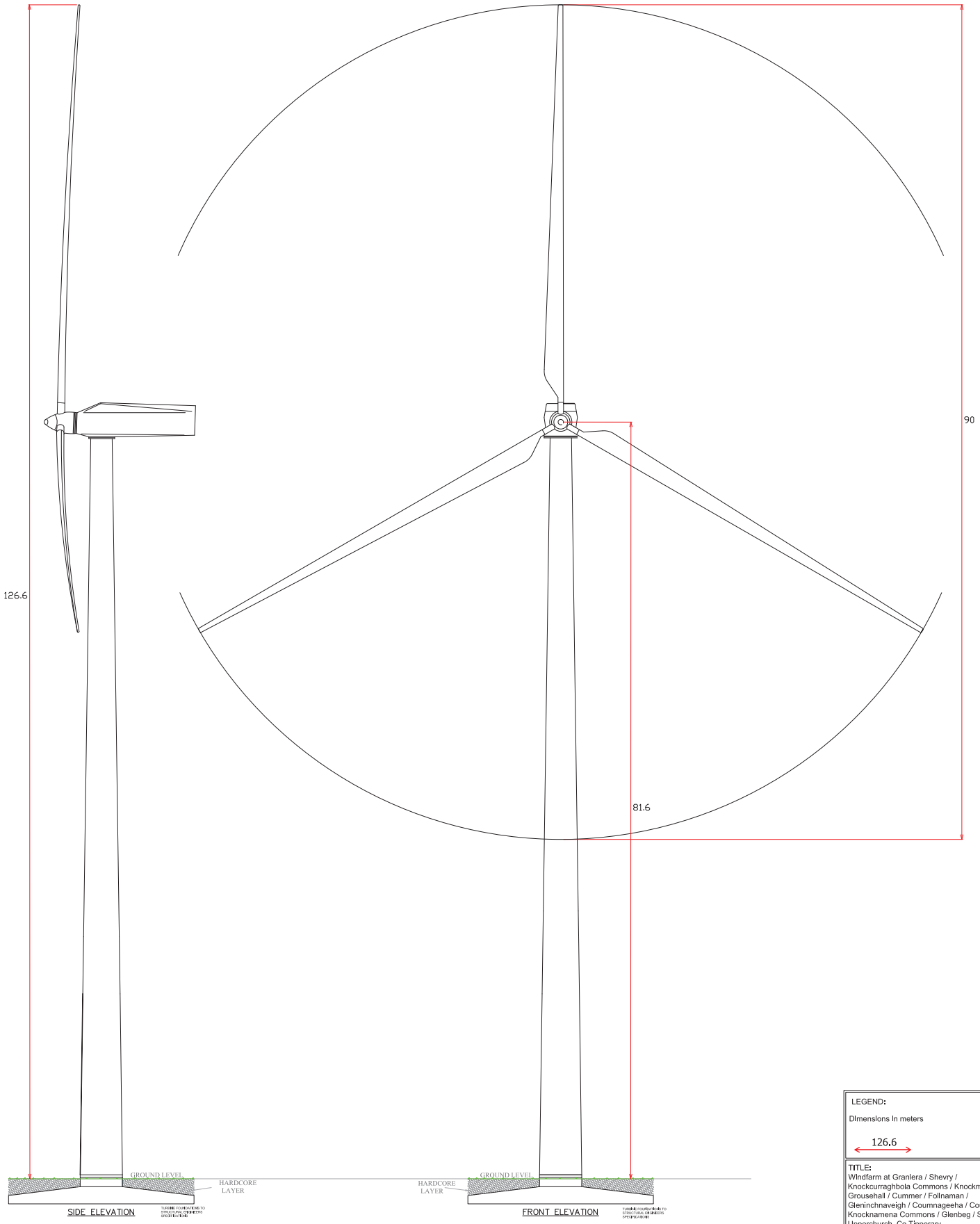
Figure UWF-2: Wind Turbine Elevation



LEGEND:

Dlmenslons ln meters

126.6

TITLE:
Wlndfarm at Granlera / Shevry / Knockcurraghbola Commons / Knockmaroe / Grousehall / Cummer / Follnaman / Gleninchnaveigh / Coumnageeha / Coumbeg / Knocknamena Commons / Glenbeg / Seskln, Upperchurch, Co.Tipperary

DRAWING:
WIND TURBINE ELEVATIONS

SCALE: 1:200

DRAWING NUMBER:
UWF-PA1-03

DATE: 19/12/12

Drawn by:
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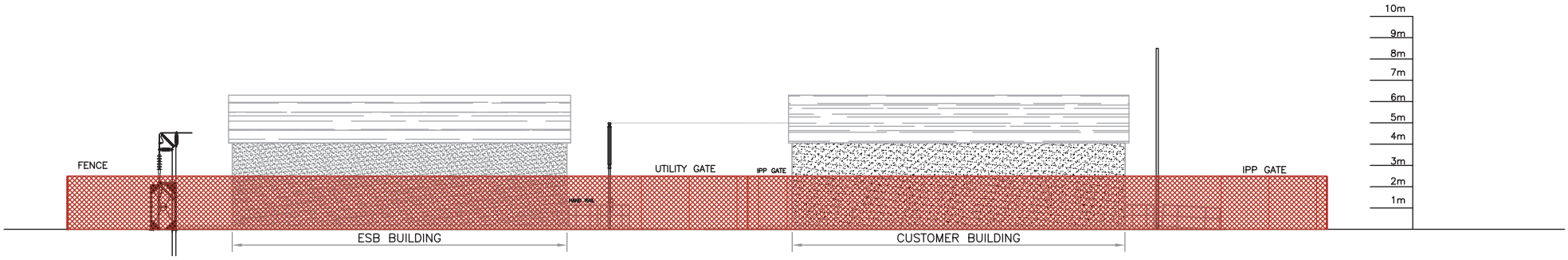
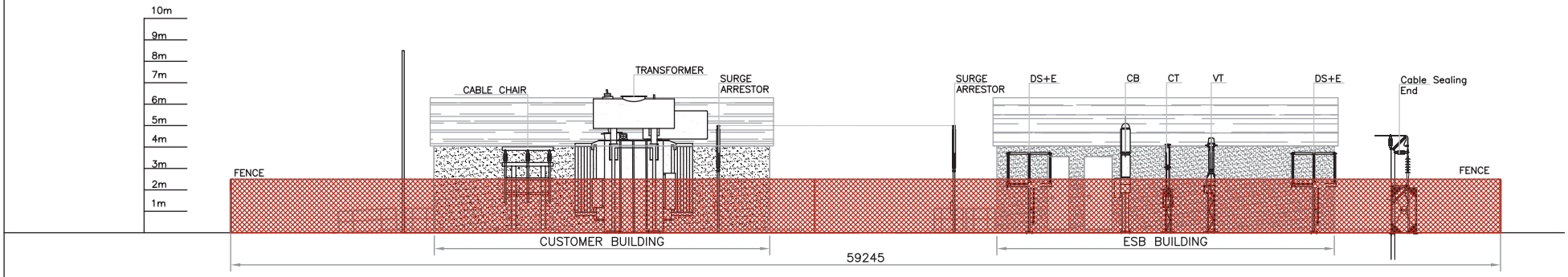
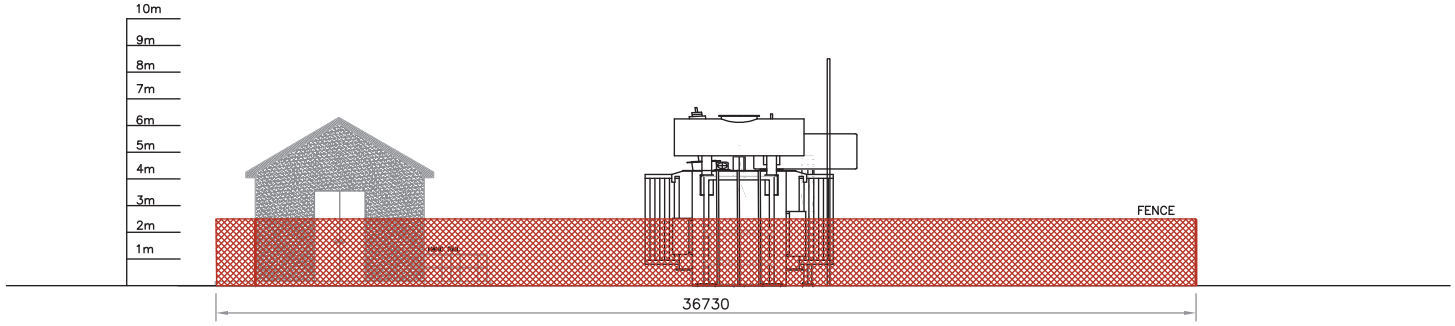


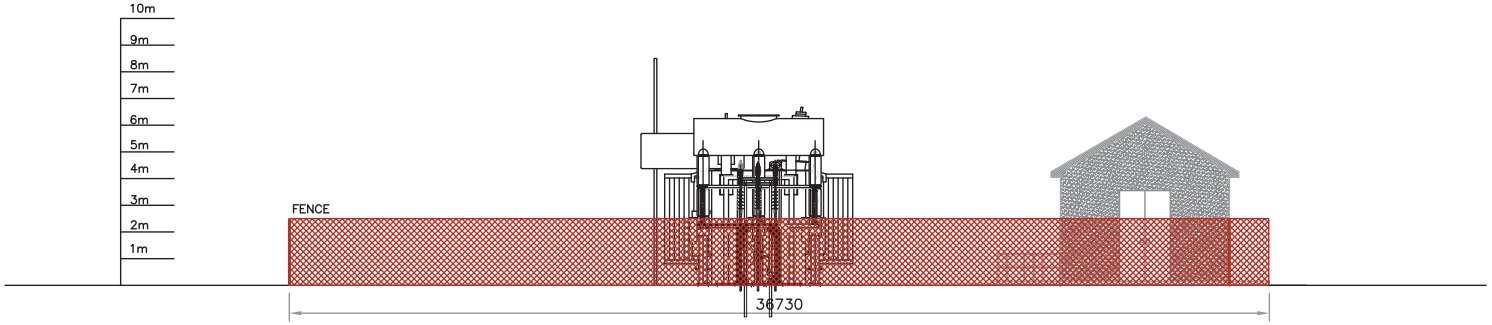
WEST ELEVATION



EAST ELEVATION



SOUTH ELEVATION



NORTH ELEVATION

REFERENCE DOCUMENTS

Figure UWF-3: Electrical Substation Compound Elevation View

Dimensions are in millimeters

A	21.05.12	M.R.	P.K. FIRST ISSUE
REV	DATE	DRAWN BY	CHECKED BY | DETAILS

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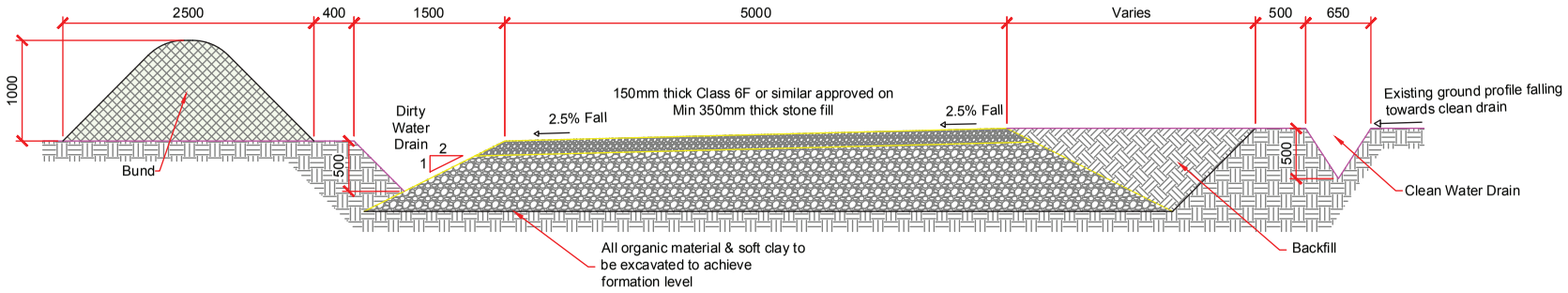
CLIENT

PROJECT
WINDFARM AT GRANIERA / SHEVRY / KNOCKCURRAGHBOLA COMMONS / KNOCKMAROE / GROUSEHALL / CUMMER / FOILNAMAN / GLENINCHNAVEIGH / COUMNAGEEHA / COUMBEG / KNOCKNAMENA COMMONS / GLENBEG / SESKIN, UPPERCHURCH, CO.TIPPERARY

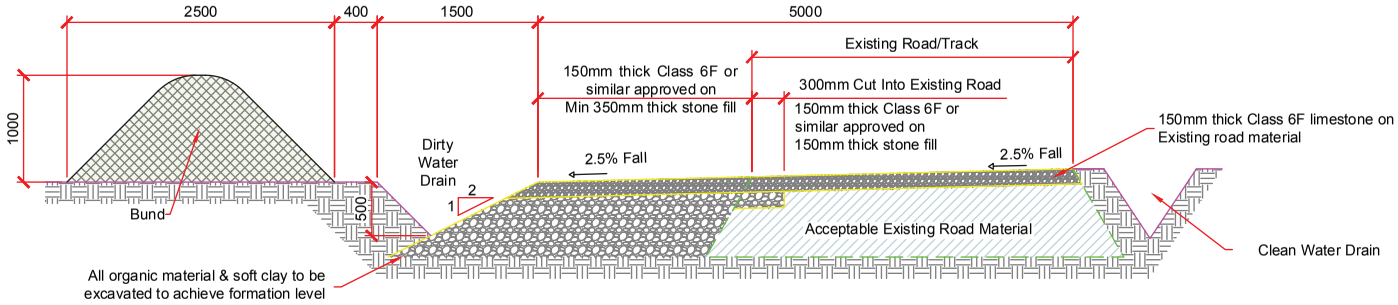
TITLE
ELECTRICAL SUBSTATION COMPOUND ELEVATION VIEW

SCALE: 1:100	STATUS	
PAPER SIZE: A1	DRAWN BY: M.KRAS	CHECKED AND APPROVED: C.DONNELLY
PROJECT PHASE	DATE: 21/05/2012	DATE: 21/05/2012
DRAWING NUMBER: CUNY d001.1.2		REVISION: A

FILE NAME



Typical Excavated Access Track Detail Scale 1:50



Typical Widening To Existing Access Track Detail Scale 1:50

Figure UWF-4: Proposed Internal Roads Details

Rev.	Date	Description	by	ch'd	app
A	13.06.12	Issued For Planning	PN	TB	JoL

Project: Upperchurch Wind Farm

Client: Ecopower Developments Ltd

Title: Proposed Internal Road Details

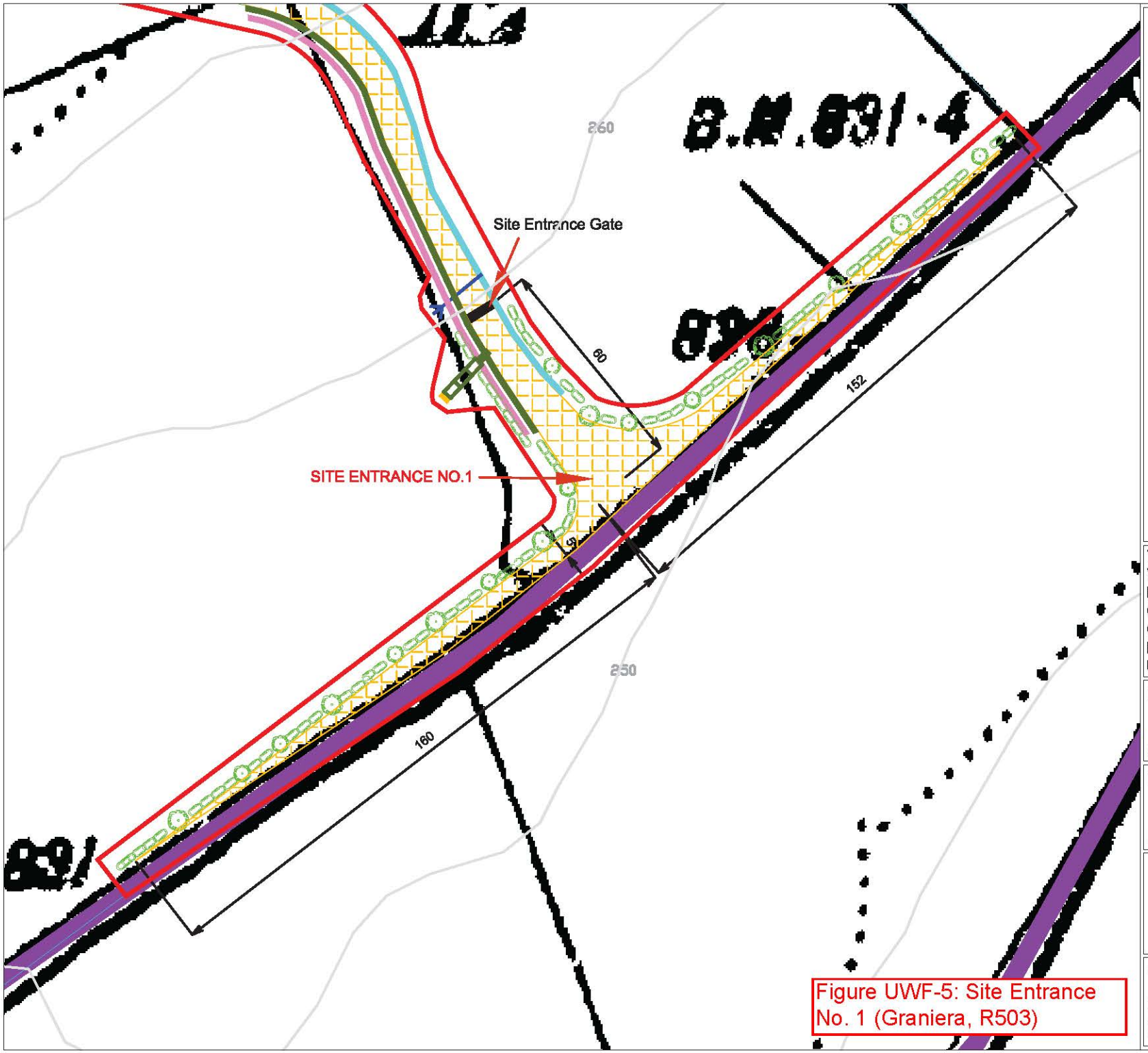
Malachy Walsh and Partners
Consulting Engineers
Cork | Tralee | London | Limerick

Scales (A3)	1:50	
Drawn	PN	13.06.2012
Checked	TB	13.06.2012

Drg. No. 14708-5005

Rev. A

REFERENCE DOCUMENTS



LEGEND:

Proposed new windfarm roadways hatched in orange

Site Boundary outlined in red

Public Roadway shown in purple

Dimensions in meters

55

Contour line with elevation in meters

180

Hedge and trees planted post construction phase

Clean water drain shown in light blue

Dirty water drain shown in dark green

Bund shown in pink

Clean water cross drain with outlet weir

Dirty water settling pond with outflow weir

N

TITLE:
Windfarm at Graniera / Shevry / Knockcurraghbola Commons / Knockmaroe / Grousehall / Cummer / Foilnaman / Gleninchnaveigh / Coumnageeha / Coumbeg / Knocknamena Commons / Glenbeg / Seskin, Upperchurch, Co.Tipperary

DRAWING:
Site Entrance No.1

SCALE: 1:1000

DRAWING NUMBER:
UWF-PA1-39

DATE: 19/12/2012

Drawn by:
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OS Licence Number: EN 0022612
EN 0022613
Map Sheet Numbers: TY033, TY034, TY039, TY040
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Figure UWF-5: Site Entrance No. 1 (Graniera, R503)

REFERENCE DOCUMENTS

FIGURE 7-1: TURBINE COMPONENTS HAUL ROUTE

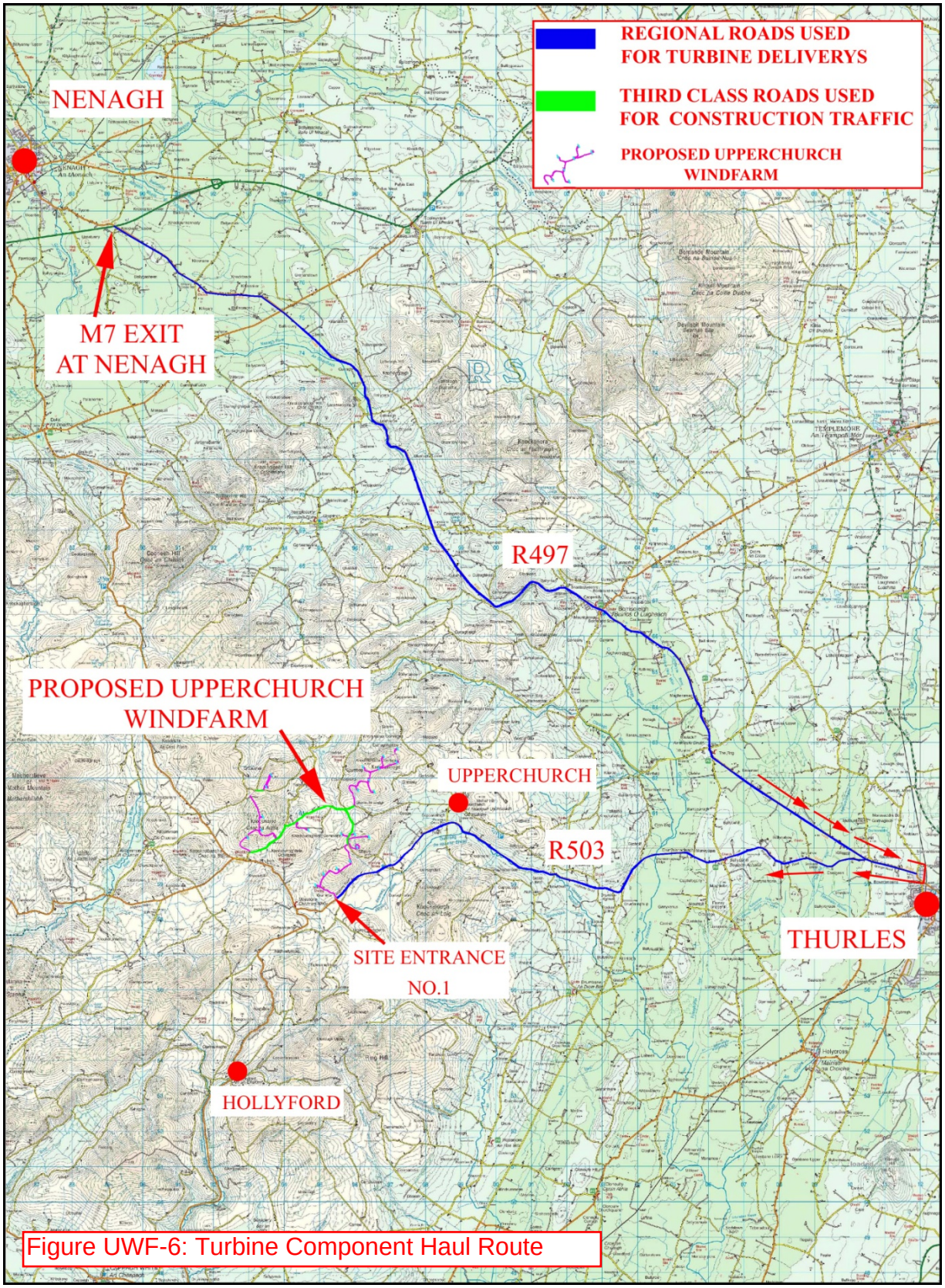


Figure UWF-6: Turbine Component Haul Route

Appendix to Chapter 5: Description of Development (UWF Replacement Forestry)

Appendix 5.6: Description of UWF Other Activities

The data and descriptions in this appendix have informed Chapter 5: Description of Development (UWF Replacement Forestry) of the EIA Report. The information presented in this Appendix 5.6 is outlined below and the relevant element(s) of the Whole UWF Project are also identified.

Appendix	Title	Relevant EIAR
A.5.6	Complied Description of UWF Other Activities	UWF Other Activities

Appendix to Chapter 5: Description of Development

Appendix 5.6: Description of UWF Other Activities

A5.6 -5.1 Introduction to Appendix 5.6

UWF Other Activities do not form part of the permission applications, however they do form part of the Whole UWF Project and therefore this description has been prepared to facilitate the cumulative evaluation.

This Description of UWF Other Activities has been prepared in the same format as the Description of Development chapters (Main EIA Report Chapter 5's) for the UWF Grid Connection, the UWF Related Works and the UWF Replacement Forestry in particular Sections 5.2, 5.3, 5.4 and 5.5.

For ease of cross referencing the number system used here is also the same, i.e. A5.6-**5.2**, A5.65-**5.3** etc. Figures and mapping are included at the end of this appendix.

The data and descriptions in this appendix have informed the environmental factor evaluations in the EIAR Main Report, in relation to the evaluation of cumulative effects of the subject development together with the other elements of the Whole UWF Project and with other existing or consented projects or activities.

UWF Other Activities are described in this appendix, in the following order:

Appendix 5.6 Sections	**Section Heading**	**Relevant Individual Project Element**
A5.6-**5.2**	Characteristics of UWF Other Activities including environmental protection measures	UWF Grid Connection UWF Related Works UWF Replacement Forestry Upperchurch Windfarm
A5.6-**5.3**	Life Cycle Stages The durations and timing, main activities, personnel and material requirements during construction, operation and decommissioning stages (relative to the Other Elements of the Whole UWF Project)	
A5.6-**5.4**	The use of natural resources, emissions and production of wastes	
A5.6-**5.5**	Figures and Mapping	UWF Replacement Forestry
	Note: Section 5.6 of the EIAR Main Report Chapter 5 relates to Vulnerability to Major Accidents and Natural Disasters. As the UWF Other Activities do not relate to works or the development of lands or infrastructure, it is considered that their vulnerability to these events is not applicable.	

A5.6 -5.2 Characteristics of UWF Other Activities

UWF Other Activities include the following activities:

- Haul Route Activities;
- Overhead Line Activities;
- Upperchurch Hen Harrier Scheme; and
- Monitoring Activities.

A5.6 -5.2.1 Purpose of UWF Other Activities

Haul Route Activities to facilitate the transportation of turbine components to the Upperchurch Windfarm site.

Upperchurch Hen Harrier Scheme to enhance and protect foraging habitat for hen harrier in the vicinity of Upperchurch Windfarm, in order to fulfil planning condition No.18, attaching to the consented Upperchurch Windfarm.

Monitoring Activities to monitor the Whole UWF Project for compliance with the environmental protection measures and mitigation measures detailed in the UWF 2013 EIS and 2013 RFI (including the Construction Environmental Management Plan for Upperchurch Windfarm and the Ecological Management Plan for Upperchurch Windfarm); Planning Conditions attaching to the already consented UWF; and measures in the 2018 UWF Grid Connection EIA Report, the 2018 UWF Related Works EIA Report and the 2018 UWF Replacement Forestry EIA Report and associated UWF Grid Connection Environmental Management Plan and UWF Related Works Environmental Management Plans. Monitoring will also involve the supervision and recording of key construction activities, and monitoring of progress of land reinstatement.

Overhead Line Activities: to correct the tension of the existing overhead line, following the installation of the UWF Grid Connection End Masts, so that the lines are held within predefined tension parameters and fibre wrapping to provide a communication link to the newly installed Mountphilips Substation.

A5.6 -5.2.2 Location and overview description of UWF Other Activities

The **Haul Route Activities** relate to the laying of matting over verges at up to 5 No. locations, removal of street furniture (mainly signposts) at 13 No. locations and the trimming of up to 960m of hedgerow/trees at up to 15 No. locations on the national and regional road network along the turbine component haul route between Foynes Port in Co Limerick and the junction of the R503 and R497 Regional Roads in Knockmaroe townland. Note: the Haul Route Activities are also referred to as Ancillary Haul Route Activities in this EIA Report.

The **Upperchurch Hen Harrier Scheme** is located in Knockcurraghbola Commons, Coumnageeha, Foilnaman, Knockmaroe and Grousehall townlands on a mixture of wet grassland and improved grassland between the Slievefelim to Silvermines SPA and the already consented Upperchurch Windfarm. Activities associated with the Scheme includes once off activities such as planting of hedgerows and trees; enhancement of riparian corridors and scrub/wood areas and the fencing off of watercourses and newly planted trees and shrubs. These activities will create new habitat and protect and enhance existing habitat.

The Scheme also includes long-term farm management practices such as management of rush coverage, livestock grazing and the control of the use of lime, fertilizers and burning of gorse, amongst others, which will result in the long term maintenance of hen harrier habitat. Nine local landowners are signed-up to the Scheme.

Overhead Line Activities are associated with the existing overhead 110kV line between Killonan ESBN Station (just east of Limerick City) and ESBN Angle Mast Structure No. 90 (2.3 km north of Mountphilips Substation). These activities will be carried out by ESBN or ESBN contractors. Activities include (a) re-sagging/correcting the tension using puller/tensioner machines at Angle and End Masts and stringing wheels at Intermediary Structures, and (b) Wrapping of the overhead line with fibre-optic cable (called fibre wrapping) using an aerial crawler fibre wrap machine.

Monitoring Activities relate to water quality monitoring; ecology surveys for habitats, vegetation, birds, bats, badgers; otters; invasive species monitoring; archaeological monitoring; reinstatement monitoring; Falling Weight Deflectometer confirmatory surveys of public road condition; noise and shadow flicker monitoring and reporting; monitoring, auditing, visual inspections and supervision during the Whole UWF Project preconstruction, construction and operational stages. Monitoring Activity locations relate to all works areas associated with the UWF Grid Connection, UWF Related Works, UWF Replacement Forestry and Upperchurch Windfarm locations.

Relevant Figures (contained at the end of this Appendix 5.6)

Figure OA 1: Location of UWF Other Activities on OSI Mapping

A5.6 -5.2.3 Characteristics of UWF Other Activities

A5.6 -5.2.3.1 Haul Route Activities

Haul Route Activities will be carried out on the public road network between Foynes Port in Co Limerick and the junction of the R503 and R497 Regional Roads in Knockmaroe townland.

The Haul Route Activities are located along the Upperchurch Windfarm turbine component haul route and will facilitate the transport of abnormal loads associated with the transport of turbine blades and towers to the windfarm through the laying of matting over verges at up to 5 No. locations, removal and replacement of street furniture (mainly signposts) at up to 13 No. locations and the trimming of up to 960m of hedgerow/trees at up to 15 No. locations, as outlined in Table 1.

The use of heavy duty geotextile matting will facilitate the delivery of the component without any requirement for excavation works and without causing any damage to the verge soils. The matting will provide sufficient carrying capacity to allow the trailers carrying the turbines components to pass.

Table 1: Description of Haul Route Activities

Activity ID	Description of the Haul Route Activity
HA1	Removal of street furniture at T-Junction on N69 at Foynes Port, Co Limerick
HA2	Removal of street furniture and laying of matting on the roundabout on the N69 at Clarina, near Limerick City
HA3	Removal of street furniture at roundabout on the N18, on the Dock Road at Bunlicky, Limerick
HA4	Removal of street furniture at roundabout on the N18, on the Dock Road at Ballykeefe, Limerick
HA5	Removal of street furniture and laying of matting on the verge at the M7 Exit 25 at Knockalton Upper, near Nenagh, County Tipperary
HA6	Removal of street furniture and laying of matting the roundabout at the M7 Exit 25/R498 at Knockalton Upper, near Nenagh, County Tipperary
HA7	Vegetation trimming of the roadside boundary on the R498 at Sallypark, Co. Tipperary
HA8	Vegetation trimming of the roadside boundary on the R498 at Bigpark, Co. Tipperary
HA9	Vegetation trimming of the roadside boundary on the R498 at Bigpark, Co. Tipperary
HA10	Vegetation trimming of the roadside boundary on the R498 at Bigpark, Co. Tipperary
HA11	Vegetation trimming of the roadside boundary on the R498 at Bigpark, Co. Tipperary
HA12	Removal of street furniture and vegetation trimming on the R498 at Glennanoge, Co. Tipperary
HA13	Removal of street furniture and laying of matting at the Killinane junction of the R498 with the R503 in Thurles
HA14	Removal of street furniture at a roundabout on the R498 at Racecourse in Thurles
HA15	Vegetation trimming of the roadside boundary on the R503 at Ballynahow, Co. Tipperary
HA16	Vegetation trimming and laying of matting on the R503 at Ballynahow, Co. Tipperary
HA17	Removal of street furniture and vegetation trimming on the R503 at Drumminnagleagh, Co. Tipperary
HA18	Removal of street furniture and vegetation trimming on the R503 at Rosmult, Co. Tipperary
HA19	Removal of street furniture and vegetation trimming on the R503 at Ballyboy, Co. Tipperary
HA20	Vegetation trimming of the roadside boundary on the R503 at Gortnaskehy, Co. Tipperary
HA21	Removal of street furniture and vegetation trimming on the R497 at Knockduff, Co. Tipperary
HA22	Vegetation trimming of the roadside boundary on the R497 at Knockmaroe, Co. Tipperary
HA23	Removal of street furniture and vegetation trimming on the R497 and L2264-50 Knockmaroe, Co. Tipperary

Relevant Figures (contained at the end of this Appendix 5.6)

Figure OA 2: Haul Route Activities (8 maps)

A5.6 -5.2.3.2 Upperchurch Hen Harrier Scheme

As required by Condition No.18, the promoters of Upperchurch Windfarm will develop the Upperchurch Hen Harrier Scheme which, as detailed in the 2013 RFI will provide and enhance foraging habitat for hen harrier on agricultural grassland, in the vicinity of the Slievefelim to Silvermines SPA. Nine local landowners are signed-up to the Scheme covering 128 hectares and the participating landowners will be compensated for implementing a set of habitat improvement measures for foraging hen harrier on their lands. (*Note*: Upperchurch Windfarm is lcoated outside the SPA).

Upperchurch Windfarm 2014 Grant of Permission (PL.22.243040) Condition No. 18*:*

(a) *The Ecological Management Plan submitted to the planning authority on the 21 day of November, 2013, shall be implemented in full. Details including timescale, and monitoring shall be agreed with the planning authority following consultation with the National parks and Wildlife service.*

(b) *A timescale for the provision of the enhanced foraging areas including rush managements, the provision of additional hedgerows enclosures for native scrub and trees and measures by landowners in relation to spreading, burning, interference with drainage, retention of hedgerows, restrictions on use of poisons and new forestry plantation shall be agreed with the planning authority following consultation with the National parks and Wildlife service prior to the commencement of development works on the site.*

(c) *A programme of on-going surveys and monitoring of the species in years 2 and 3 after the commencement of the operation of the turbines shall be submitted to, and agreed in writing with the planning authority, following consultation with the National parks, and prior to the commencement of development works on the site.*

Reason: *In the interest of the protection of the environment and the protection of the foraging habitat of the hen harrier species.*

The Upperchurch Hen Harrier Scheme is based on the NPWS Hen Harrier Scheme for farmers. This scheme (NPWS Scheme) has now finished, however, the Upperchurch Hen Harrier Scheme will bring about a very similar scheme in the Upperchurch area, which is set out in detail in the Ecological Management Plan (EcMP), to be found in the 2013 RFI in the Reference Documents volume with the planning application.

Activities associated with the Upperchurch Hen Harrier Scheme includes once off activities such as planting of hedgerows and trees; enhancement of riparian corridors and scrub/wood areas and the fencing off of watercourses and newly planted trees and shrubs. These activities will create new habitat and protect and enhance existing habitat. The Scheme also includes long-term farm management practices such as management of rush coverage, livestock grazing and the control of the use of lime, fertilizers and burning of gorse, amongst others, which will result in the long term maintenance of hen harrier habitat. Training and development for those farmers involved will be conducted, and the success of the Scheme will be monitored throughout the lifetime of the associated Upperchurch Windfarm.

Relevant Figures (contained at the end of this Appendix 5.6)

Figure OA 3: Upperchurch Hen Harrier Scheme – Layout on Aerial Photography Mapping

A5.6 -5.2.3.3 Overhead Line Activities

Overhead line activities are associated with the existing overhead 110kV line between Killonan ESBN Station (just east of Limerick City) and ESBN Angle Mast Structure No. 90 (2.3 km north of Mountphilips Substation).

These activities will be carried out by ESBN or ESBN contractors.

Activities include will involve (a) re-sagging/correcting the tension, and (b) fibre-wrapping.

Re-sagging: The connection of Upperchurch Windfarm to the National Grid will cause a change in the configuration of the existing line between the new End Mast locations and the nearest Angle Masts, which will require line tension correction, or re-sagging, on 2 no. Sections:

i) between ESBN Angle Mast Structure No. 78 (c.200m south of Mountphilips substation) to New Mountphilips End Mast No. 1 and

ii) between New Mountphilips End Mast No. 2 and ESBN Angle Mast Structure No. 90 (2.3 km north of Mountphilips substation).

Re-sagging will be carried out using puller/tensioner machines at Angle and End Masts and stringing wheels at Intermediary Structures.

Fibre-wrapping: One of the conductors (wires) on the line between Killonan ESBN Station to Mountphilips Substation will also be wrapped with fibre optic cable, using an aerial crawler fibre wrap machine

The activities will be carried out according to industry standard method statements, including standard health & safety and environmental management systems.

Relevant Figures (contained at the end of this Appendix 5.6)

Figure OA 4: Overhead Line Activities – Layout on OSI Discovery Mapping

A5.6 -5.2.3.4 Characteristics of Monitoring Activities

Monitoring Activities will be carried out during the construction, operation and decommissioning stages. Monitoring relates to UWF Grid Connection, UWF Related Works, Upperchurch Windfarm, UWF Replacement Forestry and the UWF Other Activities, and includes the following:

- Inspections and maintenance of sediment and erosion control measures
- Water quality monitoring
- Hydrographic monitoring and reporting after rainfall events
- FWD and video survey of the local road network
- Preconstruction hen harrier, badger, otter, curlew, bat and marsh fritillary surveys
- Monitoring of pre-construction management of marsh fritillary habitat
- Archaeological monitoring of initial groundworks
- Supervision of the vegetative planting of the UWF Grid Connection Concealed Access Roads,
- Annual monitoring and assessment of re-vegetation and recovery success at construction works areas
- Annual hen harrier, badger and bat surveys, including fatality searches
- Invasive species monitoring
- On-going annual monitoring of the Upperchurch Hen Harrier Scheme
- Monitoring of compliance with planning condition No. 11 for Upperchurch Windfarm (operating windfarm noise)
- Monitoring of compliance with planning condition No. 12 for Upperchurch Windfarm (operating windfarm shadow flicker)
- Monitoring the implementation of and compliance with the environmental planning conditions and commitments in the 2013 EIS, 2013 RFI, including the EMP for the Upperchurch Windfarm
- Monitoring the implementation of and compliance with the environmental commitments (including the Surface Water, Traffic, Waste and Invasive Species Management Plans) in the UWF Grid Connection Environmental Management Plan and UWF Related Works Environmental Management Plan, and any additional requirements conditioned with a grant of planning permission.
- Monitoring the implementation of and compliance with the environmental protection measures set out in UWF Replacement Forestry EIA Report (Volume C2: EIAR Main Report: Chapter 5 and Volume C4: EIAR Appendices: Appendix 5.1 and Appendix 5.2) and any additional requirements conditioned with the afforestation license.
- Monitoring the implementation of and compliance with the environmental protection measures for UWF Other Activities set out in Section A5.6 -5.2.4 below. Monitoring compliance with these measures will be through the relevant UWF construction and operational stage Environmental Management Plans, the UWF Grid Connection Environmental Management Plan and the UWF Related Works Environmental Management Plan – for example compliance with environmental protection measures which relate to Overhead Line Activities will be carried out through the UWF Grid Connection Environmental Management Plan.

These monitoring and survey activities will be carried out both prior to and during, the construction of Upperchurch Windfarm, UWF Related Works, UWF Grid Connection and prior to and during the planting of UWF Replacement Forestry. Monitoring activities also relate to the operational stage of the Elements, and to the decommissioning stage of the Upperchurch Windfarm and UWF Related Works where relevant.

A5.6 -5.2.4 Environmental Protection Measures for UWF Other Activities

- Except with the approval of the National Parks and Wildlife Service: no activities will be carried out within 500 metres of an active hen harrier nest or nesting attempt; no activities will be carried out within 30m of an active main badger set or within 150m of an active otter holt.
- In order to prevent disturbance to breeding birds, tree trimming for Haul Route Activities will be conducted outside of the bird breeding season.
- Invasive Species monitoring in the form of confirmatory surveys will be carried out during the construction stage of the UWF Grid Connection, UWF Related Works and Upperchurch Windfarm to identify any infestations within or close to the relevant UWF Other Activity locations. Surveys will focus always on the activity location plus 7m and will be carried out ahead of any activities taking place. The measures included in the Invasive Species Management Plan for UWF Grid Connection and UWF Related Works will be implemented – See Volume D of the planning applications for these Elements.
- To minimise disturbance or displacement to lands, landowners will be contacted ahead of activities taking place on their lands and personnel involved in Overhead Line Activities or the Upperchurch Hen Harrier Scheme will ensure that the lands are left in at least as good condition than before the activity began. Activities will be carried out with minimum interference to land or livestock.
- In order to protect water quality, Overhead Line Activities, Haul Route Activities and Upperchurch Hen Harrier Scheme activities which occur within 50m of a watercourse will be carried out during a dry spell of weather; a minimum buffer of 5m will be maintained between the activity and the watercourse where possible; straw bales will be placed between the activity location and the watercourse if there is a risk of sediment runoff from the activity (such as tree planting); all machinery or equipment used will be steam-cleaned before use at the location and checked for oil leaks prior to use; no refuelling of machinery or equipment will take place with 100m of a watercourse; access matting such as bog mats will be used in wet/boggy areas to provide access to vehicles, and any ground rutted by vehicles associated with UWF Other Activities will be repaired through loosening the compacted soil under any ruts with fork; any disturbed ground will be re-seeded immediately following the completion of the activity at a location.

These environmental protection measures will be implemented as part of the UWF Grid Connection, UWF Related Works and Upperchurch Windfarm and will be incorporated into their respective Environmental Management Plans. For example, measures listed above which are relevant to Overhead Line Activities will be monitored through the UWF Grid Connection Environmental Management Plan.

A5.6 -5.3 UWF Other Activities during Life Cycle Stages

A5.6 -5.3.1.1 Duration & Timing

Table 5-1: Duration and timing of the construction of the Upperchurch Windfarm

Activities	Duration	Timing of Activities
Haul Route Activities: Laying of Matting	15 mins per location 1 day to put down, and 1 day to take up	Prior to commencement of turbine component haulage
Haul Route Activities: Street furniture and signage removal and reinstatement	15 mins to 4 hours per location	Immediately prior to the arrival of turbine components at the location, with reinstatement after the passage of the turbine components.
Haul Route Activities: Tree Trimming along public road corridor	15 mins per location 1 day to carry out	In order to prevent disturbance to breeding birds, tree trimming will be conducted outside of the bird breeding season
Upperchurch Hen Harrier Scheme – initial once-off activities	2 – 3 months	Trees and shrubs will be planted during the dormant period October to March, fencing around new plants will be carried out at the same time. A tractor will only be used during dry weather in the riparian area.
Upperchurch Hen Harrier Scheme – farming practices	On-going	None
Monitoring Activities Inspections and maintenance of sediment and erosion control measures	1hr – 1 week	6 months Post construction
Monitoring Activities Monthly Water monitoring	6 hrs	1st year Post construction
Monitoring Activities Hydrographic monitoring and reporting after rainfall events	6hr	3 years Post construction
Monitoring Activities Monitoring and care of Concealed Access Roads during the establishment phase	3 hours per month	First 18 months post construction
Monitoring Activities Annual monitoring and assessment of re-vegetation and recovery success	6 hrs	5 years Post construction
Monitoring Activities: Survey of invasive species locations	1 hour per location	Immediately prior to works in an area, and prior to the delivery of turbine components.
Monitoring Activities Annual bird, badger and bat surveys	1hr – 2 weeks per survey	3 years Post construction

including fatality searches		
Monitoring Activities On-going annual monitoring of the Upperchurch Hen Harrier Scheme	c. 5 days per survey	Operational Stage Annually monitoring and reporting to NPWS for the first five years, and then every 2 to 3 years from Yr6 onwards
Monitoring Activities Monitoring compliance with planning conditions, EIS/EIAR/EMP commitments	Ongoing observations throughout the construction stage – carried out by the Environmental Clerk of Works and throughout the operational (and where relevant decommissioning) stage by the Environmental Manager	Entire Life Cycle
Monitoring Activities Monitoring of compliance with planning condition No. 11 for Upperchurch Windfarm (operating windfarm noise)	c.2 months	Report to be submitted within 6 months of commissioning of UWF
Monitoring Activities Monitoring of compliance with planning condition No. 12 for Upperchurch Windfarm (operating windfarm shadow flicker)	Ongoing by computer software	Report to be submitted within 12 months of commissioning of UWF
Overhead Line Activities Re-sagging/tensioning	2 'straights' and 11 structures	Following connection of Mountphilips substation.
Overhead Line Activities Fibre wrapping	1 day per 'straights' i.e. 17 days	Prior to connection of Mountphilips substation.

A5.6 -5.3.1.2 UWF Other Activities Personnel

In total c.50 personnel will be required to carry out the UWF Other Activities as per:

- **Haul Route Activities** will require a 3-man crew for each type of activity – mat laying, street furniture removal and tree trimming.
- The **Upperchurch Hen Harrier Scheme** will be implemented by the 9 landowners involved in the Scheme.
- The **Monitoring Activities** will be carried out by c.16 individual expert engineering and environmental consultants.
- **Overhead Line Activities** will be carried out by small teams of up to 8 overhead linesmen for both re-sagging and fibre wrapping.

A5.5 -5.3.1.2.1 Welfare Facilities

The Upperchurch Windfarm construction stage Site Compound No. 1 and the operational stage site office containing welfare and canteen facilities will be available to personnel carrying out UWF Other Activities.

A5.6 -5.3.1.3 Activities

A5.5 -5.3.1.3.1 Haul Route Activities

Haul Route Activities will involve the following activities:

Trimming of roadside vegetation within the road corridor, using a tractor mounted hedge trimmer to trim any protruding vegetation along the haul route roadside hedgerows, where required. Flag men will control and manage traffic on both sides of the tractor.

Laying of matting by hand at roundabouts and verges. This will involve covering the relevant part of the verge along the public road corridor with heavy duty geotextile or rigid geocell material or aluminium or plastic matting, which will be secured in place. When the turbine component deliveries are complete the matting will be removed.

Street furniture removal will involve the following activities: Immediately prior to the passage of turbine components being delivered to the consented Upperchurch Windfarm, the street furniture will be removed from its sockets, and stored safely nearby. Immediately after the passage of the convoy, the street furniture will be refitted into its sockets as before. This will be done for every turbine component delivery that requires the road signage to be temporarily removed.

A5.5 -5.3.1.3.2 Upperchurch Hen Harrier Scheme Activities

Initial Once-Off Activities

- Planting of 2.2 hectares of tree and shrub species in scrub areas, improvement planting with suitable trees and shrub species along existing field boundary hedgerows, and planting of 2.8km of new hedgerows with native trees and shrubs, which will improve cover for hen harrier;
- Erection of 4.8km livestock-proof fencing on newly planted or improvement planting areas to prevent damage by livestock, which will improve hen harrier habitat quality;
- Attachment of fence markers to electric fences in the areas, which will improve visibility of electric fences to hen harrier; and
- Planting of 1.4km of woody scrub species along riparian corridors and fencing of watercourse corridors to prevent access to the watercourses by livestock, which will enhance the quality of riparian habitats.

On-Going Farming Practices

- Management of rush coverage with controlled grazing and rush cutting starting in year 3, and thereafter as required, to achieve 30 – 70% rush coverage in fields, which will improve cover for hen harrier;
- During the first 2 years of the Plan, stocking levels between 0.6 and 1.6 LU (livestock units) per hectare which will maintain the appropriate sward within fields and not allow excessive stands of scrub or rush to dominate. To be reviewed at the start of Year 3;

Restrictions to farming practices

- No excavation of drains, which will allow improved grassland swards to revert back to wet grassland and more semi-natural grassland habitats;
- Limiting spreading of fertilizer and/or lime to every 4 – 5 years;
- No burning of gorse, scrub or heather to improve land cover;
- No removal of hedgerows, or new forestry plantation;

- No recreational off-roading with vehicles; and
- No use of poisons or stupefying baits.

Educational Measures

Hen harrier workshops will be delivered by the project ecologist at the initiation of the scheme to all landowners participating in the plan as well as those involved in the Upperchurch Windfarm development. The aim of the workshop will be to advise on the importance of the conservation of the hen harrier and the proper and full implementation of the Scheme, and to fully explain the measures and the restrictions set down in the Scheme.

Monitoring of the Scheme

The continual monitoring of the Hen Harrier scheme especially in the early years when measures are initiated, is crucial for the plan to be fully successful. Annual inspections will be carried out for the first 5 years of the scheme, by the project ecologist. The project ecologist shall assess the alternative habitats, raise any specific issues which need to be addressed and discuss with landowners any further measures required. A report will be prepared annually and submitted to National Parks and Wildlife Services for comment. Inspections and reporting will take place every 2 to 3 years from Year 6 onwards.

A5.5 -5.3.1.3.3 Overhead Line Activities

Overhead Line Activities will include the following activities;

- The Overhead Line Activities will be carried out during a planned outage of the overhead line.
- Access: 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 ESBN structures for ESBN 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.
- Re-sagging: the intermediary ESBN Structure Nos. 79, and 80 to 89 will be climbed and fitted with stringing wheels, in order to facilitate the re-sagging activity. Puller/tensioner equipment will be positioned at the bases of Mountphilips End Mast No. 1 and No. 2 and Angle Mast ESBN Structure No. 78 and No. 90. The tension will be corrected on all 3 No. conductors (wires) between the structures, using the puller/tensioner equipment. Once the tension is corrected, the stringing wheels will be removed.
- Fibre-wrapping: 1 No. conductor (wire) on the overhead line between the Killonan Station and the new Mountphilips Substation will be wrapped with fibre-optic cable. Intermediary structures between angle masts, will be climbed and stringing wheels will be fitted. The aerial crawler fibre wrap machine will be set up at an Angle Mast structure and will wrap the wire as far as the next Angle Mast, where it will be set up once more for the next 'straight'. Following the fibre wrapping of the overhead line between Angle Masts, the intermediary structures will be climbed once more and the stringing wheels removed.

A5.5 -5.3.1.3.4 Monitoring Activities

Monitoring Activities will involve the following activities:

- Pre-construction confirmatory surveys of public road condition,
- Pre-construction confirmatory ecological surveys of habitats, hen harrier, curlew, bats, badgers, otters and marsh fritillary;
- Pre-construction management of Marsh Fritillary (butterfly) habitat
- Construction stage collection of water samples and monitoring of water quality, archaeology, invasive species, monitoring of works, monitoring of vegetation of Concealed Access Roads, monitoring of reinstatement of lands and
- Monitoring and auditing of compliance with the UWF Construction Environmental Management Plan, UWF Ecological Management Plan, UWF Grid Connection Environmental Management Plan, and UWF Related Works Environmental Management Plan;
- Early operational UWF monitoring to include adherence to the UWF Ecological Management Plan; the UWF Surface Water Management Plan including inspections and maintenance of sediment and erosion control measures and water sampling; hydrographic monitoring and reporting after rainfall events, monitoring and assessment of re-vegetation and recovery success; bird surveys; fatality survey for badger and bat. In addition, compliance with planning conditions for UWF in relation to noise and shadow flicker requires that results of monitoring be submitted and agreed with the planning authority.
- Monitoring of the Upperchurch Hen Harrier Scheme annually in Years 1 to 5 and thereafter every 2 or 3 years, and associated reporting to NPWS.

A5.6 -5.3.1.4 Use of Equipment and Tools

The main equipment and tools which will be required are listed in

Table 5-2 Equipment and tools

Equipment	Tools
Haul Route Activities - tractor with mounted hedge trimmers	- hand tools
Upperchurch Hen Harrier Scheme - tractor will pole driver attached - tractors for rush cutting and land cover management	- spades - slash hooks - hand tools
Monitoring Activities - FWD survey machine	- bat detectors - cameras - containers - noise monitoring equipment
Overhead Line Activities - Puller/Tensioner - Teleporter - Fibre wrap crawler - Crew cab 4X4 - Van - Climbing and Electrical Safety Equipment	- Stringing wheels - Chains/hand tools

A5.6 -5.3.1.5 Use of Hydrocarbons

Very small volumes of hydrocarbons will be used during UWF Other Activities and will be limited to the diesel or petrol fuel and mechanical oils used by vehicles and machinery.

A5.6 -5.3.1.6 Other Facilities - Fuel Storage & Tool Storage

There will be no requirement for either fuel or tool storage.

A5.6 -5.3.2 Imported Materials

The materials, which will be brought onto the UWF Other Activities areas, are listed in Table 5-3 along with details of the quantity and likely source of the materials.

Table 5-3: Quantities, type and source of construction materials

Materials	Quantity	Likely Source of Materials
Geotextile material / matting	1 No. load	Nenagh, Co Tipperary / Cork
Native trees and shrubs and peat for topdressing Concealed Access Roads (if required)	2 No. loads	Established nurseries in Ireland or Scotland
Wooden posts, fencing wire	7 No. loads	Arrabawn Co-Op, Reiska
Fibre optic cable spools/cassettes	14.7km on 17 drums	EU Region

A5.6 -5.4 UWF Other Activities: Use of Natural Resources, Emissions and Waste

A5.6 -5.4.1 UWF Other Activities: Use of Natural Resources

A5.6 -5.4.1.1 Use of Resources: Land

No requirement for lands or change of use of lands due to the UWF Other Activities.

A5.6 -5.4.1.2 Use of Resources: Water

All water requirements for welfare facilities will be supplied at the temporary construction stage compound associated with the Upperchurch Windfarm during the construction stage and at the Upperchurch Windfarm site office during the operational (and if relevant decommissioning) stages. Bottled drinking water will be carried with personnel.

A5.6 -5.4.1.3 Use of Resources: Soils

Haul Route Activities: No excavation or other disturbance of soils are required.

Upperchurch Hen Harrier Scheme: any initial planting will be carried out by hand using spades, small localised patches of disturbed soil will occur at the sapling tree root areas.

Monitoring Activities: No excavation or other disturbance of soils are required.

Overhead Line Activities: No mechanical excavations are required.

A5.6 -5.4.1.4 Use of Resources: Biodiversity

Haul Route Activities: Up to 960m of roadside boundary hedges/treelines will be trimmed, outside of the general bird breeding season.

Upperchurch Hen Harrier Scheme: in total, 2.2ha of trees, 1.4km of riparian habitat and 2.8km of new hedgerow will be enhanced or created during initial activities. In total 128 hectares of agricultural lands will be management for the benefit of hen harrier, protecting foraging habitat in the vicinity of the Slievefelim to Silvermines SPA.

Monitoring Activities: monitoring and auditing will ensure compliance with the Environmental Management Plans and Ecological Management Plans for Upperchurch Windfarm, UWF Grid Connection, UWF Related Works and with the environmental protection measures for UWF Replacement Forestry and UWF Other Activities; monitoring will include confirmatory surveys for birds, mammals and invertebrates, surveys for invasive species, the reinstatement of lands at felling locations and construction works areas, monitoring of construction works, monitoring of the planting of heather and grasses in the UWF Grid Connection Concealed Access Roads; monitoring the development of hen harrier foraging habitat under the Upperchurch Hen Harrier Scheme, the timing of works and the implementation of environmental protection measures, all of which will protect biodiversity in the area.

Overhead Line Activities: The activities will be carried out according to electrical industry standard method statements, including standard health & safety and environmental management systems and adherence to guidelines set by IFI for water quality protection, all of which will protect biodiversity in the area.

A5.6 -5.4.2 UWF Other Activities: Emissions

D**ust** will not arise, due to the absence of mechanical excavation of and storage of soils.

Vehicle Exhausts Fumes will be emitted by vehicles and machinery during planting and some monitoring activities but the amounts will be negligible.

Noise: Machinery and vehicles which will be used during planting and monitoring activities will emit noise during their operation, but the levels will be negligible.

Vibration: FWD survey of the public road network will emit low levels of vibration, but the levels will be negligible.

Light: No light emissions will occur.

Electromagnetic Radiation: No emissions of electromagnetic radiation will occur.

A5.6 -5.4.3 UWF Other Activities: Waste

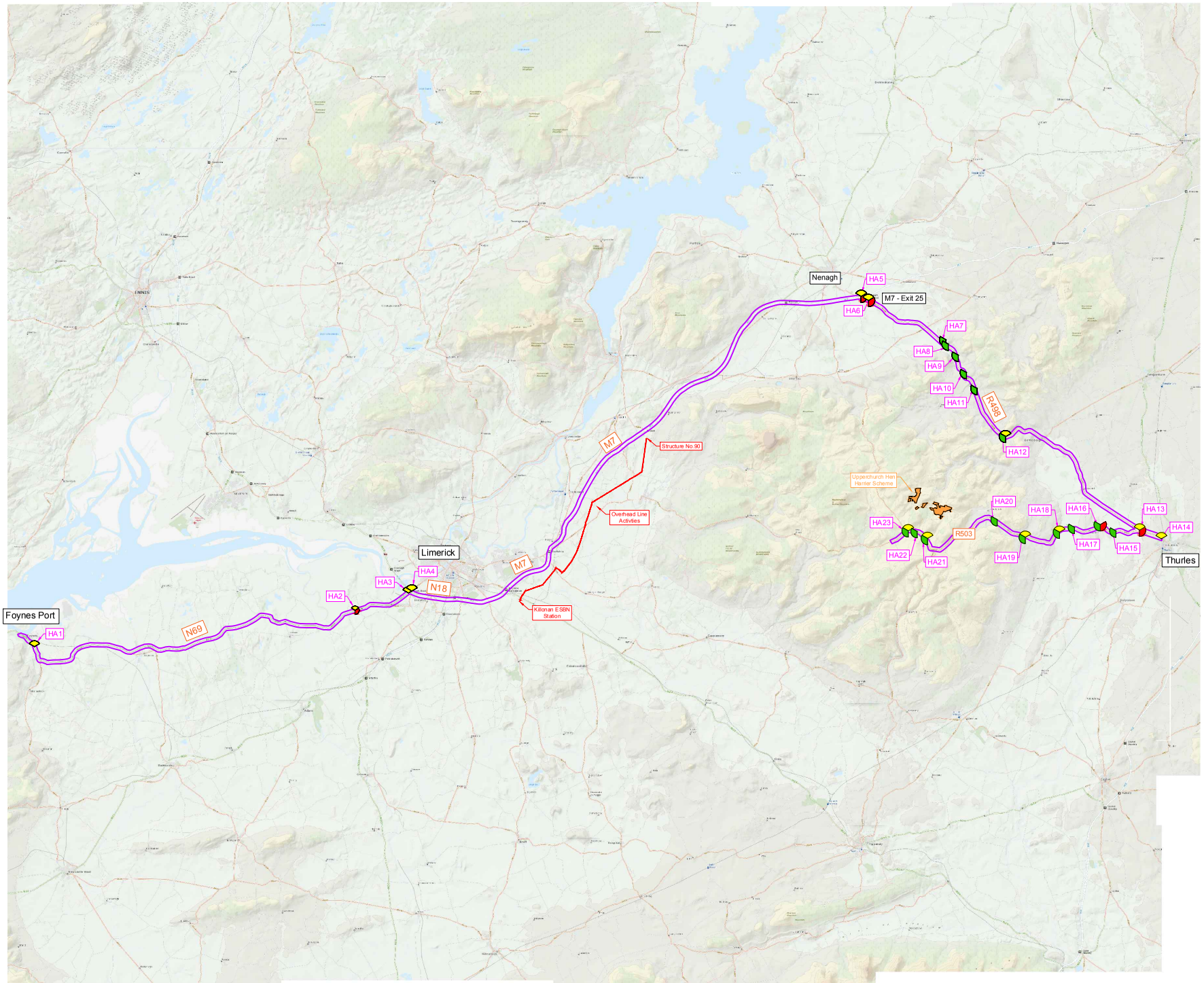
Waste Water: No waste water will occur at UWF Other Activities locations. Toilet facilities at the temporary construction stage compound associated with the Upperchurch Windfarm during the construction stage and at the Upperchurch Windfarm site office during the operational (and if relevant decommissioning) stages will be available to personnel involved in UWF Other Activities.

General Waste: such as excess geotextile material and packaging, will be generated in very small quantities. This waste will be removed from the activity location and stored at a designated area at the the temporary construction stage compound associated with the Upperchurch Windfarm during the construction stage and at the Upperchurch Windfarm site office during the operational (and if relevant decommissioning) stages. General waste will be collected by an appropriately licensed operator.

Chemical waste: No chemical wastes are expected.

With the exception of Overhead Line Activities, the wastes from UWF Other Activities will be managed under the construction stage Waste Management Plans for the consented Upperchurch Windfarm as relevant. During the operational stage, waste related to UWF Other Activities will be managed under the Upperchurch Windfarm's **Waste Management Plan**. Overhead line activities will be managed by the System owner (ESBN) who will have their own waste management commitments and plans.

A5.6 -5.5 Figures and Mapping



Title:

Figure OA 1

Location of UWF Other Activities on OSI Mapping

Map Number:
Map 1 of 1

Legend:

Ancillary Haul Route Activities

- Street Furniture Removal
- Vegetation Trimming
- Matting Overlay
- HA1 Identification Number (HA1 - HA23)
- Haul Route

Upperchurch Hen Harrier Scheme

- Agricultural lands included in the Upperchurch Hen Harrier Scheme

Overhead Line Activities

- Overhead 110kV Line between Killonan ESBN Station and Structure No.90

R503 Public Road Numbers

Monitoring Activity locations relate to the works areas associated with UWF Grid Connection, UWF Related Works and Upperchurch Windfarm.

N

Project:
UWF Other Activities (OA)

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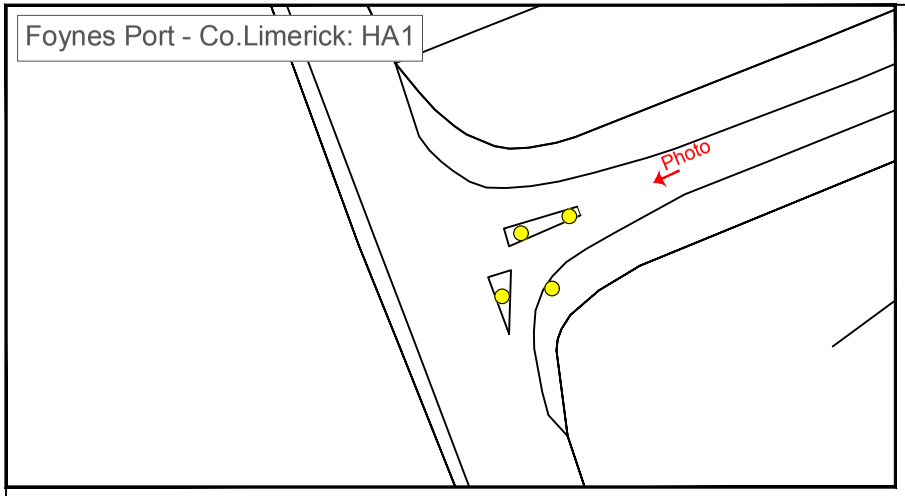



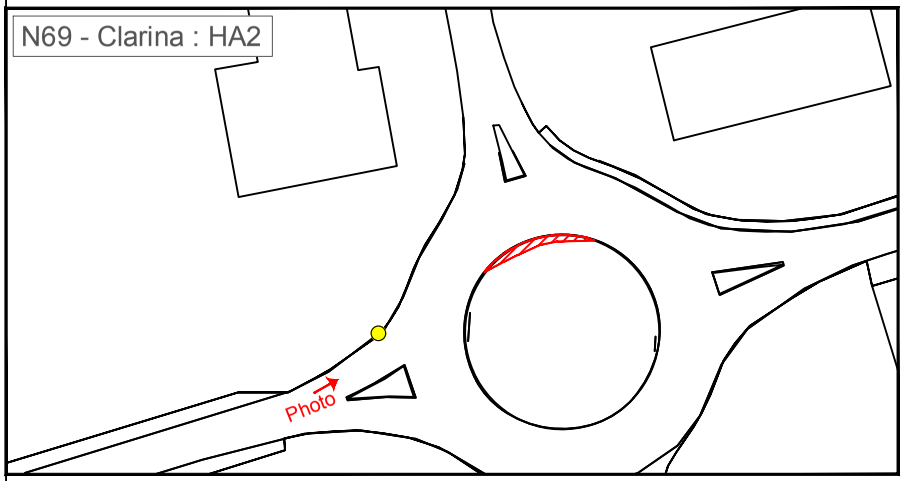



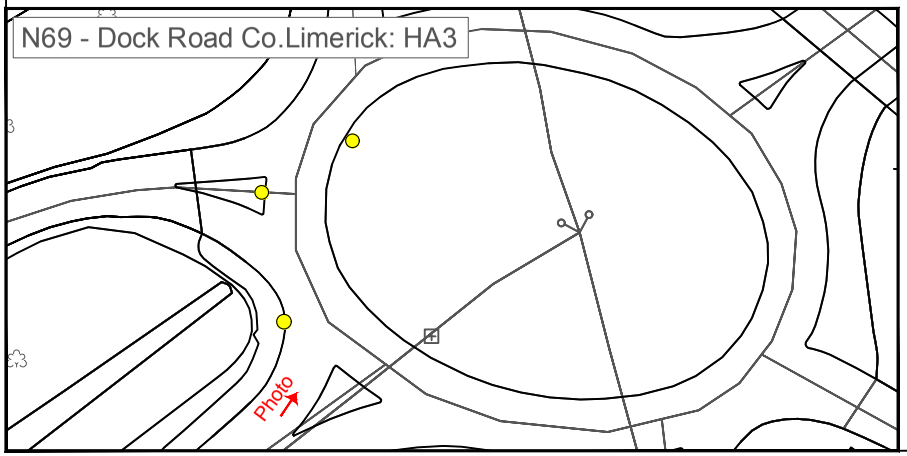



Title:

Figure OA 2

Haul Route Activities (8 maps)

Map Number:
Map 1 of 8

Legend:

- Haul Route Activities: Street Furniture Removal
- Haul Route Activities: Matting
- Photo — Direction of which the photo has been taken

N

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UWF Other Activities (OA)

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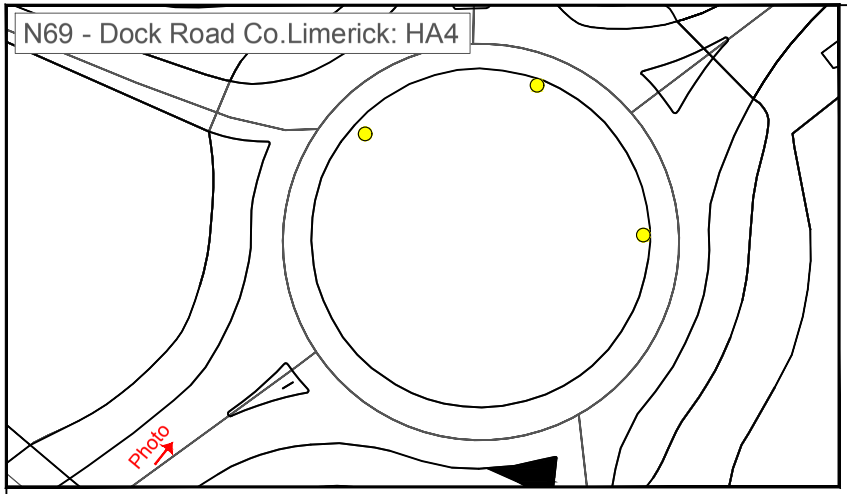



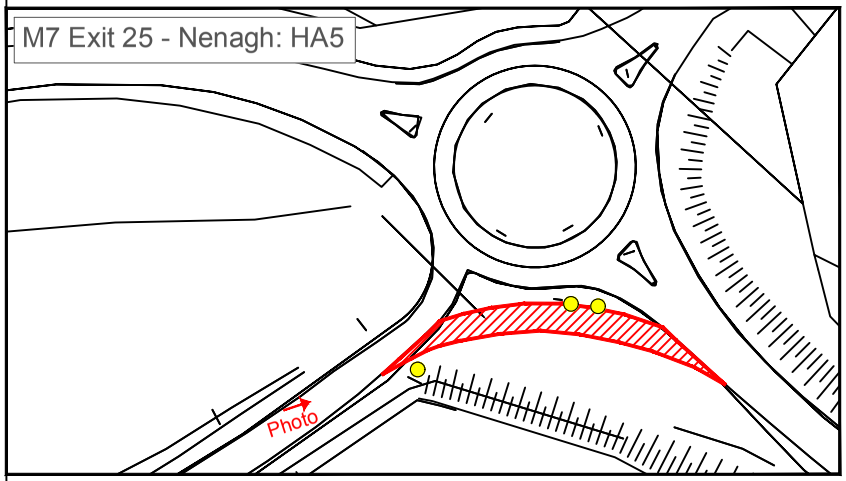



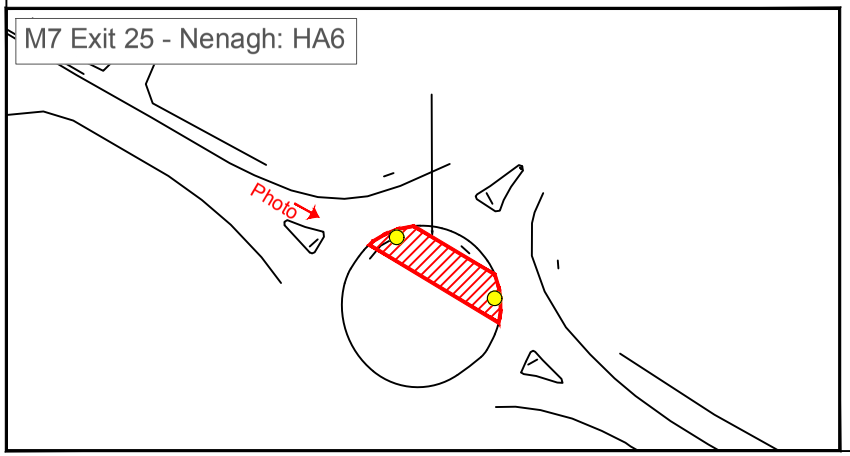



Title:

Figure OA 2

Haul Route Activities (8 maps)

Map Number:
Map 2 of 8

Legend:

- Haul Route Activities: Street Furniture Removal
- Haul Route Activities: Matting
- Direction of which the photo has been taken

N

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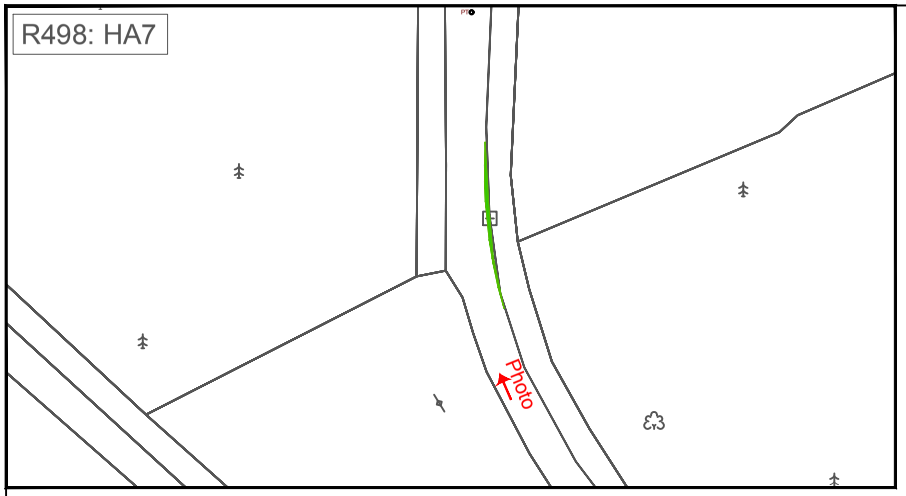



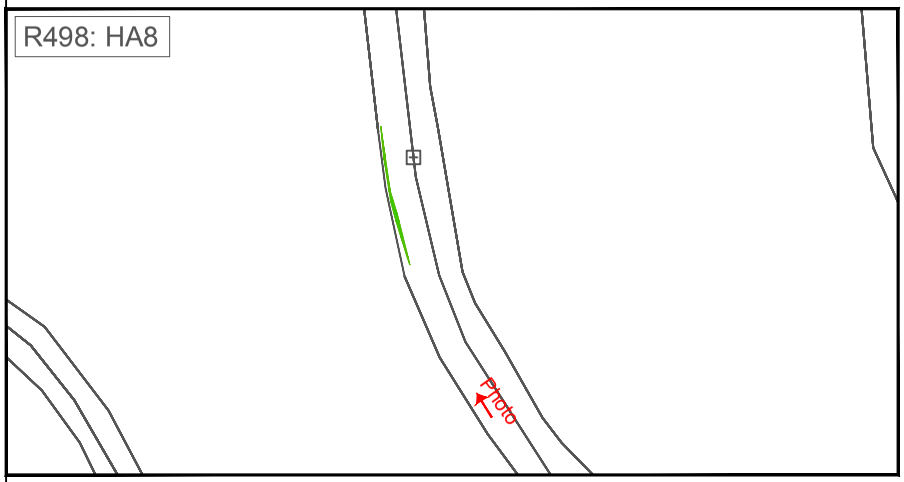



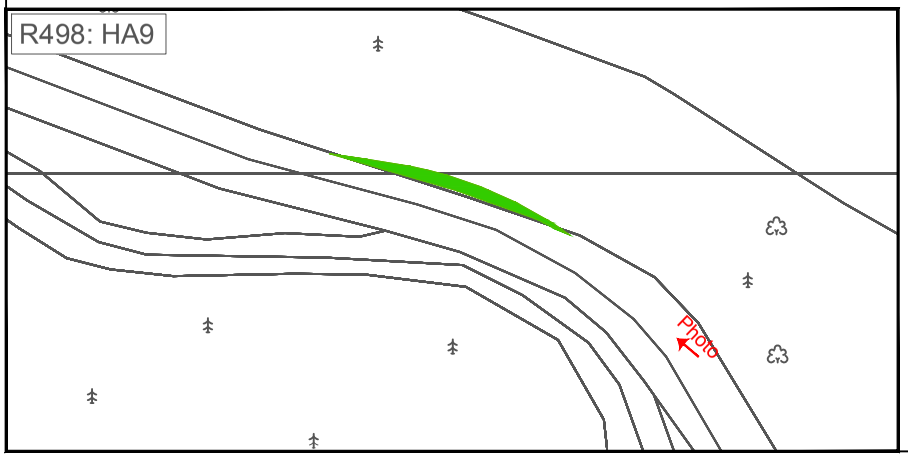



Title:

Figure OA 2

Haul Route Activities (8 maps)

Map Number:
Map 3 of 8

Legend:

Haul Route Activities:
Vegetation Trimming

Direction of which the photo has been taken

N

Project:

UWF Other Activities (OA)

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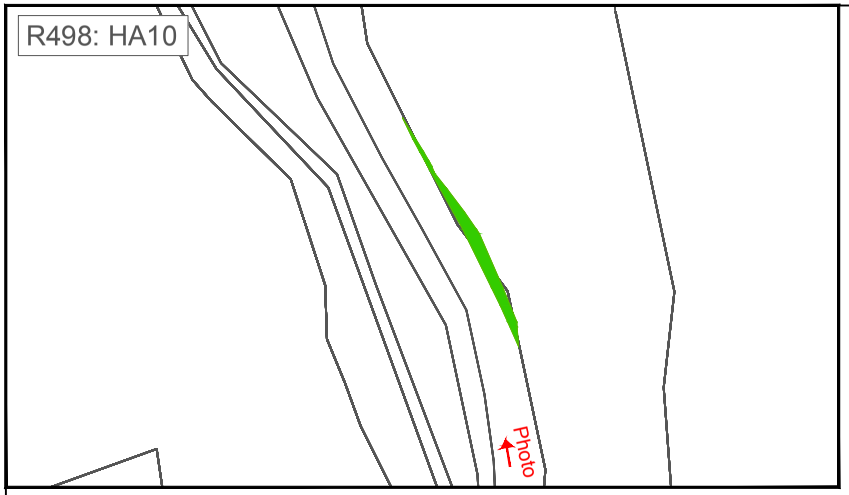



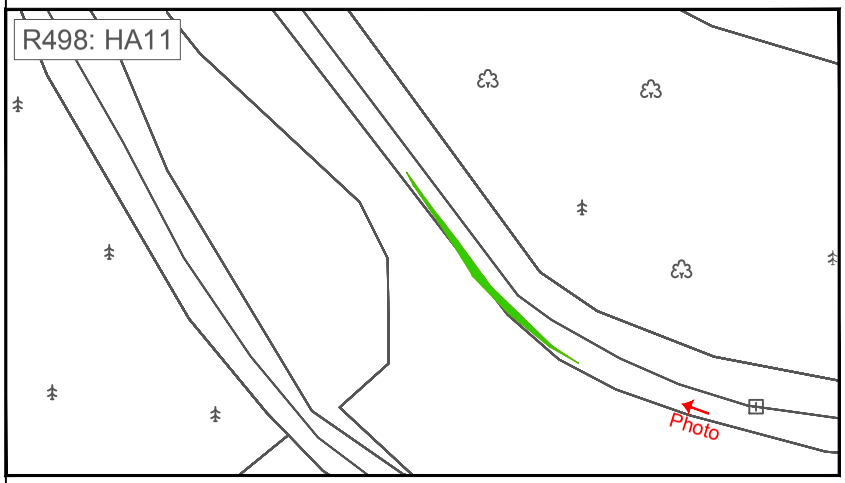



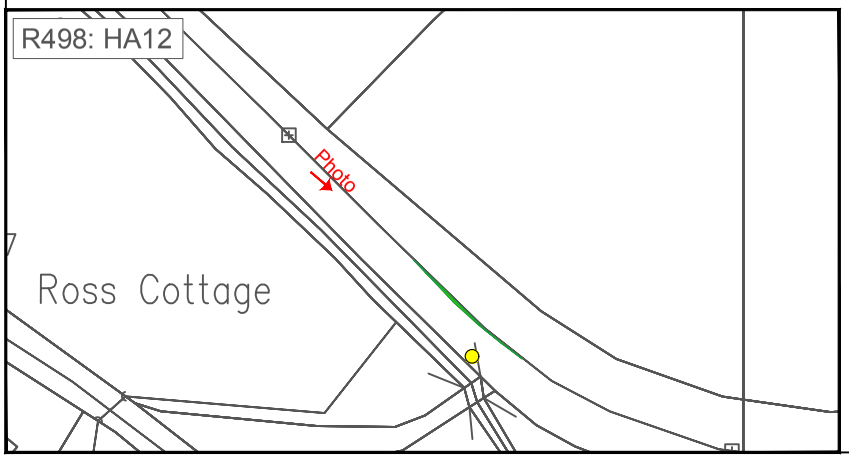



Title:

Figure OA 2

Haul Route Activities (8 maps)

Map Number:
Map 4 of 8

Legend:

- Haul Route Activities: Street Furniture Removal
- Haul Route Activities: Vegetation Trimming
- Direction of which the photo has been taken

N

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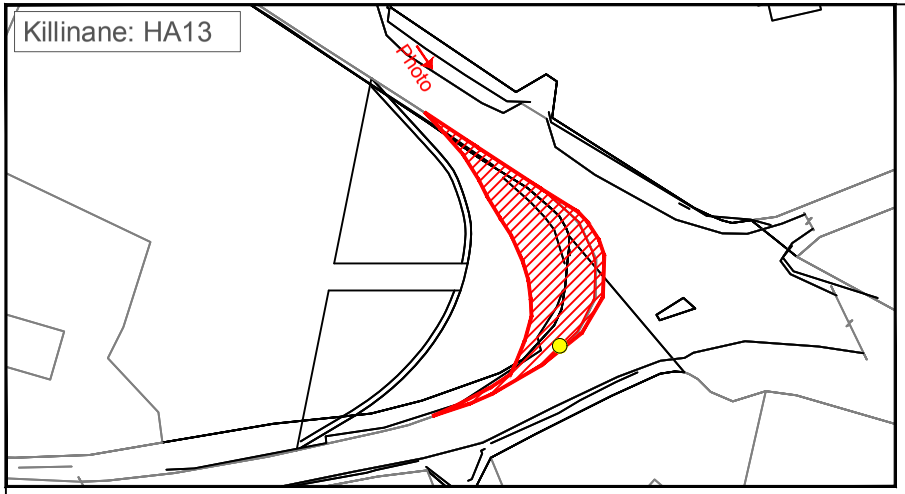



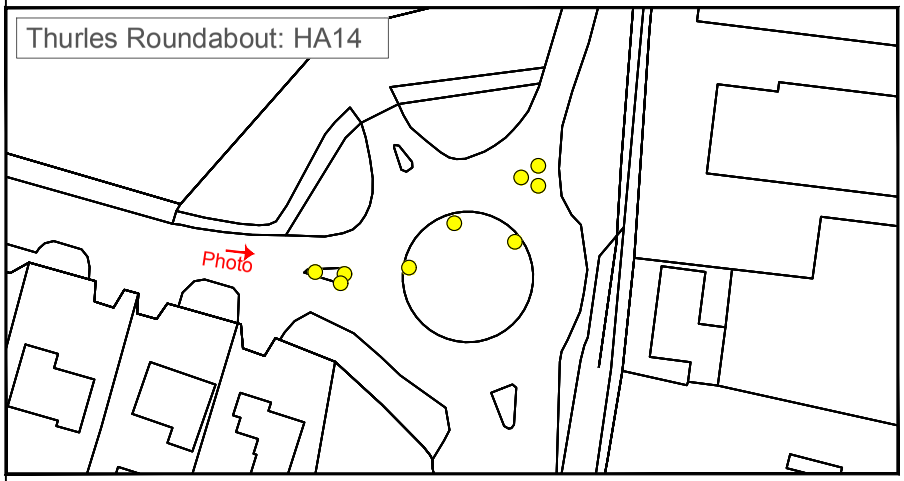



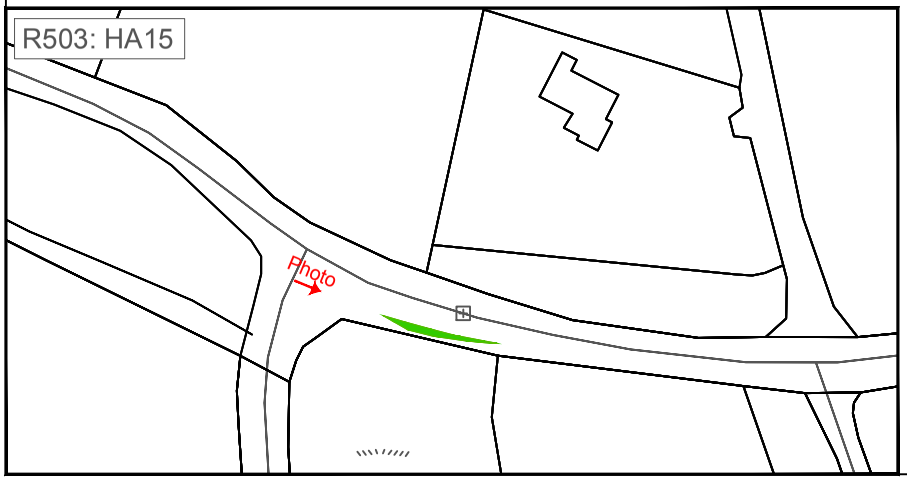



Title:

Figure OA 2

Haul Route Activities (8 maps)

Map Number:
Map 5 of 8

Legend:

- Haul Route Activities: Street Furniture Removal
- Haul Route Activities: Matting
- Haul Route Activities: Vegetation Trimming
- Photo — Direction of which the photo has been taken

N

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UWF Other Activities (OA)

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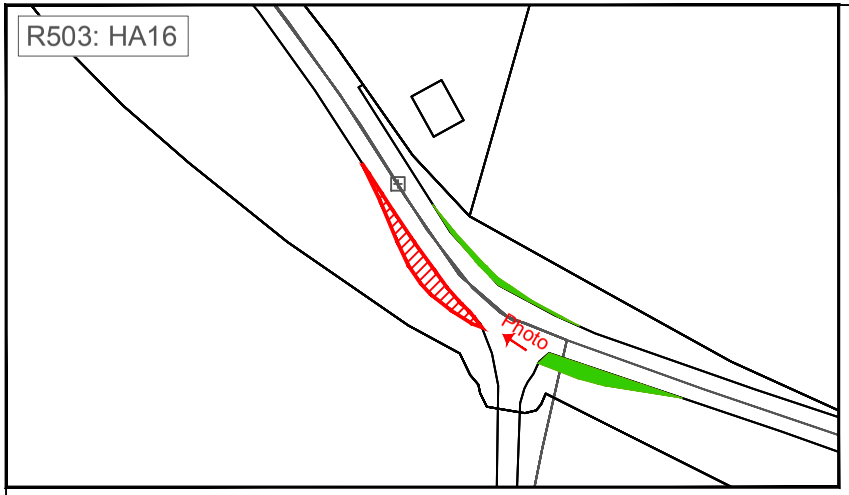



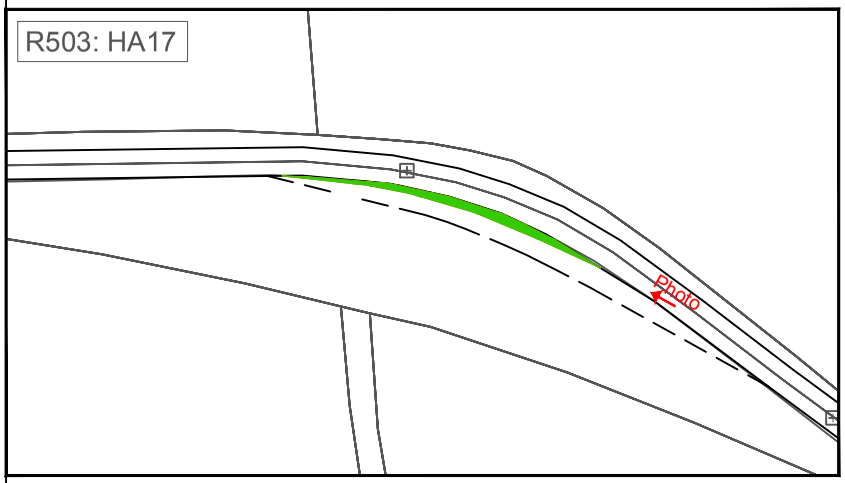







Title:

Figure OA 2

Haul Route Activities (8 maps)

Map Number:
Map 6 of 8

Legend:

- Haul Route Activities: Street Furniture Removal
- Haul Route Activities: Matting
- Haul Route Activities: Vegetation Trimming
- Photo — Direction of which the photo has been taken

N

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UWF Other Activities (OA)

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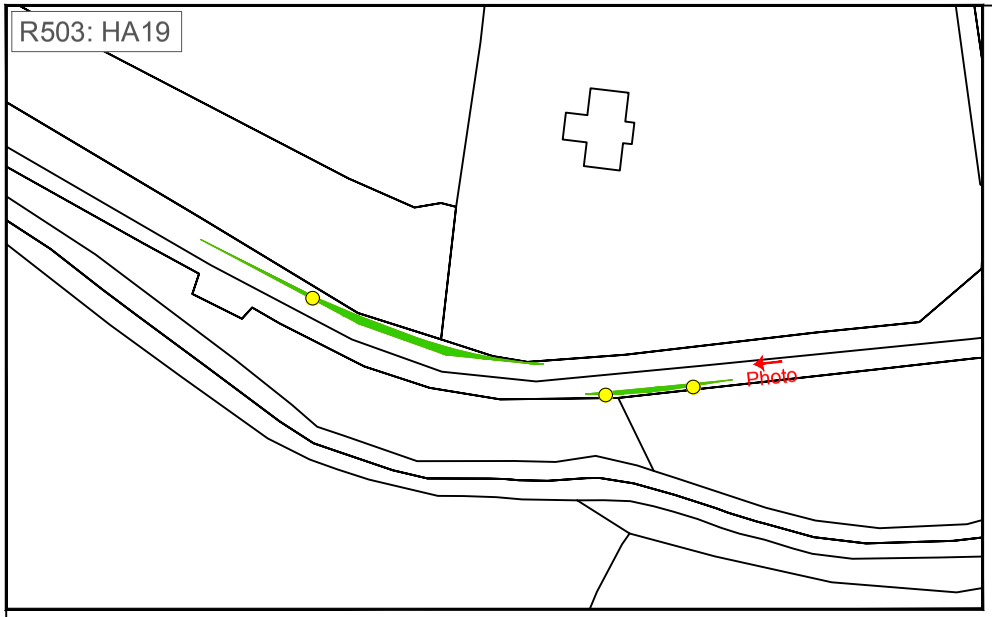



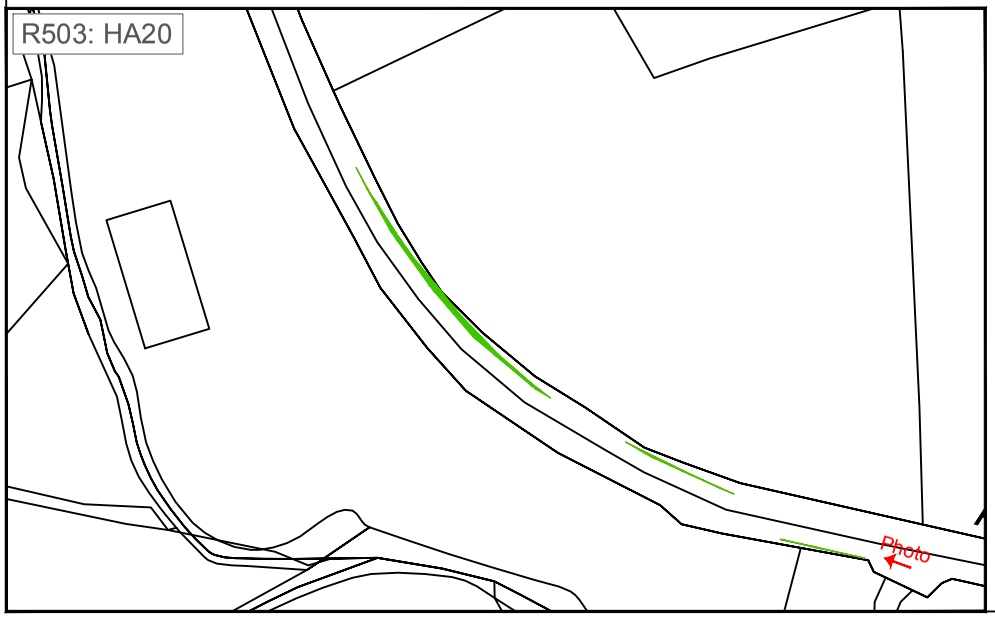



Title:

Figure OA 2

Haul Route Activities (8 maps)

Map Number:
Map 7 of 8

Legend:

- Haul Route Activities: Street Furniture Removal
- Haul Route Activities: Vegetation Trimming
- Direction of which the photo has been taken

N

Project:

UWF Other Activities (OA)

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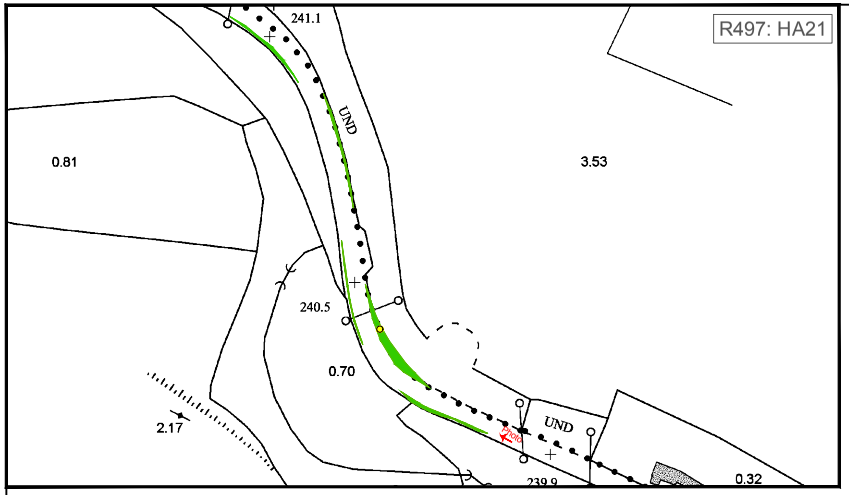
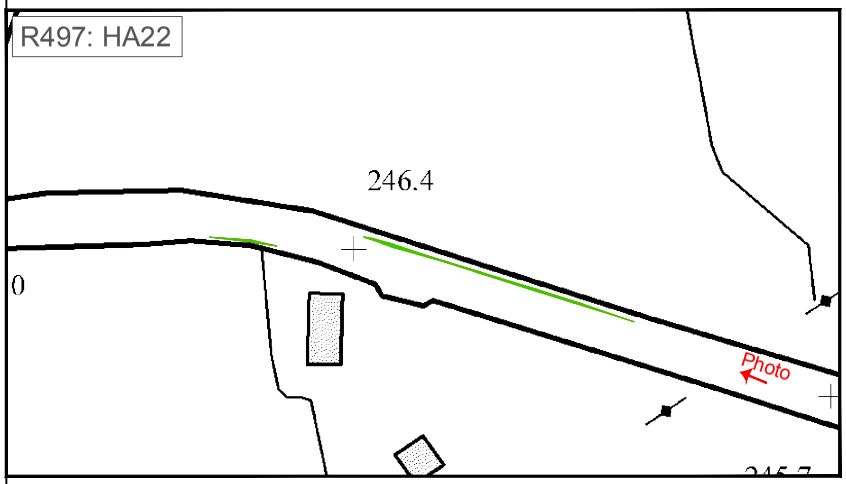
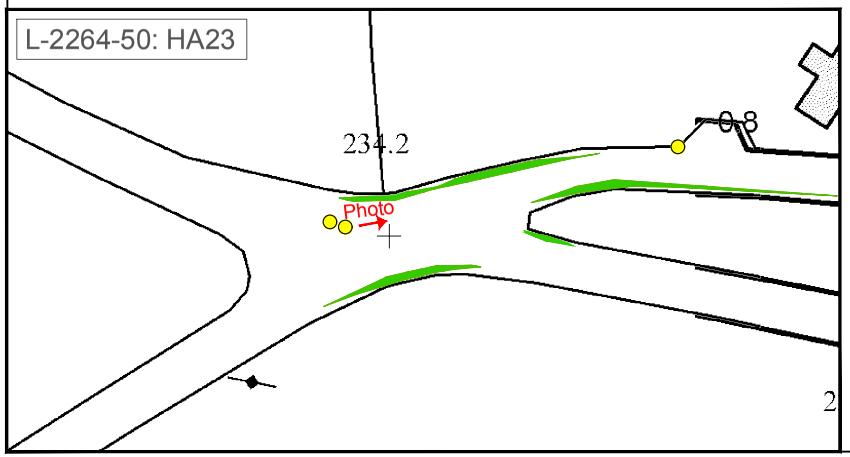
REFERENCE DOCUMENTS













Title:

Figure OA 2

Haul Route Activities (8 maps)

Map Number:
Map 8 of 8

Legend:

- Haul Route Activities: Street Furniture Removal
- Haul Route Activities: Vegetation Trimming
- Direction of which the photo has been taken

N

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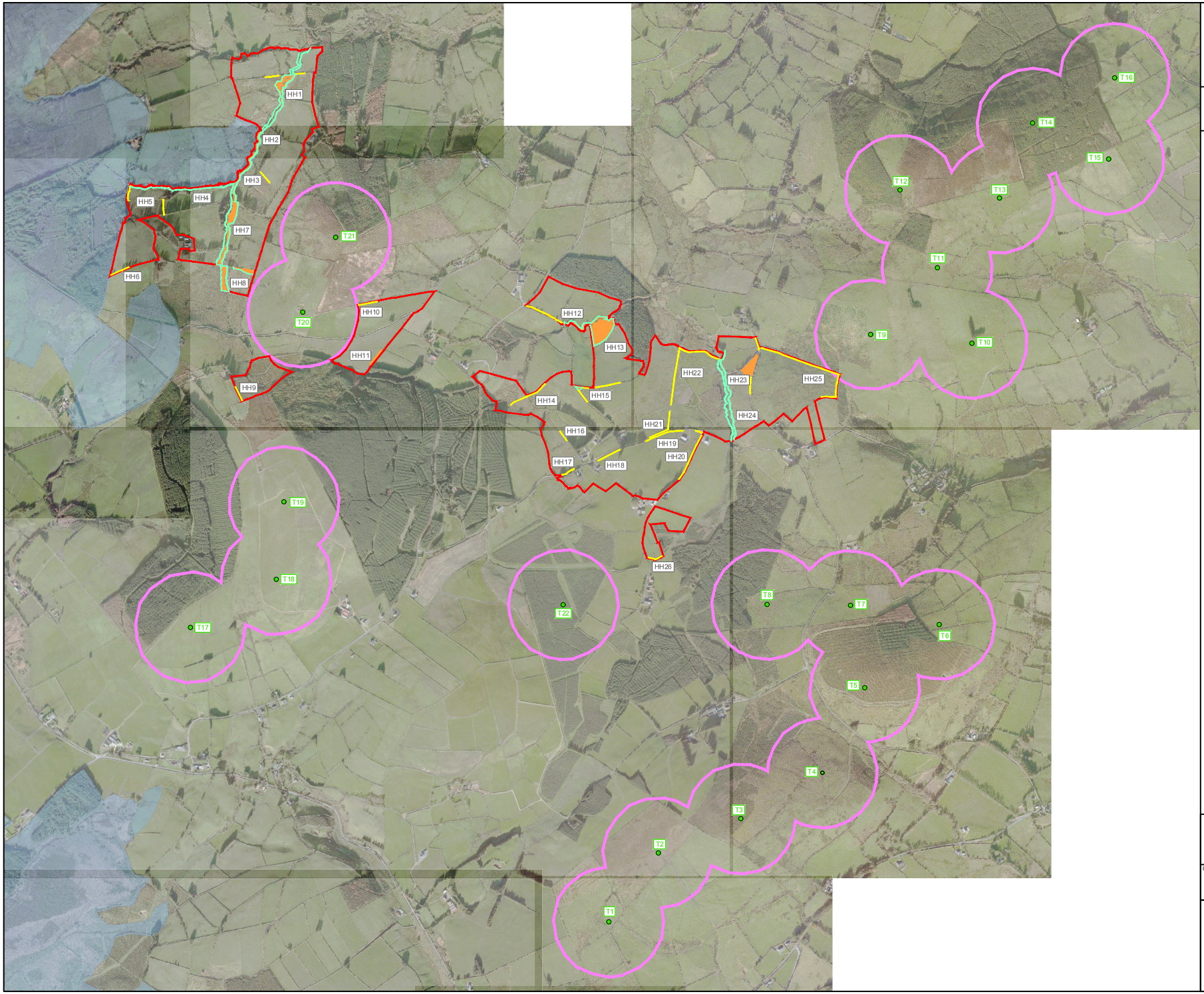

Title:

Figure OA 3

Upperchurch Hen Harrier Scheme - Layout on Aerial Photography Mapping

Map Number:
Map 1 of 1

Legend:

- Hedgerow Planting
- Fencing of Riparian Area
- Tree Planting
- Agricultural lands included in the Upperchurch Hen Harrier Scheme
- Slievefelim - Silvermines SPA
- Consented Upperchurch Windfarm Turbines
- T6 — Consented Upperchurch Windfarm Turbine Identification
- 250m Radius from each Consented Windfarm Turbine
- HH16 — Upperchurch Hen Harrier Scheme Identification

N

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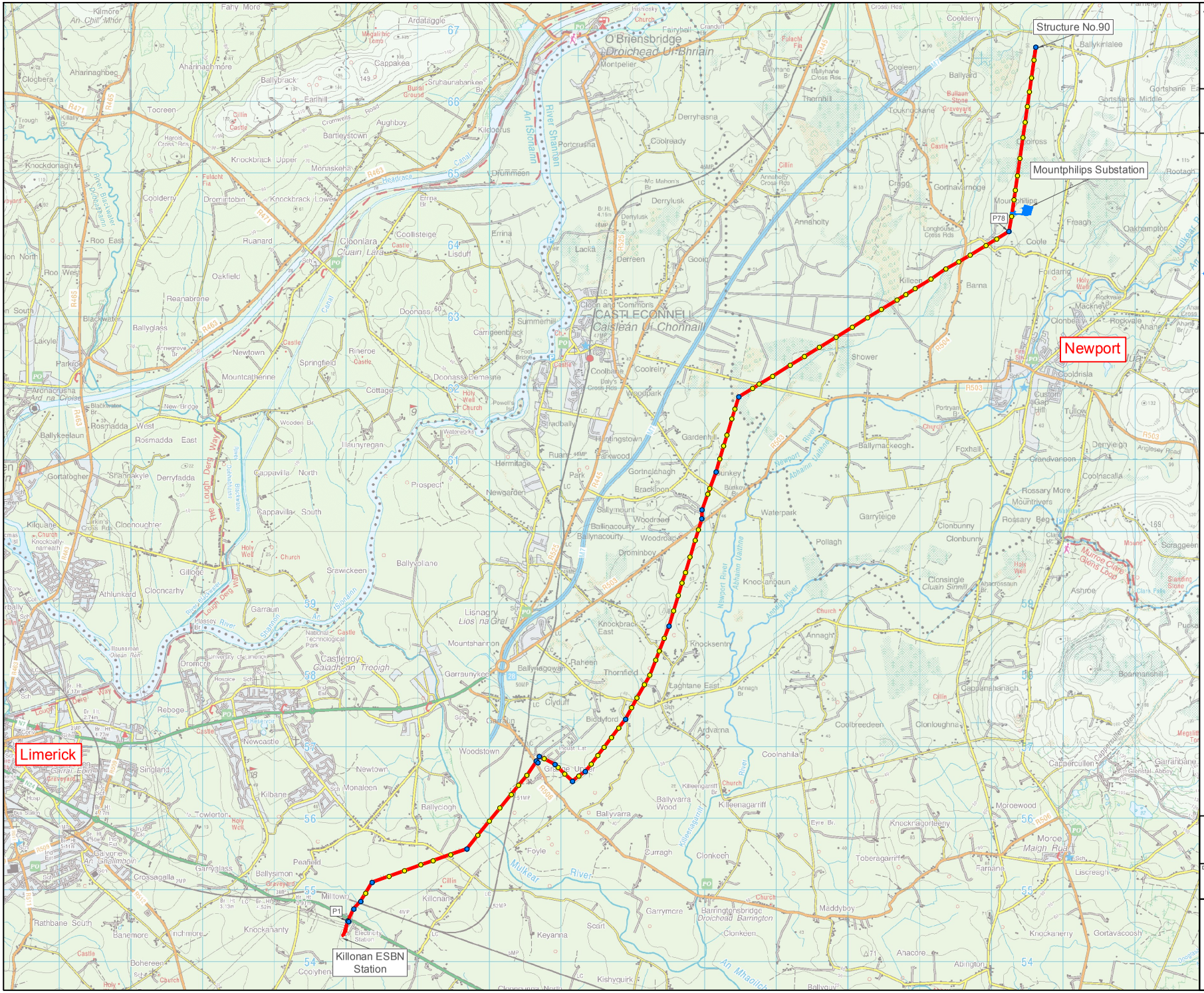
Structure No.90
Mountphilips Substation
P78
Newport
Limerick
P1
Killonan ESBN Station
O'Briensbridge
CASTLECONNELL
Caisleán Uí Chonnaill
Cloon and Commons
Lisnagry
Lios na Grá
Castletroy
Caiaidh an Trooigh
Clonloughna
Cappanahanagh
Moroe
Maigh Rua
Ballymackeogh
Foxhall
Clonbunny
Pollagh
Garryfeige
Rossary More
Rossary Beg
Ashroe
Annagh
Knocknagonleeny
Killeenagarriff
Ballyvarra
Ballyvarra Wood
Curragh
Clonkeen
Barrington's Bridge
Droichead Barrington
Garrymore
Maddyboy
Toberagarriff
Farnane
Liscreegh
Knockanerry
Gortavacoosh
Anacore
Abington
Ballyguy
Kishyquirk
Keyanna
Scart
Knockananty
Rathbane South
Banemore
Inchmore
Bohereen
Cooiyhen
Milltown
Killonan
Peafield
Ballysimon
Crossagalla
Garryglass
Calvoyle
Towlerton
Kilbane
Monaleen
Newtown
Singland
Garraí Eoin
Woodstown
Garraun
Biddyford
Clyduff
Laghtane East
Ardvarna
Coolbreedeen
Cappercullen
Garrahbane
Boormanshill
Thornfield
Raheen
Ballynagowan
Garraunykeen
Knocksentry
Knockbrack East
Mountshannon
Dromcre
Reboge
Newcastle
Castletroy
Ballyvolane
Clooncarhy
Athlunkard
Gilloge
Srawickeen
Garraun
Kilquane
Clonoughter
Shannakyle
Derryfadda
Gortatogher
Ballykeelaun
Rosmadda West
Rosmadda East
Ardnacrusha
Ard na Croise
Parkroe
Blackwater
Ballyglass
Lakyle
Roo West
Roo East
Knockdonagh
Knockbrack Upper
Knockbrack Lower
Dromintobin
Cooldery
Toocreen
Aharinaghbeg
Aharinaghmore
Cloghera
Kilmore
An Chill Mhór
Fahy More
Ardataggle
Cappakea
Sruhaunabankee
Earlhill
Ballybrack
Aughboy
Bartleystown
Monaskeha
Headrace
Canal
River Shannon
An tSionainn
Portcrusha
Coolready
Derryhasna
Kildoorus
Drumneen
Lisduff
Cloonlara
Cluain Lara
Coollisteige
Ruanard
Oakfield
Reanabrone
Doonass
Doonass Demesne
Carrigeenbrack
Summerhill
Lacka
Derreen
Derrylusk
Erina
Annaholty
Gortnavarnoge
Fraagh
Oakhampton
Coole
Killeen
Barna
Foildarrig
Clonbeaver
Rockvale
Mackney
Ahane
Cooldrisla
Shower
Tullow
Custom Gap Hill
Derryvegn
Grandvanoon
Coolnacalla
Scraggeen
Ashroe
Ballynacourty
Woodroad
Drominboy
Sallymount
Brackloon
Gortnadahagh
Gardenhill
Huntingstown
Parkwood
Woodpark
Coolbane
Coolreiry
Radbally
Hermitage
Ruan
Prospect
Newgarden
Cappavilla North
Cappavilla South
Mountcatherine
Springfield
Rineroe
Cottage
Newtown
Ballylaggan
Blackwater
Ballykeelaun
Lough Derg Way
Shannon
Mulkear River
Newport River
Abhainn Uaithne
Annacrossaun
Clonsingle
Cluain Sinnil
Knockanbaun
Waterpark
Standing Stone
Murroe Clare Glens Loop
Church
Holy Well
Graveyard
Castle
Cillin
Fulacht Fia
Megalithic Tomb
Burial Ground
Graveyard
Sch
PO
Br
Ch
Fire Sta
Pol Sta
Hospital
Reservoir
Electricity Station
Quarry
Golf Course
Caravan Park
Camping Site
Picnic Area
Viewpoint
Waterworks
Weir
Lock
Ford
Footbridge
Bridge
Tunnel
Level Crossing
Roundabout
Traffic Lights
Toilets
Information
Parking
Petrol Station
Hotel
Pub
Restaurant
Cafe
Shop
Post Box
Telephone
Recycling
Bus Stop
Railway Station
Tram Stop
Ferry
Airport
Heliport
Marina
Boat Yard
Slipway
Lighthouse
Beacon
Mast
Tower
Windmill
Wind Turbine
Chimney
Factory
Warehouse
Office
Hospital
Clinic
Pharmacy
Police Station
Fire Station
Prison
Courthouse
Library
Museum
Art Gallery
Theatre
Cinema
Stadium
Sports Ground
Golf Course
Swimming Pool
Leisure Centre
Park
Garden
Cemetery
Allotments
Forest
Wood
Scrub
Heath
Marsh
Bog
Peat
Sand
Gravel
Rock
Cliff
Quarry
Mine
Tip
Landfill
Industrial Estate
Business Park
Retail Park
Shopping Centre
Residential
Commercial
Mixed Use
Agricultural
Horticulture
Orchard
Vineyard
Pasture
Arable
Meadow
Hedgerow
Field Boundary
Wall
Fence
Gate
Stile
Footpath
Bridleway
Cycleway
Road
Motorway
Dual Carriageway
Single Carriageway
Slip Road
Junction
Roundabout
Traffic Island
Pedestrian Crossing
Cycle Lane
Bus Lane
Tram Line
Railway
Railway Station
Railway Bridge
Railway Tunnel
Railway Crossing
Railway Siding
Railway Yard
Railway Depot
Railway Workshop
Railway Signal Box
Railway Platform
Railway Track
Railway Switch
Railway Crossing
Railway Bridge
Railway Tunnel
Railway Station

REFERENCE DOCUMENTS

Appendix to Chapter 5: Description of Development (UWF Replacement Forestry)

Appendix 5.7: A Guide to Risk Assessment in Major Emergency Management Jan 2010

The data and descriptions in this appendix have informed Chapter 5: Description of Development (UWF Replacement Forestry) of the EIA Report. The information presented in this Appendix 5.7 is outlined below and the relevant element(s) of the Whole UWF Project are also identified.

Appendix	Title	Relevant EIAR
A.5.7	A Guide to Risk Assessment in Major Emergency Management Jan 2010	UWF Grid Connection UWF Related Works UWF Replacement Forestry

REFERENCE DOCUMENTS
APPENDIX 5.7



A FRAMEWORK FOR MAJOR EMERGENCY MANAGEMENT



GUIDANCE DOCUMENT 1

A GUIDE TO RISK ASSESSMENT IN MAJOR EMERGENCY MANAGEMENT JANUARY 2010



REFERENCE DOCUMENTS
APPENDIX 5.7

Introduction to A Guide to Risk Assessment

'A Framework for Major Emergency Management' (2006) replaces the *Framework for Co-ordinated Response to Major Emergency*, which has underpinned major emergency preparedness and response capability since 1984.

The Framework sets out the arrangement, by which the principal response agencies will work together in the management of large-scale incidents.

This *Guide to Risk Assessment in Major Emergency Management* is intended to support the Framework text and to provide additional guidance on the risk assessment process.

The guideance document is presented as best practice in the area of Risk Assessment for Major Emergency Management. Guidance documents are administrative instruments not having the force of law and, as such, allow for flexibility in approach. Alternate approaches to the principles and practices described in this guidance described may be acceptable provided they are supported by adequate justification. Alternate approaches should be discussed in advance with the:

M.E.M. Project Team,
Fire Services and Emergency Planning Section,
Department of the Environment, Heritage & Local Government,
Custom House,
Dublin 1.

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Introduction

The systems approach to Major Emergency Management involves a continuous cycle of activity. The principal elements of the systems approach are:

- Hazard Analysis/ Risk Assessment;
- Mitigation/ Risk Management;
- Planning and Preparedness;
- Co-ordinated Response; and
- Recovery

FIGURE 0.1
Five-Stage Emergency Management Paradigm



Risk Assessment is a process by which the hazards facing a particular community are identified and analysed/assessed in terms of the threat/risk which they pose.

To prepare effectively for dealing with potential emergencies it is necessary to have regard to the specific risks faced by a community. Including formal Risk Assessment as part of emergency planning is increasingly recognised as best practice nationally and internationally. In the Framework the risk assessment process is used as a basis for the decision-making associated with the other elements of the emergency management cycle.

The framework requirement is that:

Each principal response agency should, in association with its partner principal response agencies, carry out a risk assessment in accordance with the procedures set down in Section 2 of the Framework and this Guidance. The initial rise assessment should be reviewed and updated annually, or as circumstances require.

This Guidance sets out a risk assessment procedure that should be applied and documented by the principal response agencies as a basis for major emergency management. The risk assessment procedure underpins work in the later stages of the emergency management cycle. A significant benefit of the risk assessment process is that it can help establish confidence in the Major Emergency Management system, by showing it to be both realistic and logical.

This risk assessment approach is complementary to the principle of an "All-Hazards" approach discussed in Section 1 of the Framework.

Section 2 of the Framework introduced the risk assessment process and defined the following terms (See also Appendix F3):

Hazard: Any phenomenon with the potential to cause direct harm to members of the community, the environment or to physical infrastructure, or being potentially damaging to the economic and social infrastructure.

Impact: The consequences of a hazardous event being realised, expressed in terms of a negative impact on human welfare, damage to the environment or physical infrastructure or other subsequent consequences.

Risk: The combination of the likelihood of a hazardous event and its potential impact.

This guidance is divided into two parts. Part one details the four steps of the risk assessment process while part two provides guidance on how the risk assessment should be employed to inform mitigation and detailed planning. A *'Tables and Templates'* section is included that contains documents designed to support the risk assessment process. It should be noted that tables and templates do not purport to exhaust all potential possibilities but rather should be used as guides to be adapted to Local/Regional circumstances.

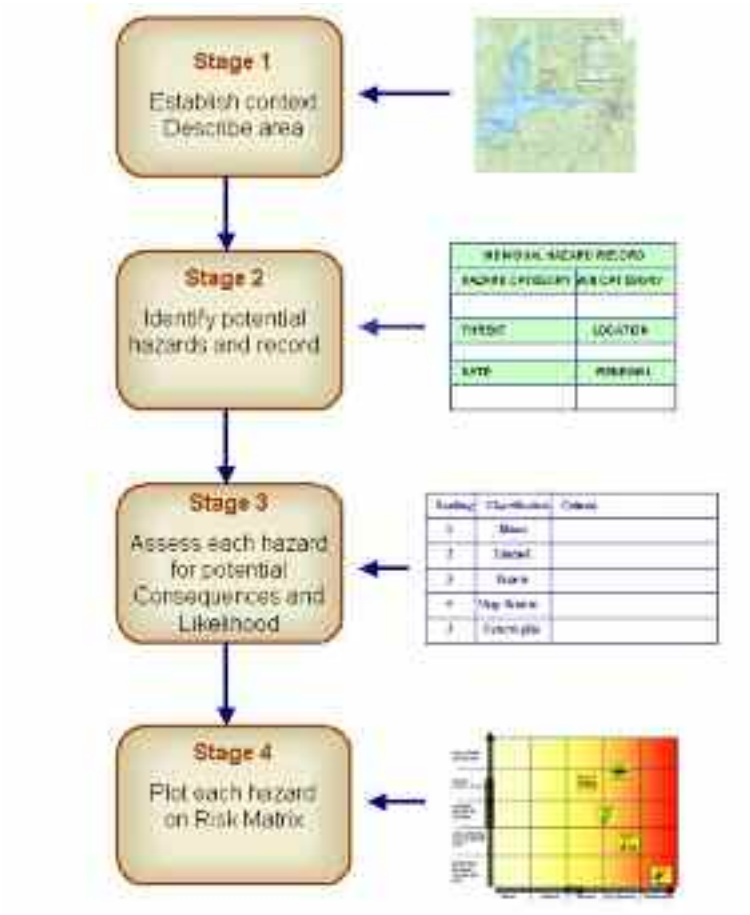
PART 1- The Risk Assessment Process

It is recommended that the risk assessment process should be carried out initially by each principal response agency, before being undertaken and documented by an inter-agency team, working under the aegis of the Regional Steering Group on Major Emergency Management. The relevant outcomes from the regional process should be incorporated into each principal response agency's own major emergency plan.

The risk assessment comprises four stages as illustrated in Figure 1.1 below:

1. Establishing the context
2. Hazard Identification
3. Risk Assessment
4. Recording potential hazards on a risk matrix

FIGURE 1.1
Schematic Risk assessment Process



Risk Assessment Stages

Stage 1 - Establishing the Context

The purpose of this stage is to describe the characteristics of the area for which the risk assessment is being completed, as this will influence both the likelihood and the impact of a major emergency. Establishing the Local/Regional context enables a better understanding of the vulnerability and resilience of the area to emergencies.

Each principal response agency should undertake an initial local risk assessment. The process begins for each agency by establishing the context in which the risk assessment is taking place.

Methodology

The team undertaking the risk assessment exercise should consider the national, regional and local contexts which impact on major emergency management in their area. The outcomes should be recorded in a series of short statements. To assist in this, the team should reflect on the relevant aspects of their area, considering emerging and potential future trends, in addition to the current situation. It will be appropriate also for the team to establish links with bodies that could provide relevant information/input for the risk assessment process. These could include bodies such as the Environmental Protection Agency (EPA), the Health and Safety Authority (HSA), the Food Safety Authority (FSA), Port and Harbour Authorities, and Airport Authorities.

- **Social:** Describe the demographic, ethnic and socio-economic composition of the community. How are the various communities geographically distributed within the area? Are there any particularly vulnerable groups in the community? Are there annual events during which there is an influx of people into the area e.g. Festivals and Concerts? How experienced is the community at coping with different types of emergencies? Is there a strong volunteer/community support ethos?

- **Environment:** Is the area to be assessed urban, rural or mixed? Are there any particular local geographical factors contributing to vulnerabilities? Are there particularly high-density areas? Are there specific environmentally sensitive/amenity areas? What is the history of events in or adjoining the area?

- **Infrastructure:** How is the infrastructure configured in the area - transport (road, rail, air, sea), utilities, business, etc? What are the critical supply networks in the area? Are there any sites in the area that are particularly critical for local, regional or national essential services (e.g.

telecommunications hubs, power generation, fuel /energy supply, medical facilities, educational establishments, head offices of large public or commercial concerns)? What are the drivers of the economy in the area?

- **Hazardous sites:** What potentially hazardous sites exist in the area? Where are they in relation to communities or sensitive environmental areas?

The Regional Context will be established by integrating the statements of all the principal response agencies. Relevant details from the regional process could also be annotated on a suitably scaled map. An example of a generic output from this stage is presented in Table 1 below, this should be used in the preparation of risk assessment.

Table 1- Example to Illustrate Establishing the Context

Social Population-major centres	Region 350,000 City 1 100,000 Town 1 20,000 Town 2 10,000	Demography summary % Elderly % Children % Ethnic minority/immigrant workers
Primary economic drivers	Tourism Industry	Express in Euros/% of local economy List industries with relevant comments
Principal Emergency Services	An Garda Síochána HSE Fire Service	Number and location of stations and relevant comments e.g. station types HSE Ambulance resources and Hospital locations with relevant details Number and location of fire stations and relevant comments e.g. % full time/ % retained
Environment Geographical characteristics	Area over 3,000 square miles Forests Main rivers National Parks	% Urban % Rural % Commercial List-show on map List-show on map % area covered
Adjacent counties	County A County B	
Infrastructure Transport Types	Roads Rail Shipping Airport	Major routes Significant congestion points All land transport of hazardous material takes place by road Mainly passenger traffic International ferry routes Port activity Major international/minor terminal
Water Supply	Local Authority supply schemes Treatment plants	Relevant details
Power Supply	Generating stations	Location and relevant details
Gas Supply	Pressure Stations	Pipeline location
Hazardous Sites SEVESO sites	 Upper Tier Lower Tier	 Details Details
Other Industry		Details

Stage 2 - Hazard Identification

The generic threats that exist in all communities are sometimes taken for granted (e.g. fires, road traffic accidents, accidents involving transport of people, hazardous materials, building collapse). The purpose at this stage is to review and note the generic hazards, including any particular features of these specific to the region, and then to add the hazards that are specific to the local area. Generally speaking, the hazards faced fall into four commonly used categories:

- Natural;
- Transportation;
- Technological;
- Civil.

Methodology

Using the tables provided (see Table 4 in the *Tables and Templates*) each principle response agency should list the hazards that are present in its area. Any hazards that appear on the tables that are not relevant should be deleted and new hazards added to produce a complete list. Tables listing National and International disasters by hazard type are presented to illustrate this process (see Tables 5.1 to 5.4 in *Tables and Templates*).

For each identified hazard, the elements of the community that are at risk should be identified. Both the hazards to the community, and their likely point of impact, should emerge from this stage.

Stage 3 - Risk Assessment

The next stage is to consider the overall risks presented by these hazards. Risk assessment starts with an examination of the impact (severity of consequences to life and health, property and infrastructure, and the environment) of the hazards identified. The likelihood (probability) also has to be considered and the resulting judgement recorded on a risk matrix in the next stage. The basis for making this judgement should be set out on the individual hazard record sheet, and should include sources which influence the judgement (e.g. national/local level intelligence and advice from available centres of expertise, information from risk holder/risk regulator).

A five-point scale is proposed for categorising both impact and likelihood, ranging as shown in the risk matrix in Figure 1.2. In considering the potential impact of a hazard, it is relevant to take two factors into account, - the type or nature of the impact, and the scale. The type or nature of impact may be considered in three fields:

- impact on life, health and residual welfare of a community
- social/environmental impact. Social impact may be thought of in terms of disruption/displacement of people affected by the event, while environmental impact is the impact on the physical area;
- economic impact in terms of costs of property/ infrastructure damage as well as recovery costs or loss of economic production.

It is also important to take account of the potential for escalation of an event or the 'domino effect' when combined with other hazards.

A simple approach to assessing likelihood is proposed, expressed in terms of the probability of an event occurring. This is to reflect the judgement of people involved in this field, rather than being a strict mathematical probability.

Methodology

Each principal response agency should complete a Hazard Record Sheet (see *Tables and Templates*) for each hazard identified in Stage 2. The Hazard Record Sheet provides a means of recording information about the hazard and its potential impact and likelihood, with a view to identifying a likely position on the risk matrix. Impact guidance sheets (see Tables 4(a)-4(c) in *Tables and Templates*) for human, environmental, infrastructure can be used to achieve a full understanding of the potential impact of each hazard.

When completing the hazard record sheets, agencies should identify areas of uncertainty where expert technical advice will need to be sought. However, it should be remembered that this assessment does not require detailed technical analysis. An informed estimate, based on experience or existing safety assessment, is all that is required.

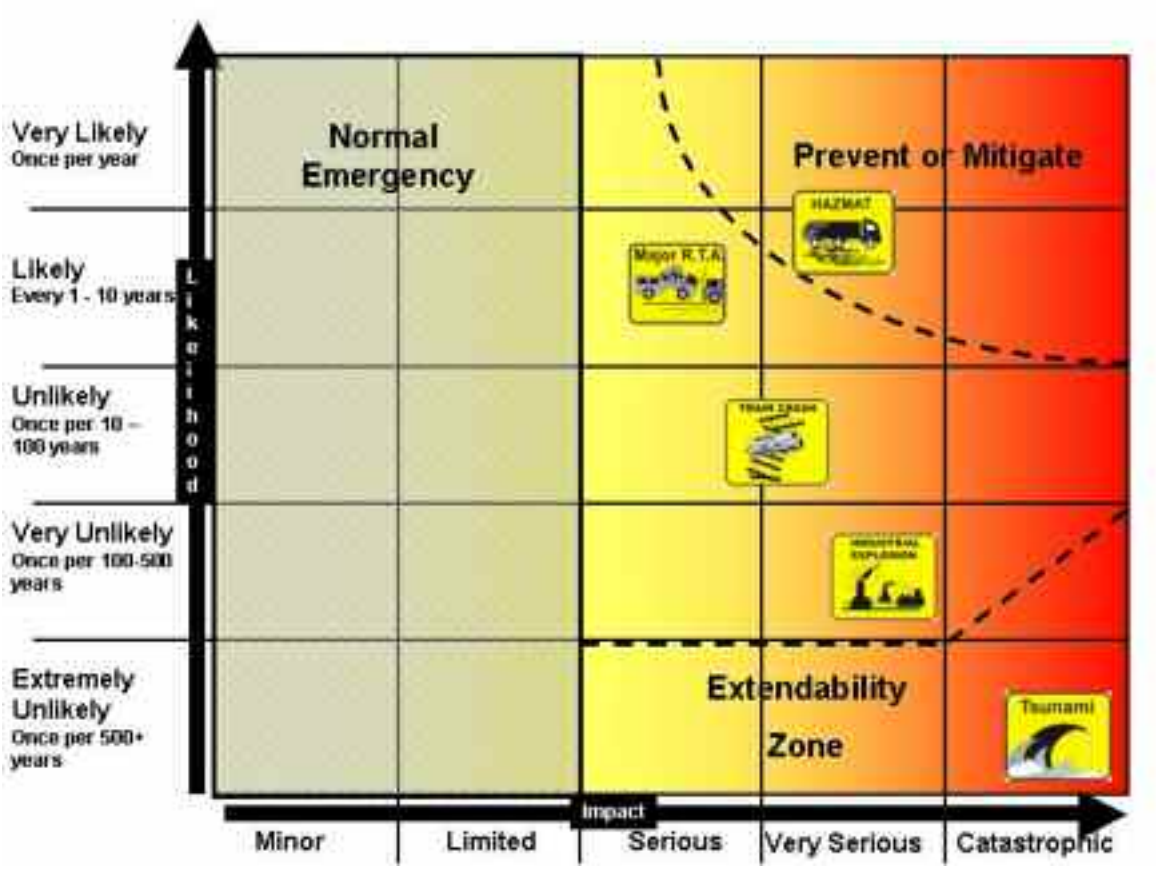
The prevention, control and mitigation measures that are already in place should be considered and recorded and, taking these into account, a decision made on the position of the hazard on the risk matrix.

This process is initially undertaken at individual agency level and then repeated at regional level in a small multi-agency team/s, typically 3 or 4 persons. The hazard record sheets produced at inter-agency level should include as much detail as is available in relation to the hazard. Where quantitative data is available, it should be used in support of the risk assessment.

Stage 4 - Recording Potential Hazards on a Risk Matrix

The process proposed for recording the risk assessment is considered in this stage. A five by five matrix (see Figure 1.2), using the scales for impact and likelihood presented in Tables 13 and 14 below, is used to present the results of the risk assessment. The process requires the outcome from the risk assessment to be recorded and inserted in the box judged to be most appropriate for the functional area under consideration. Multi-agency perspectives can help bring balance to this task. The risk assessment exercise records, in a readily presentable format, the combined judgement of the principal response agencies in regard to the identified hazards in the area.

FIGURE 1.2



The Risk Matrix

Methodology

The impact and likelihood criteria as outlined in Tables 2 and 3 below are used to position all the identified hazards on the risk matrix.

Table 2 - Classification of Likelihood

Ranking	Classification	Likelihood
1	Extremely Unlikely	May occur only in exceptional circumstances; Once every 500 or more years
2	Very Unlikely	Is not expected to occur; and/or no recorded incidents or anecdotal evidence; and/or very few incidents in associated organisations, facilities or communicates; and / or little opportunity, reason or means to occur; May occur once every 100-500 years.
3	Unlikely	May occur at some time; and /or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisations worldwide; some opportunity, reason or means to occur; may occur once per 10-100 years.
4	Likely	Likely to or may occur; regular recorded incidents and strong anecdotal evidence and will probably occur once per 1-10 years
5	Very Likely	Very likely to occur; high level of recorded incidents and/or strong anecdotal evidence. Will probably occur more than once a year.

Table 3 - Classification of Impact

Ranking	Classification	Impact	Description
1	Minor	Life, Health, Welfare	Small number of people affected; no fatalities and small number of minor injuries with first-aid treatment.
		Environment	No contamination, localised effects
		Infrastructure	<0.5M Euros
		Social	Minor localised disruption to community services or infrastructure (<6 hours).
2	Limited	Life, Health, Welfare	Single fatality; limited number of people affected; a few serious injuries with hospitalisation and medical treatment required. Localised displacement of a small number of people for 6-24 hours. Personal support satisfied through local arrangements.
		Environment	Simple contamination, localised effects of short duration
		Infrastructure	0.5-3M Euros
		Social	Normal community functioning with some inconvenience.
3	Serious	Life, Health, Welfare	Significant number of people in affected area impacted with multiple fatalities (<5), multiple serious or extensive injuries (20), significant hospitalisation. Large number of people displaced for 6-24 hours or possibly beyond; up to 500 evacuated. External resources required for personal support.
		Environment	Simple contamination, widespread effects or extended duration
		Infrastructure	3-10M Euros
		Social	Community only partially functioning, some services available.
4	Very serious	Life, Health, Welfare	5 to 50 fatalities, up to 100 serious injuries, up to 2000 evacuated
		Environment	Heavy contamination, localised effects or extended duration
		Infrastructure	10-25M Euros
		Social	Community functioning poorly, minimal services available
5	Catastrophic	Life, Health, Welfare	Large numbers of people impacted with significant numbers of fatalities (>50), injuries in the hundreds, more than 2000 evacuated.
		Environment	Very heavy contamination, widespread effects of extended duration.
		Infrastructure	>25M Euros
		Social	Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

PART 2 - Using the Risk Assessment

While being an intrinsically useful exercise in itself, the risk assessment also provides a sound basis for determining a range of steps at later stages of the emergency management cycle - especially in the Mitigation and the Planning and Preparedness stages. As outlined in section 2 of the Frameworks the risk matrix may be overlaid by a template, as shown in Figure 2.1(a) and 2.1(b) below, which shows how the risk assessment can place a potential hazard into either:

- the "normal" emergency zone;
- the major emergency zone, at the extremities of which are delineated two specific areas;

    - o A Prevent or Mitigate area, where prevention/mitigation of hazards is required
    - o A Disaster/Extendibility area, where hazards are extremely/ very unlikely and do not therefore warrant specific preparedness, but can be responded to by extending the inter-agency arrangements of the major emergency regime

FIGURE 2.1(a)
The Risk Matrix Zones

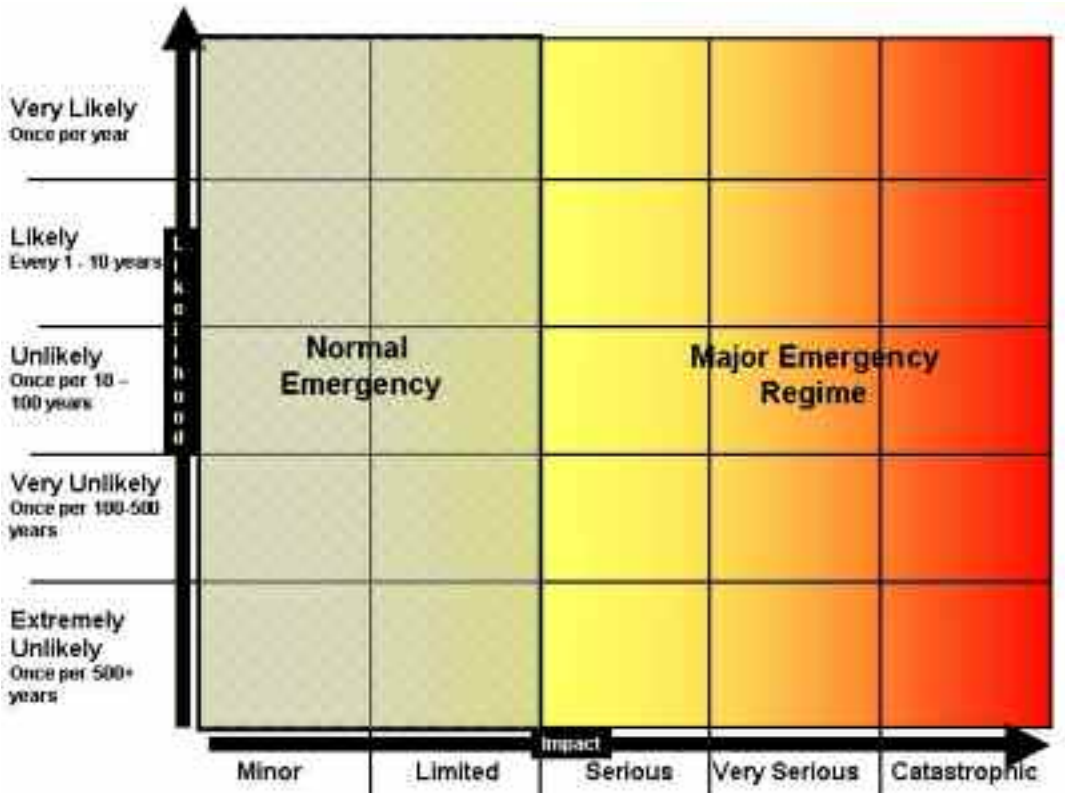
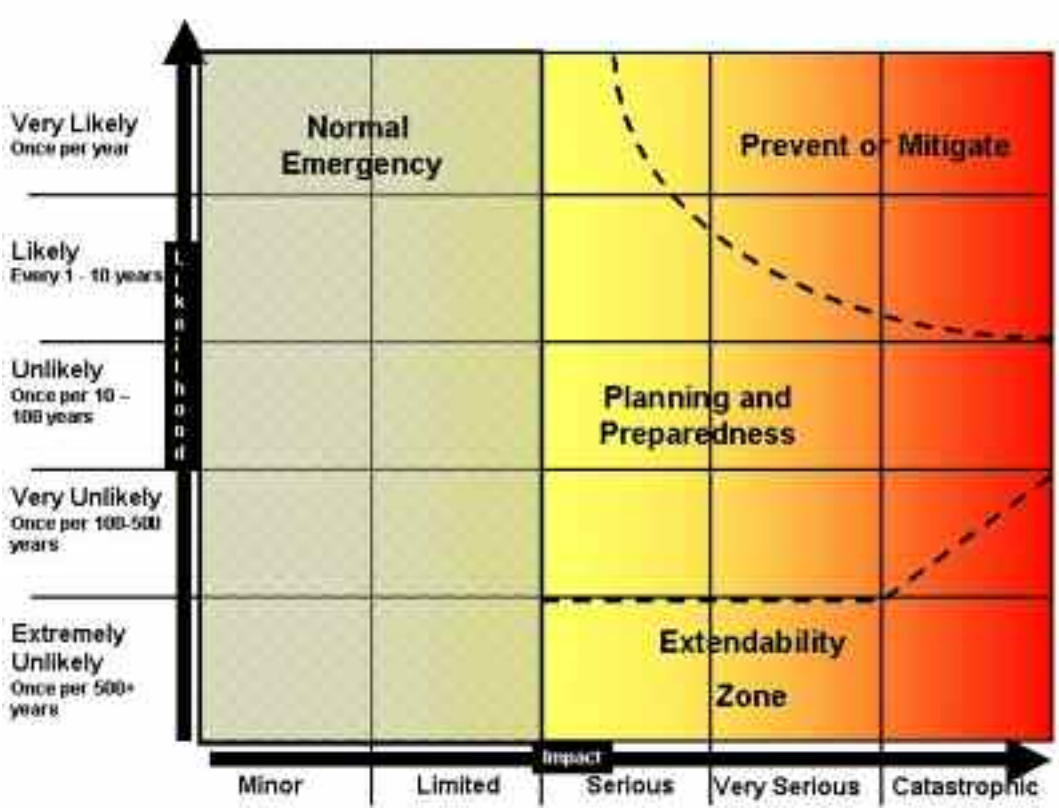


FIGURE 2.1(b)
The Risk Matrix Zones



Methodology

An inter-agency group, comprising representatives of An Garda Síochána, the Health Service Executive and the Local Authorities, should select a range of approximately six major emergency scenarios, which will provide a good basis for development of a robust, All-Hazards major emergency plan. One scenario in the extendibility zone (catastrophic impact, very unlikely) should be included as part of this process. It is recommended that an extreem version of a more likely event is chosen for this purpose, rather than a potential "freak" or "bizzare" incident.

Consideration should be given to a range of factors in the selection of an appropriate list of scenarios. Scenarios should be chosen that test the response dimensions and resource requirements towards the limits of those required within the major emergency regime. This could mean choosing a particular scenario as a vehicle for testing the local requirements for a specific type of response, such as specialist fire-fighting capability, specialist health-care, e.g. multiple burns or paediatric casualties, or specialist community care provision. Consideration should also be given to the rate of development and escalation of the chosen scenarios. This in turn allows the determination of reasonable resource requirements in terms of quantity, quality and timing.

Defining Local Response Dimensions

Each principal response agency should use the chosen scenarios as a basis for determining a range of essential response requirements for major emergencies. Response dimensions are qualitative or quantitative statement of the performance required of a system or resource to deliver an appropriate response to mitigate the impact of the emergency.

These responses could cover topics such as:

- Provision of resources or specialist equipment
- Number and quality of local responders
- Situations where plans or 'Standard Operating Procedures' are required for specific risks
- Areas where training and exercising should be focussed
- Situations/sites/events where specific protocols need to be established with third parties such as utility companies
- Situations/sites/events where specific arrangements needt o be established with the private sector.

Once established, the relevant response dimensions should be used to inform the planning and preparedness stage for the individual agencies. If gaps are identified, part of the preparedness cycle should involve identifying where additional resources may be obtained in an emergency, and ensuring that arrangements are in place to mobilise them and use them effectively.

TABLES AND TEMPLATES

It should be noted that these templates are not exhaustive of all possibilities. They should be used to stimulate discussions about the functional area where they are to be used. Tables should be edited as appropriate.

Table 4 Hazard Identification Template

Natural Hazards			
Category	**Type**	**Sub-type**	**Local Hazard**
Meteorological			
Hydrological			
Geological			
Other			
Transportation Hazards			
Aviation			
Rail			
Road			
Water			
Technological Hazards			
Industial Accidents			
Explosions			
Fires			
Building Collapse			
Hazardous Substance			
Pollution/ Contamination			

Table 4 Hazard Identification Template (cont..)

Civil Hazards			
Category	**Type**	**Sub-type**	**Local Hazard**
Civil Disorder / Disturbance			
Major Crowd Safety			
Mass Shooting			
Loss of Critical Inafrastructure			
Food Situation Crisis			
Water Supply			
Epidemics and Pandemic			
Animal Disease			
Missing Persons			

Table 5.1 National and International Examples - Natural Hazards

Category	Type	Sub-type	Irish Examples	International Examples
Meteorological	Storm/ Severe Gales	Hurricane/ Cyclone	Storm on Christmas Eve 1997	
		Tornado (local)		
	Heavy Snow	Blizzards	Jan 1982	
	Severe Cold/ Frost	Icy Roads Hypothermia		
	Thunder and Lightning Storms			
	Dense/persistent fog			
	Heat Wave/ Drought			Heat Wave France 2003
Hydrological	Flooding	Coastal/Tidal	SE Coast Nov 2004 Dublin Nov 2002	UK/ NL 1953
	Heavy Rain	Inland	Clonmel Nov 2004	Prague 2002
Geological	Earthquake			Kobe 1995 Turkey 1999 Bam, Iran 2003
	Tsunami		Ireland 1750s	SE Asia Dec 04
	Volcano			Krakatoa 1887 Mount St Helens
Other	Landslide		Polathomais 2003 Derrybrien 2003	Aberfan 1967
	Land Cave in			
	Reservoir/ Dam-burst			
	Forest/ Wilderness fire		Donegal Easter 2003	Portugal/France 2003
	Space debris/ meteor etc			

Table 5.2 National and International Examples - Transportation Hazards

Category	Type	Illustrative Example	Irish Examples	International Examples
Aviation	Aircraft collision/ loss	Mid-air	Air-India 1985	Lockerbie 1997
		Low-speed (near Airport)	Shannon 1953	British Midland 1989
		Airport incident		Frankfurt 1998 Paris CdeG 2003
	Aviation security	Hijacking		
Rail	Mainline		Cherryville 1983 Buttevant 1982 Roscommon 2001	December 2000
	DART/ Suburban			
	Tram		Luas/Bus Crash Sept 2009	
	Haz Mat/ Goods			
	Tunnel / Bridge			Mont Blanc, Kaprun etc. tunnel fires; Germany, Austria, Switzerland.
Road	Multiple vehicle RTA			
		Bus		
		Motorway	M7 Pileup March 2007	
		Tunnel		
	Hazmat			
	Bridge		Rathcoole 2004	
Water	Marine	Ferry	Rosslare Ferry Feb 2003	Swedish Ferry 2007 Zeebrugge March 1987
		Port	Dublin Bay collision	
	Inland Waterways	Pleasure craft/ cruises		Marchioness London 1987
		Pollution	Kowloon Bridge 1986 Princess Eva Feb 2003	Braer January 1993 Spanish Coast Feb 2003

Table 5.3 National and International Examples - Technological Hazards

Category	Type	Illustrative Example	Irish Examples	International Examples
Industrial Accidents	Explosions		Hicksons 1994	Toulouse 2004 Flixboro 1974 Seveso 1976
	Petrochemical Fires			Wales Brucefield 2005
	Industrial Fires	LPG tank fire	Belmullet 1999 Edgeworthstown 1995	
	Gas Emission			Bhopal 1984
	Fluid Emission	Pipeline leak Fire-water run-off		Sandoz 1986
Explosions	Domestic	Natural gas explosion	Raglan House 1984	Belgium 2004
	Bomb		Omagh 1998 Dublin 1974	Madrid 2004
	LPG			BLEVEs
	Pipelines/Platforms			Piper Alpha 1988
Fires			Stardust 1981 Bundoran 1980 Whiddy 1979	Gothenberg 1998 Netherlands 2000
Building Collapse			Raglan House 1984	
Chemical		Accident at site		
		Transportation accident		
		Weapons		
	Biological	Leak/ Weapons	Anthrax scares 2001	
	Nuclear Accident			Chernobyl 1986 Three Mile Island 1990
	Radiological	Fire at storage site/ dirty bomb		
Pollution/ Contamination	Air/Water Pollution		Hicksons 1994	Basil Fire 1986
	Space Debris			
	Mining			

Table 5.4 National and International Examples - Civil Hazards

Category	Type	Illustrative Example	Irish Examples	International Examples
Civil Disorder / Disturbance			Lansdowne Road Intl Soccer 1995	G8 summits
Major Crowd Safety	(movement, crushing etc)	Pop Concerts Sports events Fireworks displays Airshows	Lansdowne Road 2005	Ibrox 1971 Heysel Stadium 29 May 1985
Terrorism	Bombs	Car-bombs	Dublin/Monaghan 1974	
		Bombs in buildings		
		Fire-bombing		
	CBRN as weapons			
	Disruption	Bomb scares		
Mass shooting				Dunblane 1996 Columbine 1999
Loss of Critical Infrastructure	Energy and Power Supply	Electricity		Canada Italy London
		Natural Gas		
		Fuel Oil		
		Communications	PSTN: Mobiles: Web	
Food Situation Crisis		Food Contamination		
Water Supply		Shortage Contamination		
Epidemics and pandemic		Communicable diseases	Swineflu 2009	Flu pandemics
Animal Disease		Foot & Mouth 2001		Avian Influenza

INDIVIDUAL HAZARD RECORD SHEET TEMPLATE

INDIVIDUAL HAZARD RECORD SHEET TEMPLATE

INDIVIDUAL HAZARD RECORD SHEET

HAZARD CATEGORY	SUB-CATEGORY
Hazard Description	Hazard Location
Date:	Review Date:

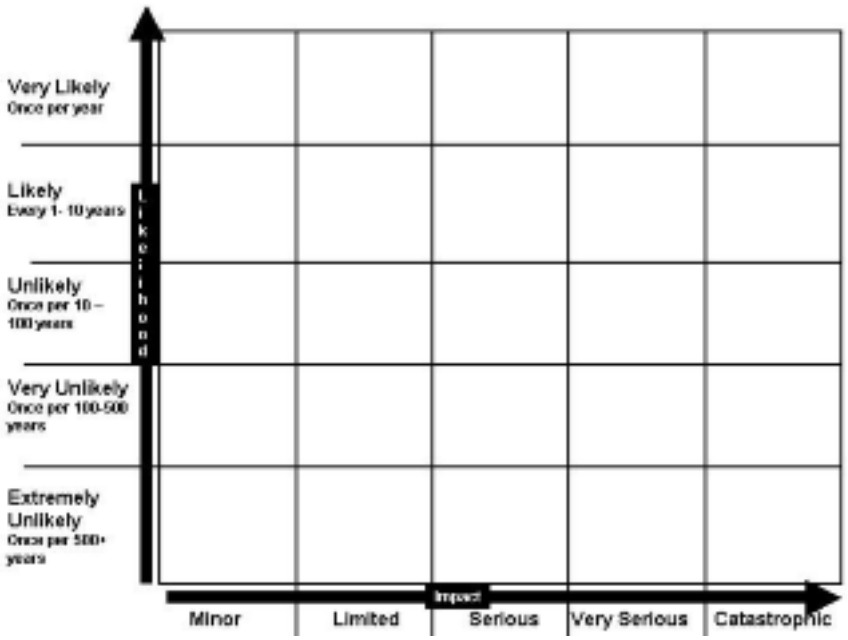
1. Overview of Hazard

2. Key Historical Evidence

3. Assessment of Impact and Likelihood

Hazard	Impact				Likelihood
	Human Welfare	Environment	Physical Infrastructure	Speed of Development/ Escalation	
	Minor	Minor	Minor	Minor	Very Likely
	Limited	Limited	Limited	Limited	Likely
	Serious	Serious	Serious	Serious	Unlikely
	Very Serious	Very Serious	Very Serious	Very Serious	Very Likely
	Catastrophic	Catastrophic	Catastrophic	Catastrophic	Extremely Unlikely

4. Position on Risk Matrix



5. Prevention/Control/Mitigation Measures in Place

6. Risk Management Approach: Prevention/Control/Mitigation Measures Required

REFERENCE DOCUMENTS
APPENDIX 5.7



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Appendix to Chapter 6: Population

Appendix 6.1: Central Statistics Office Data

The data and descriptions in this appendix have informed Chapter 6: Population of the EIA Report, in relation to the existing Local Economy environment.

The information presented in this Appendix 6.1 is outlined below and the relevant element(s) of the Whole UWF Project are also identified.

Appendix 6.1 Sections	Section Heading	Relevant Individual Project Element
A6.1.1	Population and Age Profile	UWF Grid Connection UWF Related Works UWF Replacement Forestry Upperchurch Windfarm
A6.1.2	Housing Stock, Age and Average Household Size	
A6.1.3	Economic Profile	
A6.1.4	Commuting Patterns	
A6.1.5	Residential and Commercial Properties in the Cumulative study area	

Data is sourced primarily from the Census of population 2016 and 2011, with data from previous censuses used for trend analysis.

For convenience, discussion is focused on the Whole UWF Project Cumulative Study Area however data relating to the study area for Individual Project Elements can also be isolated from the tables, as data is presented for each of the Electoral Districts in the area, as outlined below.

The **UWF Grid Connection** is located in five separate EDs in County Tipperary – Kilcomenty, Killoscully, Kilnarath, Abington and Foilnaman, which include the villages of Birdhill, Toor, Rear Cross, and Kilcommon.

The **UWF Related Works** and the Upperchurch Windfarm are both located in two EDs – Upperchurch and Foilnaman, which include the village of Kilcommon. Upperchurch village lies immediately adjacent to Upperchurch ED in the ED of Gortakelly.

The **UWF Replacement Forestry** is located in one ED – Foilnaman, in County Tipperary.

The cumulative study area for the Whole UWF Project includes the following ED's: Newport, Templederry, Borrisoleigh Gortakelly, Glenstal, Doon West, Cappamore, Bilboa, Glengar, Curraheen, Cappagh, Donohill, Clonoulty West, Clogher, Moyaliff, Greenhall/Lackagh and Kilmore in Counties Tipperary and Limerick., which include the town of Newport and the villages of Murroe, Cappamore, Dolla, Upperchurch, Borrisoleigh, Hollyford, Cappawhite, Rossmore and Drumbane.

A6.1.1 Population and Age Profile

The total population of the Whole UWF Project study area (not including the additional EDs in the cumulative study area) came to 10,888 as of Census 2016. In the cumulative study area the total population is just over 18,700 as of 2016. The populations of both study areas have been growing steadily (in line with the State average) over the previous 20 years.

Population levels, growth and density vary considerably between EDs. Newport ED stands out, with the highest population, population growth of just over 90 per cent over the 20 years, and a population density considerably higher than the State average. While the growth in the past 20 years has been considerable in Newport, it is surpassed by the growth observed in both Borrisoleigh and Cappamore, each of which records a growth rate in excess of 100 per cent. Most of the westerly EDs have experienced sizeable population growth, which may be reflective of their proximity to Limerick city. In contrast a number of EDs have experienced population loss over the period, with the largest decline recorded in the ED of Templederry (-39.1 per cent). Population density in both the Whole UWF Project and cumulative study areas, as one would expect in a largely rural area, is low.

While the Whole UWF Project study area has no large urban areas, there are a number of villages, namely Toor, Rear Cross, Kilcommon, Upperchurch, Birdhill, Newport, Murroe, Cappamore, Dolla, Borrisoleigh, Hollyford, Cappawhite, Rossmore and Drumbane. These are placed on Tipperary County's Settlement Hierarchy per the North Tipperary County Development Plan (as revised), as follows:

- Newport, Hollyford, Cappawhite and Borrisoleigh are described as a "Service Centre", the 4th tier,
- Rearcross Upperchurch are described as "Local Service Centres", the 5th tier, while
- Kilcommon, Birdhill, Rossmore, Drumbane and Dolla are on the 6th tier, described as a "Settlement Node", the last tier before "Open Countryside".

The villages of Toor, Murroe and Cappamore do not appear on the Settlement Hierarchy.

Newport and Borrisoleigh are the only villages large enough to be identified as an urban area in the 2016 Census (i.e. with a population of greater than 1,500). However, Newport village is over twice the size of Borrisoleigh. The then North Tipperary County Council adopted a Local Area Plan (LAP) for Newport, in 2010.[1] The village has experienced rapid population growth in recent times: the LAP indicates that the population was 887 in 2002, having been stable in the previous two censuses, but grew to 1,286 in 2006, and reached 1,806 in the 2011 Census. This represents a doubling of the population in less than ten years. The LAP points to Newport becoming a commuter town for Limerick city and Shannon, and indicates:

"Newport has experienced significant development in recent years and has been identified in the (Mid-West Regional Planning Guidelines) as a centre around the Limerick/Shannon Gateway which could see significant growth over the period to 2022 given its proximity to the gateway."

2016 Census data at ED level points to continued population growth in Newport, albeit at a decelerated rate compared to the previous two censuses.

[1] http://www.tipperarycoco.ie/planning/newport-local-area-plan-2010

Table 1: Population of Cumulative Study Area, 1996-2016

ED	2016	2011	2006	2002	1996	% Change 1996-2016	Population Density per sq km
Kilcomenty	693	672	648	579	526	31.7%	32.5
Newport	2,949	2,729	2,121	1,643	1,536	92.0%	102.8
Killoscully	457	418	387	311	290	57.6%	17.5
Kilnarath	330	334	311	302	285	15.8%	10.2
Abington	572	615	555	563	509	12.4%	15.9
Foilnaman	333	332	290	293	293	13.7%	13.8
Upperchurch	299	329	314	318	329	-9.1%	10.8
Dolla	224	235	217	215	246	-8.9%	7.8
Templederry	123	141	157	180	202	-39.1%	5.3
Borrisoleigh	1,215	1,231	1,184	1,129	564	115.4%	54.3
Gortkelly	544	526	476	476	452	20.4%	19.8
Glenstal	1,140	1,095	931	919	918	24.2%	34.6
Doon West	238	240	220	204	232	2.6%	10.1
Cappamore	1,362	1,428	1,407	1,408	665	104.8%	74.8
Bilboa	409	405	402	381	402	1.7%	15.9
Glengar	258	273	266	245	259	-0.4%	8.0
Curraheen	288	285	302	286	328	-12.2%	12.2
Cappagh	875	907	810	774	755	15.9%	36.2
Donohill	636	644	629	620	590	7.8%	19.0
Clonoulty West	669	672	667	681	668	0.1%	16.5
Clogher	232	244	220	233	221	5.0%	11.3
Moyaliff	394	408	382	357	363	8.5%	16.8
Greenhall/Lackagh	395	368	299	257	260	51.9%	11.0
Kilmore	688	682	642	581	551	24.9%	19.0
Whole UWF Project	**10,888**	**10,730**	**9,620**	**8,921**	**7,449**	**46.2%**	**26.5**
Cumulative study area	**15,323**	**15,496**	**13,837**	**12,955**	**11,444**	**33.9%**	**27.5**
Total State	**4,761,865**	**4,588,252**	**4,239,848**	**3,917,203**	**3,626,087**	**31.3%**	**69.5**

Source: CSO Census of population, various years; Pobal HP Deprivation Index

The age structure of the population of both study areas is not radically different from the State average, although there is a higher proportion of children and a marginally lower proportion of young adults in both areas. Again, there is a degree of variation, with some EDs exhibiting a lower proportion of children and young adults and higher proportions of older people. These coincide with the EDs that have experienced population loss over recent censuses.

Table 2: Population Age Profile of Cumulative Study Area, 2016

ED	≤ 15	16-24	25-44	45-65	> 65
Kilcomenty	28%	8%	24%	28%	12%
Newport	30%	8%	31%	19%	12%
Killoscully	30%	8%	25%	25%	12%
Kilnarath	26%	6%	22%	31%	15%
Abington	22%	11%	24%	28%	15%
Foilnaman	24%	9%	28%	24%	14%
Upperchurch	22%	10%	21%	28%	19%
Dolla	19%	13%	23%	30%	14%
Templederry	11%	9%	19%	32%	29%
Borrisoleigh	23%	10%	27%	26%	15%
Gortkelly	22%	10%	27%	25%	16%
Glenstal	28%	14%	26%	22%	11%
Doon West	22%	10%	23%	27%	18%
Cappamore	22%	12%	25%	26%	15%
Bilboa	21%	11%	29%	25%	13%
Glengar	23%	12%	19%	31%	16%
Curraheen	22%	8%	23%	31%	16%
Cappagh	27%	9%	27%	21%	16%
Donohill	22%	10%	23%	28%	17%
Clonoulty West	23%	12%	22%	28%	15%
Clogher	25%	12%	21%	24%	18%
Moyaliff	25%	8%	24%	26%	17%
Greenhall/Lackagh	26%	9%	28%	25%	13%
Kilmore	26%	9%	24%	26%	15%
Whole UWF Project	**26%**	**10%**	**27%**	**24%**	**14%**
Cumulative study area	**25%**	**10%**	**26%**	**24%**	**14%**
State	**22%**	**11%**	**30%**	**24%**	**13%**

Source: CSO Census of Population 2016.

A6.1.2 Housing Stock, Age and Average Household Size

There were 3,978 private households (i.e. excluding guest houses, religious institutions, etc.) identified in the Whole UWF Project study area in the 2016 Census, and average household size was slightly larger than the State average at 2.87. The age of the stock is slightly younger than the State average, but this is influenced in particular by Newport ED, where almost half of the housing stock has been built since 2000, reflecting the rapid population expansion in that ED and in Newport village. A number of the other EDs have an older housing stock, with relatively few houses built since 2000. For example, 77 per cent of the housing stock in Templederry were built prior to 1991 with only 11 per cent of the stock built since 2000.

Table 3: Housing Stock, Average Household Size and Age, Cumulative Study Area, 2016

ED	# Private households	Average Household size	Pre 1991	1991-2000	Post 2000	Not stated
Kilcomenty	229	3.06	50%	15%	32%	4%
Newport	982	2.93	36%	11%	49%	4%
Killoscully	147	3.07	46%	9%	42%	3%
Kilnarath	122	2.80	60%	14%	25%	2%
Abington	209	2.75	55%	14%	29%	2%
Foilnaman	119	2.83	58%	8%	31%	3%
Upperchurch	108	2.89	65%	13%	17%	6%
Dolla	81	2.78	68%	10%	21%	1%
Templederry	53	2.49	77%	8%	11%	4%
Borrisoleigh	472	2.60	52%	16%	27%	5%
Gortkelly	191	2.87	60%	11%	29%	0%
Glenstal	352	2.73	43%	10%	43%	4%
Doon West	83	2.90	64%	6%	30%	0%
Cappamore	491	2.82	62%	13%	21%	3%
Bilboa	143	2.93	69%	5%	27%	0%
Glengar	89	2.91	72%	9%	17%	2%
Curraheen	115	2.53	67%	17%	15%	1%
Cappagh	329	2.71	60%	8%	29%	3%
Donohill	231	2.77	61%	10%	24%	5%
Clonoulty West	235	2.89	65%	11%	21%	4%
Clogher	75	3.15	64%	9%	24%	3%
Moyaliff	149	2.72	65%	11%	22%	1%
Greenhall/Lackagh	136	2.96	51%	9%	36%	4%
Kilmore	250	2.76	56%	13%	27%	3%
Whole UWF Project	**3,978**	**2.87**	**51%**	**12%**	**34%**	**3%**
Cumulative study area	**5,707**	**2.84**	**54%**	**11%**	**31%**	**3%**
State	**1,702,289**	**2.75**	**52%**	**14%**	**27%**	**7%**

Source: CSO Census of Population 2016.

A6.1.3 Economic Profile

The 2016 Census allows us to ascertain the employment and economic status of the inhabitants of both study areas. The Whole UWF Project study area's local labour force in 2016 numbered approximately 5,069, with just over 4,500 of these at work. About 26 per cent of this labour force is resident in Newport ED, at the western end of the study area. The labour market characteristics of the Whole UWF Project study area are slightly better than the State average, with a lower unemployment rate and similar labour force participation rate, but again these vary considerably by ED. Similar is true for the cumulative study area.

Table 4: Employment Status, Labour Force Aged 15+, Cumulative Study Area, 2016

ED	At work	Unemployed	Labour Force	Implied Unemployment Rate*
Kilcomenty	304	22	326	6.7%
Newport	1,163	137	1,300	10.5%
Killoscully	213	9	222	4.1%
Kilnarath	153	14	167	8.4%
Abington	236	38	274	11.1%
Foilnaman	143	11	154	7.1%
Upperchurch	140	8	148	5.4%
Dolla	110	8	118	6.8%
Templederry	54	5	59	8.5%
Borrisoleigh	516	75	591	12.7%
Gortkelly	254	21	275	7.6%
Glenstal	422	59	481	12.3%
Doon West	103	7	110	6.4%
Cappamore	520	118	638	18.5%
Bilboa	179	27	206	13.1%
Glengar	105	17	122	13.9%
Curraheen	125	12	137	8.8%
Cappagh	355	45	400	11.3%
Donohill	266	29	295	9.8%
Clonoulty West	258	41	299	13.7%
Clogher	90	6	96	9.1%
Moyaliff	158	15	173	8.7%
Greenhall/Lackagh	186	13	199	6.5%
Kilmore	256	38	294	12.9%
Whole UWF Project	**4,510**	**559**	**5,069**	**11.0%**
Cumulative study area	**6,309**	**775**	**7,084**	**10.9%**
State	**2,006,641**	**297,396**	**2,304,037**	**12.9%**

Source: CSO Census of Population 2016.

*Implied Unemployment Rate: The unemployment rate as measured in the Census differs from and is higher than that per the Quarterly National Household Survey, due to a differing methodology.

Some 61 per cent of the Whole UWF Project study area's population aged 15+ is in the labour force (either at work or looking for work), with a further 11 per cent in education, 8 per cent homemakers and 14 per cent retired, all close to or at the State average.

Looking at historic trends, the labour force in the Whole UWF Project study area per the 2002 Census was 3,773, with an unemployment rate of 6.2 per cent; by the 2006 Census the labour force had grown to 4,472 while the unemployment rate had fallen to 5.8 per cent. Comparing the 2002 data with the 2016 data, two developments are clear:

- The labour force in the cumulative study area grew strongly, by over one-third (dominated by the Newport ED); while

- Labour market conditions deteriorated markedly then improved, with the unemployment rate falling between 2002 and 2006, before almost trebling from 5.8 per cent to 15.7 per cent by 2011. By Census 2016 the unemployment rate had fallen to 11 per cent in the Whole UWF Project study area.

Table 5: Principal Economic Status, Population 15+, Cumulative Study Area, 2016

ED	At work %	Unemployed %	Labour Force Participation Rate	Implied Unemployment Rate*	Student %	Home-maker %	Retired %	Other %
Kilcomenty	60%	4%	64%	6.7%	11%	6%	14%	5%
Newport	56%	7%	62%	10.5%	10%	9%	14%	5%
Killoscully	65%	3%	67%	4.1%	10%	9%	11%	2%
Kilnarath	61%	6%	66%	8.4%	8%	6%	15%	4%
Abington	56%	7%	63%	11.1%	14%	8%	11%	3%
Foilnaman	55%	4%	59%	7.1%	11%	12%	14%	3%
Upperchurch	60%	3%	63%	5.4%	9%	10%	13%	6%
Dolla	59%	4%	64%	6.8%	13%	6%	11%	6%
Templederry	49%	5%	54%	8.5%	7%	9%	22%	8%
Borrisoleigh	53%	8%	61%	12.7%	12%	8%	14%	5%
Gortkelly	59%	5%	64%	7.6%	10%	7%	16%	3%
Glenstal	50%	7%	56%	12.3%	19%	7%	14%	4%
Doon West	55%	4%	59%	6.4%	11%	9%	19%	3%
Cappamore	48%	11%	58%	18.5%	12%	8%	16%	6%
Bilboa	55%	8%	63%	13.1%	12%	9%	12%	4%
Glengar	51%	8%	60%	13.9%	11%	14%	12%	3%
Curraheen	55%	5%	60%	8.8%	9%	11%	15%	4%
Cappagh	54%	7%	61%	11.3%	8%	10%	17%	5%
Donohill	53%	6%	58%	9.8%	10%	10%	18%	5%
Clonoulty West	49%	8%	57%	13.7%	12%	11%	14%	6%
Clogher	54%	5%	59%	9.1%	9%	10%	16%	6%

ED	At work %	Unemployed %	Labour Force Participation Rate	Implied Unemployment Rate*	Student %	Home-maker %	Retired %	Other %
Moyaliff	53%	5%	58%	8.7%	8%	14%	16%	4%
Greenhall/Lackagh	62%	4%	67%	6.5%	11%	8%	11%	4%
Kilmore	50%	7%	57%	12.9%	11%	11%	17%	5%
Whole UWF Project	**54%**	**7%**	**61%**	**11.0%**	**12%**	**8%**	**14%**	**5%**
Cumulative study area	**54%**	**7%**	**61%**	**10.9%**	**11%**	**9%**	**15%**	**5%**
State	**53%**	**8%**	**61%**	**12.9%**	**11%**	**8%**	**15%**	**5%**

Source: CSO Census of population 2016. *the unemployment rate as measured in the Census differs from and is higher than that per the Quarterly National Household Survey, due to a differing methodology.

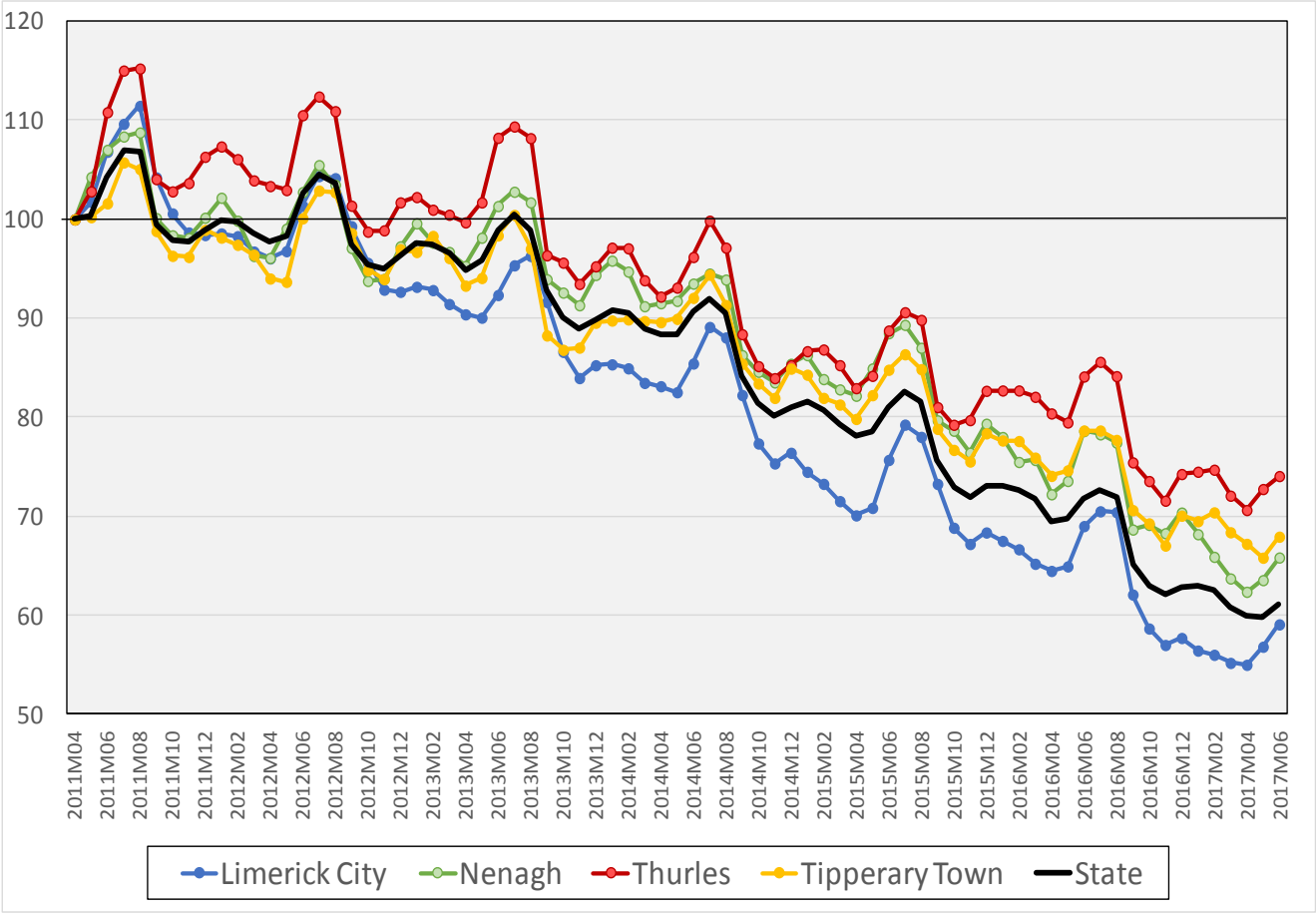
In terms of developments since the 2011 Census, labour market conditions have improved greatly. At a national level, the unemployment rate has fallen from 14.6 per cent in Q2 2011 to 6.7 per cent in Q1 2017, while for the Mid-West region, which contains all the above EDs, the equivalent fall has been from 16.1 per cent to 6.8 per cent (marginally above the State average).[2]

More localised data is available in the form of monthly Live Register statistics from the local Social Welfare offices (see Graph 1). Discussions with the Department of Social Protection have identified that residents of the cumulative study area would "sign on" in the following Social Welfare offices: Limerick Intreo, Thurles Intreo, Nenagh Branch Office and Tipperary town Branch Office. Many more people from outside the cumulative study areas would also sign on at these offices, so the data does not relate precisely to the cumulative study area, and the Live Register is not an exact indicator of unemployment[3], but it does point to a significant improvement in local labour market conditions in the five years since 2011.

The data is expressed as an index with April 2011 (the date of the Census) equal to 100, to allow comparability across the offices. Labour market conditions initially disimproved, but have since improved substantially. The numbers now signing on at these offices have fallen to between 55 per cent and 70 per cent of their 2011 levels, with Limerick City performing significantly better than the other offices. This compares to a 60 per cent fall in the State overall.

[2] http://www.cso.ie/px/pxeirestat/Statire/SelectVarVal/saveselections.asp
[3] A number of categories of people are on the Live Register, who would not be considered unemployed, including those signing on to maintain their social insurance credits, and people working part-time.

Graph 1: Live Register, Local Social Welfare Offices & State, April 2011 to April 2017, Index (April 2011 = 100)



Source: CSO, Department of Social Protection.

The 2016 Census also identifies the broad sectoral categories that the local labour force works in. In 2016, some 8 per cent of the Whole UWF Project study area's workforce was engaged in Agriculture, Forestry & Fishing twice the State average of 4 per cent. A further 5 per cent were engaged in the Construction sector, 20 per cent in the Commerce and Transport sectors, 26 per cent in Professional Services, and 6 per cent in the Public Sector. This breakdown are broadly similar for the cumulative study area. Newport again stands out as having the fewest workers engaged in Agriculture, Forestry & Fishing, and relatively more in Professional Services, indicating a pattern of commuting to larger urban areas.

Comparing the 2016 Census with previous Censuses, some trends are clear. Between 2002 and 2016:

- The proportion of the workforce in the Whole UWF Project study area engaged in Agriculture, Forestry & Fisheries fell from 12 per cent to 8 per cent, with the actual numbers involved falling from 472 to 375;
- The proportion engaged in Construction fell from 11 per cent to 5 per cent, and numerically from 387 to 241;
- The proportion engaged in Professional Services grew from 16 per cent to 26 per cent.

These changes point to strong long term trends in the workforce, reflecting those in the wider economy.

Table 6: Sectoral Employment, Population 15+, Cumulative Study Area, 2016

ED	Agriculture forestry & fishing	Building & construction	Manufacturing industries	Commerce & trade	Transport & communications	Public admin	Prof. services	Other
Kilcomenty	8%	5%	13%	23%	9%	9%	25%	9%
Newport	2%	5%	15%	23%	10%	5%	28%	11%
Killoscully	6%	4%	15%	21%	11%	4%	28%	12%
Kilnarath	9%	5%	11%	20%	8%	8%	25%	14%
Abington	13%	6%	15%	18%	8%	6%	24%	11%
Foilnaman	15%	4%	11%	22%	6%	8%	22%	11%
Upperchurch	21%	6%	7%	14%	2%	11%	17%	21%
Dolla	27%	6%	19%	10%	2%	13%	18%	5%
Templederry	17%	7%	17%	11%	6%	7%	17%	19%
Borrisoleigh	8%	6%	16%	19%	7%	7%	25%	13%
Gortkelly	16%	6%	13%	17%	6%	6%	24%	11%
Glenstal	5%	5%	17%	20%	7%	5%	27%	15%
Doon West	20%	5%	12%	18%	8%	5%	25%	7%
Cappamore	7%	6%	13%	21%	8%	4%	30%	11%
Bilboa	12%	6%	14%	17%	7%	8%	26%	9%
Glengar	26%	1%	10%	16%	5%	4%	24%	14%
Curraheen	23%	2%	14%	18%	10%	1%	20%	13%
Cappagh	6%	7%	16%	17%	6%	5%	32%	12%
Donohill	15%	6%	14%	15%	7%	7%	24%	12%
Clonoulty West	26%	4%	10%	17%	5%	3%	20%	15%
Clogher	20%	6%	19%	18%	1%	7%	21%	9%
Moyaliff	18%	9%	12%	20%	3%	7%	23%	8%
Greenhall/ Lackagh	10%	8%	9%	23%	4%	5%	26%	15%
Kilmore	9%	4%	18%	17%	4%	10%	27%	11%
Whole UWF Project	**8%**	**5%**	**14%**	**20%**	**8%**	**6%**	**26%**	**12%**
Cumulative study area	**10%**	**5%**	**14%**	**19%**	**7%**	**6%**	**26%**	**12%**
State	**4%**	**5%**	**11%**	**24%**	**9%**	**5%**	**24%**	**18%**

Source: CSO Census of population 2016.

The 2016 Census allows us to assess the socio-economic status of the labour force. This indicates the type of work people do, rather than the sector they work in. A lower than average proportion of the workforce in the Whole UWF Project study area is categorised as Professional/Managerial or Non-Manual workers, while a higher proportion is categorised as Agricultural. Newport is closer to the State average than other more rural EDs in the study area.

Table 7: Socio-Economic Status, Head of Household, Cumulative Study Area, 2016

ED	Professional /Managerial	Lower Professional	Non-Manual	Skilled	Semi/Unskilled	Agriculture	Others
Kilcomenty	20%	14%	21%	12%	13%	10%	11%
Newport	25%	16%	16%	10%	11%	3%	19%
Killoscully	26%	17%	12%	14%	7%	9%	15%
Kilnarath	17%	11%	21%	20%	8%	7%	15%
Abington	11%	13%	11%	24%	13%	11%	16%
Foilnaman	8%	10%	20%	9%	14%	17%	23%
Upperchurch	13%	9%	11%	3%	12%	33%	19%
Dolla	11%	1%	11%	12%	14%	40%	12%
Templederry	7%	7%	12%	15%	10%	29%	20%
Borrisoleigh	17%	12%	17%	13%	12%	7%	23%
Gortkelly	18%	5%	12%	11%	8%	32%	13%
Glenstal	22%	15%	16%	8%	11%	6%	21%
Doon West	8%	9%	19%	8%	15%	30%	11%
Cappamore	16%	12%	18%	12%	12%	8%	21%
Bilboa	9%	17%	11%	9%	14%	16%	23%
Glengar	11%	10%	13%	12%	9%	27%	17%
Curraheen	8%	7%	5%	23%	9%	27%	22%
Cappagh	14%	11%	17%	13%	14%	8%	23%
Donohill	12%	12%	14%	10%	16%	18%	18%
Clonoulty West	8%	10%	8%	11%	12%	29%	22%
Clogher	10%	10%	9%	19%	11%	26%	15%
Moyaliff	11%	6%	11%	18%	13%	22%	18%
Greenhall/Lackagh	22%	13%	17%	10%	7%	10%	20%
Kilmore	11%	10%	16%	13%	16%	11%	22%
Whole UWF Project	**19%**	**13%**	**16%**	**12%**	**12%**	**11%**	**19%**
Cumulative study area	**17%**	**12%**	**15%**	**12%**	**12%**	**13%**	**19%**
State	**23%**	**12%**	**18%**	**9%**	**12%**	**5%**	**21%**

Source: CSO Census of Population 2016.

A6.1.4 Commuting Patterns

The Census presents the commuting patterns of the population in school, college or work (aged 5+), in the Whole UWF Project study area, as well as the length of those commutes. Local commuters are more dependent on private transport and less dependent on public transport than the State average, as one would expect in general, although in a number of the EDs there is a relatively high usage of buses. Kilcomenty, Newport and Doon West are all highly car dependent, with over 80 per cent of commutes by car. Commute journey times in the study area are not greatly different from the State average on an overall basis, but they do vary between the EDs.

Table 8: Commuting Mode of Transport, Population 5+, Cumulative Study Area, 2016

ED	Walk	Bicycle	Bus	Motor Vehicle (inc passengers)	Train	Other & Not Stated
Kilcomenty	4%	0%	4%	85%	0%	7%
Newport	12%	1%	2%	80%	0%	5%
Killoscully	0%	0%	18%	72%	0%	9%
Kilnarath	1%	0%	10%	78%	0%	10%
Abington	4%	0%	14%	70%	0%	12%
Foilnaman	3%	0%	14%	68%	0%	14%
Upperchurch	4%	0%	16%	58%	1%	20%
Dolla	5%	0%	7%	73%	0%	15%
Templederry	0%	0%	4%	81%	0%	15%
Borrisoleigh	12%	1%	2%	76%	1%	8%
Gortkelly	2%	0%	16%	66%	1%	14%
Glenstal	16%	0%	5%	67%	0%	12%
Doon West	1%	0%	5%	80%	0%	13%
Cappamore	8%	0%	8%	77%	0%	7%
Bilboa	2%	0%	10%	76%	1%	12%
Glengar	2%	0%	11%	67%	0%	20%
Curraheen	9%	0%	15%	60%	0%	16%
Cappagh	7%	0%	6%	78%	1%	9%
Donohill	4%	0%	10%	76%	0%	10%
Clonoulty West	5%	0%	16%	63%	0%	15%
Clogher	5%	0%	27%	57%	0%	11%
Moyaliff	2%	0%	25%	60%	0%	13%
Greenhall/Lackagh	1%	0%	13%	75%	0%	11%
Kilmore	7%	0%	7%	78%	0%	7%
Whole UWF Project	**8%**	**0%**	**7%**	**75%**	**0%**	**9%**
Cumulative study area	**7%**	**0%**	**8%**	**74%**	**0%**	**10%**
State	**14%**	**3%**	**10%**	**62%**	**3%**	**8%**

Source: CSO Census of population 2016.

Table 9: Commute Journey Time, Population 5+, Cumulative Study Area, 2016

ED	< 15 min	15-30 min	30-45 min	45 min – 1 hour	1 – 1.5 hours	> 1.5 hours	Not stated
Kilcomenty	33%	29%	26%	3%	3%	1%	5%
Newport	36%	32%	20%	4%	2%	2%	4%
Killoscully	21%	31%	31%	6%	2%	4%	6%
Kilnarath	28%	30%	23%	5%	4%	2%	8%
Abington	22%	19%	32%	13%	7%	1%	5%
Foilnaman	21%	16%	41%	7%	6%	5%	7%
Upperchurch	22%	32%	18%	7%	7%	3%	12%
Dolla	17%	27%	31%	6%	6%	2%	12%
Templederry	14%	25%	37%	8%	5%	5%	8%
Borrisoleigh	45%	25%	11%	4%	4%	4%	6%
Gortkelly	28%	36%	17%	5%	7%	4%	4%
Glenstal	33%	26%	22%	5%	2%	2%	11%
Doon West	30%	26%	31%	2%	6%	1%	4%
Cappamore	31%	30%	23%	6%	3%	2%	5%
Bilboa	24%	15%	37%	9%	5%	1%	9%
Glengar	34%	17%	24%	4%	11%	1%	9%
Curraheen	35%	16%	25%	6%	3%	2%	12%
Cappagh	36%	22%	23%	7%	6%	2%	4%
Donohill	23%	24%	24%	11%	8%	3%	6%
Clonoulty West	25%	30%	21%	7%	6%	2%	10%
Clogher	24%	29%	21%	13%	3%	4%	6%
Moyaliff	13%	38%	21%	9%	9%	3%	6%
Greenhall/Lackagh	16%	34%	32%	4%	2%	4%	8%
Kilmore	34%	33%	15%	6%	3%	2%	7%
Whole UWF Project	**32%**	**28%**	**23%**	**5%**	**3%**	**2%**	**6%**
Cumulative study area	**31%**	**28%**	**23%**	**6%**	**4%**	**2%**	**6%**
State	**32%**	**29%**	**17%**	**6%**	**6%**	**2%**	**7%**

Source: CSO Census of population 2016.

A6.1.5 Residential and Commercial Properties in the Cumulative study area

In addition to the Census of Population, we can also profile the local economy based on data on the stock of business premises, per the **GeoDirectory database**.[4] The vast majority of properties in both the Whole UWF Project study area and the cumulative study area are categorised as residential. Within the Whole UWF Project study area the number of commercial properties varies between EDs, but it is noteworthy that some 601 properties are categorised as residential and commercial combined. Very few properties (228 in total) are exclusively commercial, numbering single digits in the majority of EDs.

Table 10: GeoDirectory Residential and Commercial Properties in the Cumulative Study Area

ED	No. Buildings	Residential Only	Commercial Only	Residential & Commercial Combined	Unknown
Kilcomenty	288	219	13	45	11
Newport	1,210	1,066	57	50	37
Killoscully	188	153	1	23	11
Kilnarath	157	126	5	14	12
Abington	303	219	16	39	29
Foilnaman	188	122	7	37	22
Upperchurch	163	89	12	50	12
Dolla	112	67	2	34	9
Templederry	80	40	1	28	11
Borrisoleigh	645	504	51	55	35
Gortkelly	237	139	5	77	16
Glenstal	439	370	10	40	19
Doon West	116	82	9	22	3
Cappamore	624	520	33	53	18
Bilboa	193	132	6	34	21
Glengar	126	74	1	40	11
Curraheen	149	90	9	35	15
Cappagh	464	362	29	53	19
Donohill	302	220	14	55	13
Clonoulty West	306	210	22	61	23
Clogher	101	65	2	33	1
Moyaliff	192	127	8	48	9
Greenhall/Lackagh	182	140	8	24	10
Kilmore	320	250	8	42	20
Whole UWF Project	**4,943**	**3,848**	**228**	**601**	**266**
Cumulative study area	**7,085**	**5,386**	**329**	**992**	**387**

[4] https://www.geodirectory.ie/

Source: GeoDirectory.

The GeoDirectory data also allows us to identify the level of dereliction and vacancy in each of the EDs. Table 11 indicates that:

- The Residential vacancy rate in the Whole UWF Project study area is 6.7 per cent (among exclusively residential premises).[5]
- The vacancy rate is much higher for exclusively Commercial properties within the Whole UWF Project study area, averaging 14.9 per cent.
- Among the buildings categorised as Unknown, there is a very high rate of dereliction – almost 67 per cent of the buildings are classed as derelict across the Whole UWF Project study area.

Of the 601 buildings that are categorised as both Residential and Commercial, only three are vacant, while none of the identified Residential or Commercial buildings in the Whole UWF Project study area are classified as derelict.

[5] The number of residential premises per GeoDirectory can be compared with the number of private households in the study area per the 2016 Census, which Table 3 indicates was 3,978. This should be comparable with Residential + [Residential & Commercial] – vacant stock, per GeoDirectroy. The latter is somewhat lower than the Census number, albeit they relate to different time periods. Census 2016 indicates a Residential vacancy rate of 12.8 per cent for the State overall.

Table 11: GeoDirectory Residential and Commercial Property Vacancy & Dereliction Rates in the Cumulative Study Area

ED	Residential	Residential Vacancy Rate	Commercial	Commercial Vacancy Rate	Unknown	Dereliction Rate
Kilcomenty	219	5.9%	13	7.7%	11	54.5%
Newport	1,066	6.2%	57	17.5%	37	67.6%
Killoscully	153	5.9%	1	0.0%	11	37.9%
Kilnarath	126	6.3%	5	0.0%	12	83.3%
Abington	219	12.8%	16	31.3%	29	62.1%
Foilnaman	122	6.6%	7	0.0%	22	90.9%
Upperchurch	89	13.5%	12	8.3%	12	83.3%
Dolla	67	13.4%	2	0.0%	9	77.8%
Templederry	40	20.0%	1	0.0%	11	72.7%
Borrisoleigh	504	6.5%	51	15.7%	35	37.1%
Gortkelly	139	7.2%	5	60.0%	16	66.6%
Glenstal	370	6.2%	10	0.0%	19	52.6%
Doon West	82	6.1%	9	22.2%	3	100%
Cappamore	520	4.2%	33	12.1%	18	66.7%
Bilboa	132	3.0%	6	0.0%	21	85.7%
Glengar	74	12.2%	1	100%	11	90.9%
Curraheen	90	11.1%	9	0.0%	15	73.3%
Cappagh	362	4.7%	29	13.8%	19	47.4%
Donohill	220	6.4%	14	0.0%	13	69.2%
Clonoulty West	210	7.1%	22	13.6%	23	73.9%
Clogher	65	18.5%	2	0.0%	1	100%
Moyaliff	127	16.5%	8	0.0%	9	100%
Greenhall/Lackagh	140	7.9%	8	0.0%	10	60.0%
Kilmore	250	7.2%	8	12.5%	20	60.0%
Whole UWF Project study area	**3,848**	**6.7%**	**228**	**14.9%**	**266**	**66.9%**
Cumulative study area	**5,386**	**7.1%**	**329**	**13.1%**	**387**	**67.7%**

Source: GeoDirectory.

The GeoDirectory database also describes the economic sector associated with the buildings - NACE codes[6] are provided for approximately 90 per cent of buildings classified as Commercial only or Residential & Commercial combined. This NACE code allows us to identify what economic sector each of the properties fall into. As in Table 12, a total of 464 of the premises in the Whole UWF Project study area are reported as being involved in 'Crop & Animal Production, Hunting & Related Activities', i.e. agriculture-related. The remaining 285 premises fall under approximately 80 separate NACE headings.

Table 12: GeoDirectory Premises Breakdown by Occupational Sector (NACE Code)

ED	No. Buildings	No. Buildings w/ NACE code	Agriculture	Other
Kilcomenty	288	53	36	17
Newport	1,210	83	25	58
Killoscully	188	23	19	4
Kilnarath	157	21	14	7
Abington	303	50	34	16
Foilnaman	188	43	31	12
Upperchurch	163	59	40	19
Dolla	112	35	32	3
Templederry	80	29	25	4
Borrisoleigh	645	89	30	59
Gortkelly	237	74	66	8
Glenstal	439	50	32	18
Doon West	116	28	18	10
Cappamore	624	74	33	41
Bilboa	193	38	29	9
Glengar	126	37	34	3
Curraheen	149	45	34	11
Cappagh	464	77	35	42
Donohill	302	66	48	18
Clonoulty West	306	75	53	22
Clogher	101	35	31	4
Moyaliff	192	57	45	12
Greenhall/Lackagh	182	30	17	13
Kilmore	320	50	33	17
Whole UWF Project study area	**4,943**	**749**	**464**	**285**
Cumulative study area	**7,085**	**1,221**	**794**	**427**

Source: GeoDirectory.

[6] NACE is the EU's Statistical Classification of Economic Activities, derived from the French title 'Nomenclature générale des Activités économiques dans les Communautés Européennes'.
http://www.cso.ie/en/methods/classifications/classificationofindustrialactivity/

A small number of these NACE sectors can be considered potentially impacted by this project. Table 13 lists these sectors, aggregated across all EDs in the cumulative study area. Across the 80 NACE code headings, we have identified 23 sectors which could potentially be impacted during the construction and operational phases of the project. The number of premises is very small, 185 in all, and they account for a very small proportion of the Commercial premises in the cumulative study area. This indicates that the scope for the project to impact on the local economy is likely to be limited.

Table 13: GeoDirectory NACE Sectors in the Cumulative Study Area, Identifying those Potentially Impacted by the Project

NACE Sector	No. of Premises
Beverage Serving Activities (pubs)	46
Maintenance & Repair of Motor Vehicles	20
Construction	16
Engineering Activities & Related Technical Consultancy	15
Other Accommodation (B&B)	13
Freight Transport by Road	11
Sale of Motor Vehicle Parts & Accessories	8
Restaurants & Mobile Food Services Activities	8
Electrical Installation	6
Retail Sales of Food, Beverages or Tobacco in Specialised and Non-Specialised Stores (supermarkets, convenience stores)	6
Renting & Leasing of Other Machinery, Equipment & Tangible Goods	5
Retail Sales of Automotive Fuel in Specialised Stores	5
Manufacture of Other Fabricated Metal Products N.E.C.	5
Wholesale of Wood, Construction Materials & Sanitary Equipment	3
Manufacture of Basic Iron and Steel and of Ferro-Alloys	3
Architectural Activities	3
Manufacture of other Article of Concrete, Plaster and Cement	2
Support Services to Forestry	2
Other Construction Installation	2
Roofing Activities	2
Taxi Operation	2
Agents Involved in the Sale of Agricultural Raw Materials, Live Animals, Textile Raw Materials & Semi-Finished Goods	1
Mining & Quarrying	1
Potentially Impacted	**185**
Other	395
Crop & Animal Production Hunting & Related Service Activities	1,180
Total Buildings (with NACE code) in Cumulative study area	**1,760**

Source: GeoDirectory.

Appendix to Chapter 7: Human Health

No Appendices for Chapter 7