UWF Grid Connection
Environmental Management Plan (2019)

Appendix A10

ECOPOWER

Environmental Management Plan

October 2019

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1. Introduction to the EMP

This Environmental Management Plan (EMP) has been prepared for the UWF Grid Connection and describes the approach to environmental management during the construction and early operational stage.

1.1. Objectives of the EMP

The objectives of the EMP are to:

(a) identify management responsibilities and reporting requirements for environmental management;
(b) identify the relevant Environmental Commitments;
(c) set out the environmental protection measures to be implemented;
(d) Outline how compliance with the EMP will be achieved; and
(e) Promote best environmental practices for the duration of the development.

1.2. Purpose of the EMP

The purpose of this document is to communicate environmental protection 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.

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. The EMP will be an important contract document for the main construction contractor (Contractor) who will be contractually obliged to comply with the EMP and the requirements of the Environmental Clerk of Works.

1.2.1. Scope of the EMP

This EMP covers the construction and early operational stage (i.e. until the lands returned to agricultural use and the permanent berms at Mountphilips Substation site have revegetated) of the UWF Grid Connection.

1.2.1.1. Review and Update of the EMP

Planning consent for the UWF Grid Connection is currently being sought from An Bord Pleanála through a Strategic Infrastructure Development application. The planning application is accompanied by an EIA Report (2019) and an Appropriate Assessment Report (2019)[1] which contain environmental project measures. Additional environmental requirements and environmental protection measures may be included in the conditions attached to the planning consent, should it be granted.

The EMP will also be supported by detailed Method Statements developed in the subsequent construction and operation stages.

The EMP is considered a dynamic document and as such will be reviewed and updated as required at both the commencement and throughout each stage of the UWF Grid Connection development to ensure it contains the latest relevant information, environmental commitments and environmental control measures.

[1] This EMP is appended to both the EIA Report and the Appropriate Assessment Report.

1.3. Structure of the EMP

This EMP has been developed according to the NRA *Guidelines for the Creation and Maintenance of an Environmental Operating Plan* (2007), and is presented in distinct sections, as outlined in Table 1 below.

Table 1: Structure of the EMP

Section No.	Section Heading	Information provided in this section
Section 1	Introduction to the EMP	The objectives, purpose and scope of the EMP.
Section 2	General Project Description	An overview of the main elements of the UWF Grid Connection, including purpose and location, main construction activities and classification of works locations. An overview of the other elements of the Whole UWF Project and other Activities in the area is also included.
Section 3	Contractors & Personnel	An outline of the type of contractors and personnel who will be involved in the project, including duties and responsibilities of key personnel, the training which will be provided and communication procedures which will be put in place.
Section 4	Environmental Commitments	An outline of the Environmental Commitments for the project and the Reference Documents, from which the Environmental Commitments arise.
Section 5	Monitoring	Monitoring of construction works by the Environmental Clerk of Works, and specialist environmental and engineering consultants
Section 6	Records & Reporting	Record forms and registers for compliance auditing, environmental training, environmental incidents and complaints.

Section 7	Mapping & Figures	Mapping and layouts of the UWF Grid Connection, including a table of the classification of locations along the construction works areas.
Tabs 1 to 9	Environmental Project Measures	Environmental protection measures, set out in individual tabs: Tab 1: Project Design Environmental Protection Measures; Tab 2 to 5: Traffic, Surface Water, Invasive Species and Waste Management Plans; Tab 6: Environmental Emergency Response Procedures; Tab 7: Scheduling & Timing of Works Measures; Tab 8: Environmental Surveying and Monitoring Measures; Tab 9: Best Practice Measures;

2. General Project Description

An overview of the UWF Grid Connection is provided below, the full description of the project is provided in the EIA Report (Volume C2 EIAR Main Report, Chapter 5: Description of Development – UWF Grid Connection), and also in Section 3.2 of the Appropriate Assessment Report (Volume E).

The UWF Grid Connection proposal comprises of the following parts:

- Mountphilips Substation Site,
- Ancillary Works at the Mountphilips Substation site, and
- Mountphilips – Upperchurch 110kV Underground Cable (110kV UGC).

2.1. Overview & Purpose of UWF Grid Connection

Upperchurch Windfarm (UWF) has already received planning permission but is not yet constructed. This application is for grid connection works (UWF Grid Connection) to connect the windfarm to the national electricity system.

UWF Grid Connection comprises two main parts;

- the first part is the proposed '**110kV UGC'** which is a 30.5km long underground electrical cabling network at high voltage (110 kilovolts (kV)), to connect the already consented Upperchurch Windfarm substation at Knockcurraghbola Commons townland to a new proposed substation at Mountphilips townland;

- the second part is a proposed 110kV electrical substation '**Mountphilips Substation'**, which will manage and control the power coming (via the 110kV UGC) from the consented Upperchurch Windfarm, and from Mountphilips Substation the power will be transported to national electricity system, at an adjacent point on the existing Killonan to Nenagh 110kV overhead line.

2.2. Location 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 electrical substation will be 160m east of the existing Killonan – Nenagh 110kV overhead line.

Mountphilips - Upperchurch 110kV UGC: The 110kV UGC will connect the new substation at Mountphilips to the already consented substation at Upperchurch Windfarm (Consented UWF Substation) by underground cabling (30.5km), mainly in the public road.

Starting at Mountphilips Substation, the route of the 110kV UGC follows the local road network through Rockvale and Ahane Cross, around Newport town, joining the Limerick to Thurles road (R503) on the east side of Newport town, at the GAA club. From that point, the 110kV UGC will be installed in R503 as far as the turnoff for Borrisoleigh at Knockmaroe. From there, the 110kV UGC uses the local road network and a private paved road to the Consented UWF Substation.

The route bypasses Newport; passes through the village of Rear Cross; passes through the Slieve Felim to Silvermines Mountain SPA for 8km (entirely on the R503); crosses the boundary of the Lower River Shannon SAC at 6 points (entirely on the public road and over existing bridges); and will be installed under or over 65 existing watercourse crossing structures.

The 110kV UGC will start at Mountphilips Substation; will be installed under the new access road for 0.5km as far as the Mountphilips Substation site entrance off the L2166-10 local road; then the 110kV UGC will be

installed in Local Road L2166-10 for 0.7km as far as Coole Crossroads, in Local Road L6013-0 for 1.2km; in the L2156-0 for 0.4km over Rockvale Bridge; in the L2157-0 for 0.8km as far as Ahane Crossroads and in the L6009-0 for 1.8km, joining the R503 at Newport GAA Club. The 110kV UGC is then routed under the R503 for 22.1km eastwards until the turn off at Knockmaroe townland, onto the L2264-50. The route to the consented Upperchurch Windfarm substation is along the local road network from the Knockmaroe junction - in the L2264-50 for 1.9km; then in the L6188-0 for 0.3km as far as the junction with a private paved road at Knockcurraghbola Commons. The final section of 110kV UGC will be installed in the private paved road for 0.7km and then in the Consented UWF Substation compound for the last 20m.

The 110kV UGC route is through the townlands of Mountphilips, Coole, Freagh, Foildarrig, Oakhampton, Rockvale, Mackney (O'Brien), Mackney (Bourke), Ahane, Newross, Castlewaller, Carrowkeale, Tullow, Cooldrisla, Derryleigh, Kilnacappagh, Scraggeen, Derrygareen, Inchadrinagh, Knockancullenagh, Fanit, Lackamore, Tooreenbrien Upper, Tooreenbrien Lower, Reardnogy Beg, Reardnogy More, Shanballyedmond, Baurnadomeeny, Coonmore, Foildarragh, Kilcommon, Loughbrack, Knocknabansha, Knockmaroe, Knockcurraghbola Crownlands and Knockcurraghbola Commons.

Ancillary Works at the Mountphilips Substation site will support the construction of the Mountphilips Substation for the UWF Grid Connection and includes the construction and use of a Temporary Compound at the Mountphilips Substation site; the construction of a new permanent Entrance at Coole townland (including the provision of sightlines) at an existing farm entrance; the construction of a permanent Access Road from the new entrance to the proposed substation at Mountphilips townland; the installation of drainage systems at Mountphilips Substation, around the Temporary Compound and along the new Access Road; construction of temporary and permanent watercourse crossing structures at Mountphilips; hedgerow/tree removal and hedgerow and tree replanting at the site Entrance and along the new Access Road; fencing at the Entrance, along the new Access Road and around the Substation Compound; provision of electricity supply to Mountphilips; excavation and storage of soils; reinstatement works.

The **'Mountphilips Substation site'** referred to in this EMP consists of the area from the End Masts to the Entrance from the public road in the townlands of Mountphilips and Coole, and includes the proposed Mountphilips Substation Compound, End Masts, new Access Road, permanent Entrance, and the ancillary works and also includes the western extent of the 110kV UGC between the Substation Compound and the site Entrance.

Relevant EMP Figures *(contained in Section 7 of this report: Mapping and Figures)***:**

Figure EMP 1: Location of the UWF Grid Connection on OSI Discovery Mapping

Figure EMP 2: Layout of the Mountphilips Substation site on Aerial Photography Mapping

Figure EMP 3: Layout of the 110kV UGC outside of the Mountphilips Substation Site (Overview & Maps 1 to 4)

2.3. Main 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
- New Permanent Access Road at Mountphilips Substation
- Temporary Access Road to End Masts
- Permanent Site Entrance at Mountphilips Substation Site
- Temporary Compound at Mountphilips Substation Site
- Formation of Overburden Storage Berms at Mountphilips Substation Site
- Reinstatement of Land at Mountphilips Substation Site
- 110kV Trenching and Ducting
- Instream Works Preparation and Reinstatement
- Installation of new culverts and replacing existing culverts
- Installation of temporary watercourse crossing W1
- Raising road level and parapet walls at Rockvale Bridge (W6), Tooreenbrien Bridge (W36) and Anglesey Bridge (W53)
- Horizontal Directional Drilling at W8 and W9
- 110kV Joint Bays and Associated Chambers
- 110kV Cable Pulling
- 110kV Cable Jointing

Individual Outline Construction Methodologies (OCMs) for all of the above listed main works and activities of UWF Grid Connection can be found at **Tab 10 of this EMP.** 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 are provided. 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.

2.4. Other Elements of the Whole Upperchurch Windfarm Project

The UWF Grid Connection is one part of a whole project, which is made up of five individual elements – the UWF Grid Connection, along with the Upperchurch Windfarm (UWF), UWF Related Works, UWF Replacement Forestry, and UWF Other Activities. These are collectively referred to as the Whole UWF Project in this EMP.

The location of each element of the whole UWF project is illustrated on:

Relevant EMP Figures *(contained in in Section 7 of this report: Mapping and Figures)***:**

Figure EMP 4: Location of UWF Grid Connection and the Other Elements of the Whole UWF Project on OSI Discovery Mapping.

2.4.1. 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 and in particular;

- It overlaps with Upperchurch Windfarm at the Consented UWF Substation,
- It is adjacent to the UWF Related Works and the Upperchurch Windfarm in Knocknabansha, Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola Crownlands,
- At Mountphilips Substation**,** some fiber-wrapping and re-sagging activities (UWF Other Activities) will be carried out from the new End Mast.

Relevant EMP Figures *(contained in Section 7 of this report: Mapping and Figures)***:**

Figure EMP 5: UWF Grid Connection and the Other Elements of the Whole UWF Project in the vicinity of Upperchurch Windfarm

Figure EMP 6: UWF Grid Connection and the Other Elements of the Whole UWF Project in Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola Crownlands

2.5. Other Activities in the vicinity of the UWF Grid Connection works

Other activities at and in the immediate vicinity of the UWF Grid Connection are:

- Agriculture – mainly cattle rearing and silage cutting
- Forestry – felling activities, forestry management
- Walking – presence of walkers along waymarked trails
- Traffic – on public and private roads

3. Contractors & Personnel

A typical organisational structure, a format for Contact Details Sheets for the construction stage of the UWF Grid Connection, along with the duties and responsibilities of various personnel and a description of environmental training and communication processes are outlined below.

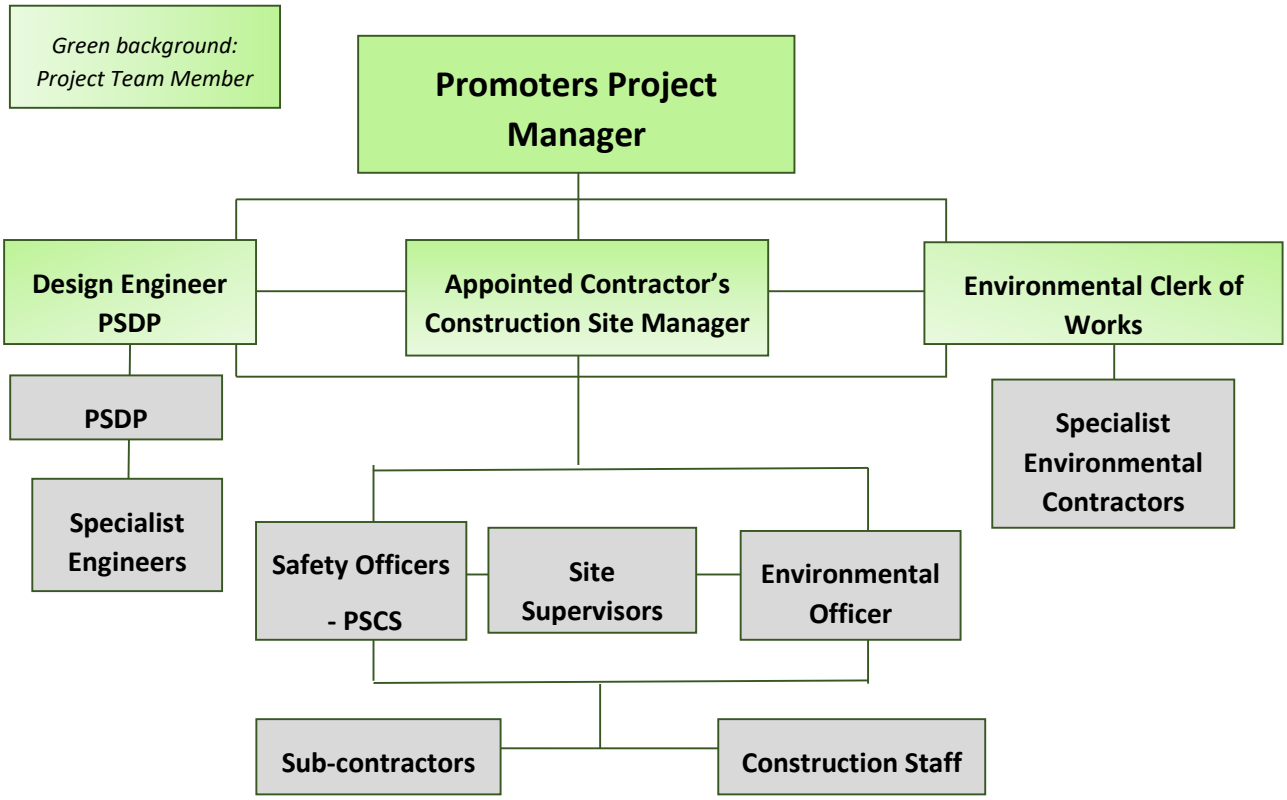
The construction Project Manager and Main Contractor will be appointed by the Promoter prior to commencement of the works. On appointment, the Project Manager and the Main Contractor will be required by the Project Promoter to update the outline organisational structure, the specific duties, roles and responsibilities of appointed personnel, contact details for these personnel, implement training programs and policies regarding communications.

It should be noted, that the contractors and personnel for the construction stage are also relevant to the pre-construction stage.

3.1. Organisational Structure and Hierarchy

The organogram below illustrates the typical reporting and hierarchal structures which will be implemented during the various stages of the UWF Grid Connection development. These organograms will inform the duties and responsibilities of all personnel under the EMP.

3.1.1. Construction Stage



3.2. Contact Details

Contact details of relevant personnel are provided in Tables 2 to 4 below to ensure the efficient reporting of environmental incidents. These tables will be populated following the appointment of the Contractor and the Project Team members, the details will be frequently reviewed by the Environmental Clerk of Works to ensure that they are up-to-date.

3.2.1. Construction Stage Contact Details

Table 2: Project Promoters Contacts

Position Title	Name	Mobile Phone Number	Email Address
Project Manager			
Design Engineer			
Environmental Clerk of Works			

Table 3: Main Contractors Contacts

Position Title	Name	Mobile Phone Number	Email Address
Construction Site Manager			
Environmental Officer			
Safety Manager – PSCS			
Safety Officers (24-hour number)			
Site Emergency Number (24-hour)			

Table 4: Third Party Contacts

Organisation	Position Title	Name	Phone Number	Email Address
Emergency Services				
Health & Safety Authority				
St Marys Health Centre, Thurles				
Newport Medical Centre				
Nenagh General Hospital				

University Hospital Limerick				
Tipperary County Council				
Inland Fisheries Ireland				
National Parks & Wildlife Service				
Environmental Protection Agency				
Emergency Spill Response Contact				
Acorn Recycling				
Kellys of Fantan, Waste Management				
Fogarty Concrete, Waste Management				
Kieran Kelly Haulage, Waste Management				
Enva Ireland, Waste Management, Portlaoise				
Enva Ireland, Hazardous Waste, Clare				
Enva Ireland, Waste Water, Cork				
Enva Ireland, Co. Laois				
Donohill Civic Amenity Centre				
Nenagh Recycling Centre				
Cashel Civic Amenity Site				

3.3. Duties & Responsibilities

3.3.1. Project Promoter

The Project Promoter (the 'Project Promoter' or 'Promoter') of the UWF Grid Connection has overall responsibility for the implementation of the environmental commitments and of environmental management of the works during construction.

3.3.2. Project Team Members – Construction Stage

The project team will be appointed prior to the commencement of the construction stage. The roles and responsibilities outlined below are indicative at this stage in the project and will be updated pending planning consent, conditions of planning and the appointment of the Main Contractor, details of the personnel involved along with their responsibilities will be added to the EMP. An outline of potential duties and responsibilities for various members of the project team is provided below. These details will require revision prior to the commencement of construction.

3.3.2.1. Project Promoters Project Manager

A Project Manager is appointed by the Project Promoter to manage and oversee the entire project.

The Project Manager's responsibilities include, but are not limited to, the following:

- management of the construction project, including the production of a construction schedule, procurement of construction materials, and maintaining a site project diary;
- liaison with the Project Promoter;
- liaison with the Main Contractor, Construction Site Manager and Project Team;
- liaison with the Environmental Clerk of Works
- implementing of the Environmental Management Plan;
- implementing the EMP sub-plans, such as the Traffic Management Plan etc.;
- Assigning duties and responsibilities in relation to the EMP.

3.3.2.2. Construction Site Manager

The Construction Site Manager manages all the works to construct the windfarm, on behalf of the Main Contractor. The Construction Site Manager reports to the Promoters Project Manager. In relation to the EMP, the Construction Site Manager is responsible for:

- Being aware of and familiar with all Environmental Commitments and Environmental Control Measures;
- Ensuring that all relevant information on project programming, scheduling, timing, construction methodology, etc., is communicated to the Promoters Project Manager and to the Environmental Clerk of Works, in a timely and efficient manner, in order to allow pre-emptive actions relating to the environment to be taken where required;
- Ensuring that the Environmental Commitments are implemented;
- Ensuring that adequate resources are provided to design and install any environmental interventions;
- Liaising with the Design Engineer and providing information on environmental management to the Design Engineer during the course of the construction phase;
- Liaising with the Project Team in assigning duties and responsibilities in relation to the EMP to individual members of the main contractor's project staff;

- Preparing site-specific Method Statements for all Works activities where there is a risk of environmental damage, by incorporating relevant Environmental Control Measures;
- Prepare and be in readiness to implement at all times environmental emergency response measures, see Tab 6 of this EMP.
- Liaising with the Environmental Clerk of Works in reviewing and updating site-specific Method Statements for all Works activities where Environmental Protection Measures had been altered, and
- Liaising with the Environmental Clerk of Works where third party agreement is required in relation to site-specific Method Statements and Environmental Control Measures.
- Liaising with the Community Liaison Officer regarding the development of a Local Employment and Sourcing Policy, and the setting up/managing of a local employment and resource database.

3.3.2.3. Design Engineer

The Design Engineer reports to the Promoters Project Manager and is responsible for:

- Design of the Works;
- Reviewing and approving relevant elements of the method statements – assisting the Construction Site Manager with the overall review;
- Consulting and liaising with Third Parties, where required;
- Updating/amending designs where required;
- Carrying out the role of PSDP, compiling the Health & Safety Plan, and liaising with the PSCS;
- Ensuring the UWF Grid Connection is constructed according to the planning drawings and consent.

3.3.2.4. Environmental Clerk of Works

The Environmental Clerk of Works is appointed by the Promoter and is independent of the Appointed Contractor. The Environmental Clerk of Works reports directly to the Promoters Project Manager. The duties and responsibilities of the Environmental Clerk of Works are outlined in the subsections below.

3.3.2.4.1. General

- Engage and manage a team of Environmental Managers and specialist environmental contractors and assigning duties and responsibilities in relation to the EMP to individual members
- Knowledgeable of the contents, environmental commitments and requirements, including within the Reference Documents, outlined in Section 4 of this EMP;
- Provision of information on environmental commitments to the Design Engineer during the course of the construction phase;
- Liaising with the Project Promoter in relation to environmental issues;
- Monitoring construction activities and auditing compliance of construction works with the Environmental Commitments and Environmental Control Measures; and
- Monitoring the implementation of the Environmental Commitments;
- Preparing weekly EMP Compliance Reports.
- Commissioning of the Environmental Surveying and Monitoring.

3.3.2.4.2. Compliance Auditing

- Carrying out daily documented inspections and audits of the site and construction works to check that work is being carried out in accordance with the Environmental Commitments and Environmental Control Measures set out in Section 4 and Tabs 1 to 9 of this EMP.

- Carrying out daily inspections of the fuel/oil storage area and the site drainage system at Mountphilips Substation site.
- Liaising with the Construction Site Manager so that any repairs or maintenance required are organised by the Construction Site Manager following the regular inspections of the site.
- Weekly reporting on the compliance of the construction works with the EMP to the Project Team
- Reporting to the Project Team on the environmental effects of the project against the predictions made during the EIA and AA process;
- Reporting to the Project Team on the effectiveness of the environmental management of the project;
- Reporting to the Project Team on the adequacy of the Promoters and Contractors response to any Corrective Action Requests
- Appending copies of the inspection reports to the EMP.

3.3.2.4.3. **Detailed Method Statements**

- Liaising with the Construction Site Manager regarding Method Statements for all works activities where there is a risk of environmental damage to ensure that these method statements incorporate the relevant Environmental Control Measures.
- Liaising with the Construction Site Manager in reviewing and updating the Method Statements where Environmental Control Measures have been altered.

3.3.2.4.4. **Third Party Consultations**

- Overseeing, ensuring coordination and playing a lead role in third party consultations required statutorily, contractually and in order to fulfil Environmental Commitments;
- Ensuring that the minutes of meetings, action lists, formal communications, etc., are well documented;
- Liaising with all prescribed bodies during any site visits, inspections and consultations;
- Where new Environmental Control Measures are agreed as a result of third party consultation, ensuring that the EMP is amended accordingly and liaising with the Construction Site Manager to ensure that any relevant Method Statements are updated;

3.3.2.4.5. **Licensing**

- Confirming that all relevant works have (and are being carried out in accordance with) the required, planning consents, permits, licences etc.;
- Where relevant, liaising with the designated licence holders with respect to licences granted pursuant to the Wildlife Act, 1976, as amended;
- Bringing to the attention of the Project Team any timing and legal constraints that may be imposed on the carrying out of certain tasks.

3.3.2.4.6. **Specialist environmental contractors**

- Identifying and engaging specialist environmental contractors (for example ecologists, hydrologists, mud engineers, conservation engineer, spill clean-up specialists etc.) before commencement of the project;
- Procuring the services of specialist environmental contractors when required and liaising with them with respect to site access and report production;
- Ensuring that the specialist environmental contractors are competent; and
- Co-ordinating the activities of all specialist environmental contractors, including surveying.

3.3.2.4.7. Environmental Induction Training and Environmental Tool Box Talks

- Confirming that Environmental Induction Training is carried out for all site personnel. No personnel will be allowed to work on the site without proof of attendance at an Environmental Induction.
- Confirming that toolbox talks on Environmental Control Measures associated with Site-specific Method Statements is carried out for all site personnel who will undertake the work.

3.3.2.4.8. Environmental Incidents/Spillages

- The Environmental Clerk of Works will have the authority to temporarily stop works over part of the site to avoid an environmental offence being committed, works will not recommence until the source of the effect (if it is from the project) has been remedied;
- Prepare and be in readiness to implement at all times environmental emergency response measures, see Tab 6 of this EMP.
- Notifying the relevant statutory authority of environmental incidents, and
- Carrying out an investigation and producing a report regarding environmental incidents. The report of the incident and details of remedial actions taken will be made available to the relevant authority, the Promoter and the Project Team.

3.3.2.5. Other Roles

3.3.2.5.1. Project Supervisor Construction Stage - PSCS

The PSCS for the construction project is appointed by the Main Contractor in line with the Construction Regulations:

- carrying out duty of Project Supervisor Construction Stage
- responsible for safety induction of all staff and personnel on site
- implementing the Health and Safety Plan
- auditing and updating the Health & Safety Plan
- all other relevant legal Safety duties
- implement and record the Waste Management Plan
- Holding copies of all permits and licences provided by waste contractors;
- Ensuring that any operations or activities that require certificates of registration, waste collection permits, waste permits, waste licences, etc., have appropriate authorisation, and
- Gathering and holding documentation with the respect to waste disposal.

3.3.2.5.2. Tipperary County Council Civil Engineer

The Tipperary County Council Civil Engineer, is a chartered civil engineer who will report to Tipperary County Council and is responsible for:

- Overseeing quality control and compliance with drawings for the Mountphilips - Upperchurch 110kV UGC,
- Ensuring the 110kV UGC is constructed according to the specifications and road opening conditions and are followed for the duration of site works;
- Consulting and liaising with the Construction Site Manager, Environmental Clerk of Works and Third Parties, where required;

3.3.2.5.3. Community Liaison Officer

The Community Liaison Officer is responsible for communicating with the local community and wider public during the construction stage, including;

- Responding to any concerns or complaints raised by the public in relation to the construction of the UWF Grid Connection;
- Liaising with the Environmental Clerk of Works on local community concerns relating to the environment;
- Keeping the local community, including the local Rear Cross and Lackamore National Schools, informed of project progress and any construction activities which may cause inconvenience to them;
- Developing the public communications strategy.
- Assisting the Construction Manager in developing a Local Employment and Local Sourcing Policy.
- Setting up and managing a local employment and resources database, engaging with local services businesses ahead of construction works, and monitoring the recruitment and training of local employees in line with the Local Employment and Local Sourcing Policy.

3.3.2.5.4. All construction site personnel

All site personnel are responsible for:

- Adhering to the relevant Environmental Control Measures and relevant site-specific Method Statements
- Reporting immediately, to the Construction Site Manager and the Environmental Clerk of Works, any incidents where there has been a breach of agreed procedures including any spillage of a potentially environmentally harmful substance; damage to a protected habitat, etc.

3.3.2.5.5. Specialist Environmental Contractors

Project Ecologist

An ecologist will be appointed by the Environmental Clerk of Works and will be responsible for:

- Advising the Environmental Clerk of Works, Project Manager, Construction Manager and Project Promoter on relevant wildlife/environmental legislation and aid in the development of practical solutions,
- Carrying out the habitat and species surveys during the appropriate periods,
- Aiding with the implementation of biodiversity related planning conditions,
- Monitoring and aiding with the implementation of biodiversity related Project Design Environmental Measures,
- Monitoring the implementation of the Invasive Plant Species Management Plan,
- Monitoring the implementation of the biodiversity related Best Practice Measures ,
- Monitoring vegetation clearance, tree root protection and
- Monitoring the success of the re-vegetation work.

Project Aquatic Ecologist – member of the CIEEM and of the Institute of Fisheries Management

A competent and experienced ecologist will be appointed by the Environmental Clerk of Works and will be responsible for:

- Monitoring instream works at W1, W2 and W3 at Mountphilips Substation site, and the culvert replacement works at the up to 13 no. locations on the public road,
- Monitoring the reinstatement of these watercourses following works, and
- Monitoring works within the boundary of the Lower River Shannon SAC;
- Advising the Environmental Clerk of Works and the Construction Manager on best practice techniques to be implemented.

Project Hydrologist

A competent and experienced hydrologist will be appointed by the Environmental Clerk of Works and will be responsible for:

- Monitoring the implementation of the Surface Water Management Plan (SWMP),
- Carrying out of site inspections in accordance with the SWMP,
- Monitoring water quality prior to, during and post construction.

Project Invasive Species Specialist

A competent and experienced invasive species specialist will be appointed by the Environmental Clerk of Works and will be responsible for:

- Carrying out of pre-construction surveys to confirm that location of any infestations in proximity to construction works areas;
- Monitoring the implementation of the Invasive Species Management Plan (ISMP),
- supervision of the implementation of all biosecurity control measures, such as the laying of grass carpet terram material over infestations which occur in roadside boundaries,
- Monitoring each infestation location during all critical stages of construction works,
- Supervising construction works adjacent to infestation locations.

Project Mud Engineer

A competent and experienced mud engineer will be appointed by the Environmental Clerk of Works and will be responsible for:

- Advising the Construction Manager on the selection of competent drillers for the HDD works,
- Monitoring of Horizontal Directional Drilling at the watercrossings W8 and W9, in particular monitoring monitor the watercourse bed and the drilling pressures,
- Supervising the implementation of any contingency measures, and
- Monitoring and advising on the implementation of the Environmental Emergency Procedure for Frac-Out, in the unlikely event of frac out.

Project Archaeologist

A competent and experienced archaeologist(s) will be appointed by the Environmental Clerk of Works and will be responsible for:

- Monitoring of groundworks and carrying out of surveys in accordance with Environmental Commitments,
- Communicating with the National Monument Service regarding licences etc.

Specialist architectural restoration stonemason and conservation engineer

The remedial works to the parapet walls at Anglesey Bridge will be carried by a specialist architectural restoration stonemason under the supervision of a suitably qualified conservation engineer, with completed works certified by a suitably qualified conservation engineer.

3.4. Environmental Awareness Training

Environmental Awareness Training will be provided to ensure that all of the appointed Contractors site personnel have the appropriate knowledge to successfully implement the EMP. The main objective of the training is to make sure that site personnel are aware of the relevant Environmental Commitments and Environmental Control Measures and that site personnel are aware of the steps to take in an environmental emergency situation.

3.4.1. EMP and Contractual Requirements Briefing

The Environmental Clerk of Works will regularly brief the relevant project team members on the compliance with the EMP and on the Environmental Commitments which must be met and the Environmental Control measures which must be implemented during the construction.

3.4.2. Environmental Induction Training

The Environmental Clerk of Works will provide Environmental Induction Training for all project team members. All other site personnel, including sub-contractor personnel, will receive relevant environmental induction training in conjunction with safety induction training.

Every member of the Main Contractors and sub-contractor's teams must have access to and have read the EMP prior to beginning works – this will be a strict requirement for all people working on this project.

No workers will be allowed to work on this project without having attended a formal Environmental Induction. The induction training will ensure that both Contractors employees and subcontractors are fully informed of their responsibilities regarding specific environmental commitments. The induction will outline the objectives for the environmental management of the site, identify the relevant environmental sensitivities and outline the environmental control measures to be put in place to prevent adverse impacts to the environment.

Copies of the signed training records will be kept by the Environmental Clerk of Works for all environmental training provided.

3.4.3. Task Specific Training – Tool Box Talks

Where a site-specific Method Statement (one which incorporates Environmental Control Measures) has been devised for a works activity, all site personnel involved in that activity will receive a toolbox talk outlining the Environmental Control Measures. The Site Supervisor will be responsible for providing the toolbox talk and will provide a copy of signed training records to the Environmental Clerk of Works.

3.5. Communication

Procedures for both internal and external communication of information regarding specific elements of the UWF Grid Connection will be implemented during the construction of the development.

3.5.1. Internal Communication

During construction, the Environmental Clerk of Works will be responsible for communicating the Environmental Commitments, Environmental Control Measures and Environmental Emergency Response Procedures to the Main Contractor, who will communicate them to the Site Supervisors, who in turn will bring the Environmental Control Measures to the attention of all site personnel.

Important environmental information on specific elements of the UWF Grid Connection will be communicated to contractors and site personnel through site inductions, site management meetings, safety meetings and tool-box talks. The Environmental Clerk of Works will attend and report on environmental issues at the site management meetings.

3.5.2. External Communication with the Public

Communications with the public will managed by a Community Liaison Officer (CLO), appointed by the Promoter. A two-way mechanism will be put in place whereby members of the public will be able to communicate with the CLO and also the CLO will be able to communicate important information on various aspects of the development to the general public.

A complaints register will form part of the public communications strategy. Any complaints will be handled by the Community Liaison Officer with the complainant receiving a response within one week after lodging the complaint.

All environmental complaints will be directed to the Environmental Clerk of Works.

4. Environmental Commitments

The Environmental Commitments are the obligations and requirements which will be implemented during the development of the UWF Grid Connection to avoid, prevent or minimise significant adverse impacts to the environment.

The current List of Environmental Commitments, listed in Table 5 below, arises from the UWF Grid Connection EIA Report (2019) and Appropriate Assessment Report (2019). This List will be updated with any additional environmental commitments arising from the Reference Documents in Section 4.1 below.

Table 5: List of Environmental Commitments (ECs) – *to be updated*

Environmental Commitment	Location in this EMP	Implemented By:	Method by which the EC will be met
The Project Promoter is committed to implementing the Project Design Measures as set out in Tab 1, and as per the EIA Report (2019), Main Report, Chapter 5, Section 5.2.3, and as per Section 3.5 of the Appropriate Assessment Reporting (2019).	EMP, Tab 1	Project Team, specialist environmental and engineering experts, all site personnel	Incorporation of PD's listed in Tab 1 into Method Statements, Management Plans, Scheduling & Timing of Works. and Surveying and Monitoring requirements.
The Project Promoter is committed to implementing the Traffic Management Plan.	EMP, Tab 2	Project Team, specialist environmental and engineering experts, all site personnel	Implementation of the Traffic Management Plan during construction works
The Project Promoter is committed to implementing the Surface Water Management Plan.	EMP, Tab 3	Project Team, specialist environmental and engineering experts, all site personnel	Implementation of the Surface Water Management Plan during construction works
The Project Promoter is committed to implementing the Invasive Species Management Plan.	EMP, Tab 4	Project Team ECoW, Invasive Species Specialist	Implementation of the Invasive Species Management Plan during construction works
The Project Promoter is committed to implementing the Waste Management Plan.	EMP, Tab 5	Project Team, ECoW,	Implementation of the Waste Management Plan during construction works
The Project Promoter is committed to implementing the Environmental Emergency Response Procedures as set out in Tab 6.	EMP, Tab 6	Project Team, specialist environmental and engineering experts, all site personnel	Implementation of the Emergency Response Procedures should an environmental emergency occur.
The Project Promoter is committed to implementing Best Practice Measures as set out in Tab 9.	EMP, Tab 9	Project Team, specialist environmental and engineering experts, all site personnel	Incorporation of BPM's listed in Tab 9 into Method Statements, Management Plans, Scheduling & Timing of Works Measures, and Surveying and Monitoring requirements.
The Project Promoter is committed to monitoring the development to check that	EMP, Section	ECoW, and specialist environmental and	Carrying out of audits of compliance, through the

Environmental Commitment	Location in this EMP	Implemented By:	Method by which the EC will be met
the project is in practice, conforming to the predictions made in the EIA Report and in the Appropriate Assessment Report.	5, and Tab 8	engineering experts	completion of EMP Compliance Record Sheets, and carrying out Environmental Surveying.

4.1. Reference Documents

The List of Environmental Commitments will be updated with any relevant changes to the Reference Documents, listed in Table 6.

Table 6: List of Reference Documents

Reference Document Title	Location
An Bord Pleanála Order including Planning Conditions	Tab 11
Feedback from consultations with Statutory Bodies and Other Parties	Tab 12
Construction Contract Documents	Tab 13

5. Monitoring

Adverse effects on the environment due to the development of the UWF Grid Connection for the most part relates to the construction stage. Monitoring of the construction works will check that the project in practice conforms to the predictions made in the EIA Report and Appropriate Assessment Report during the planning process. This audit of the conformity with the EIA Report and Appropriate Assessment Report will be carried out through the EMP by the Environmental Clerk of Works.

5.1.1. Environmental Clerk of Works

The Project Promoter of the UWF Grid Connection (the 'Promoter') will employ a suitably qualified Environmental Clerk of Works (minimum NEBOSH Certificate in environmental management) who will be independent of the Main Contractor. The Environmental Clerk of Works will be employed for the duration of the pre-construction, construction and early operational stages (i.e. until the lands returned to agricultural use and the permanent berms at Mountphilips Substation site have revegetated), and will have a full time presence during the construction stage. The Environmental Clerk of Works will be adequately resourced and will manage a team of Environmental Managers and specialist environmental and engineering experts, adequately staffed to ensure strict compliance with the EMP and all relevant planning conditions.

The Environmental Clerk of Works will monitor the compliance of the construction works with the EMP, and will engage specialist environmental consultants, such as ecologists, hydrologists and archaeologists, as required.

5.1.2. Compliance Auditing

On-going audits, will be carried out by the Environmental Clerk of Works, during the construction of the UWF Grid Connection. The audits will record the:

- compliance with this EMP;
- monitoring and reporting on the environmental effects of the project against the predictions made during the EIA and AA processes;
- monitoring and reporting on the effectiveness of the environmental management of the project; and
- reporting on the adequacy of the Promoters and Contractors response to any Corrective Action Requests.

5.1.3. Application of Environmental Protection Measures

The Environmental Clerk of Works will monitor the implementation of the Environmental Protection Measures (see Tabs 1 to 9) for the UWF Grid Connection.

In order to facilitate the monitoring and auditing of compliance with Environmental Commitments along various parts of the UWF Grid Connection during its construction, the Environmental Protection Measures applicable to each location or type of construction activity is presented below and is based on location or distinguishing features of the works, which are:

- Construction works at Mountphilips Substation site
- Cable Trench and Joint Bay works in roads along 110kV UGC outside the Mountphilips Substation site
- Bridge Works and Culvert Replacement Works along the 110kV UGC outside the Mountphilips Substation site

- Cable trenching over/under the other existing watercourse crossings along the 110kV UGC route

Table 7: Application of Environmental Protection Measures during the Construction Stage

Works Area	Relevant Project Design Environmental Protection Measure (PDs)	Relevant Management Plans	Relevant Best Practice Measures (BPMs)	Relevant Outline Construction Methodologies (OCMs)
Mountphilips Substation Site (includes works for Mountphilips Substation, ancillary works, and 110kV UGC works within the Mountphilips Substation site.	PD1, PD2, PD5, PD11, PD12, PD13, PD14, PD15, PD16, PD17, PD18, PD22, PD23, PD24, PD29, PD30, PD31, PD32, PD38, PD39, PD40, PD41, PD43, PD44, PD45, PD46, PD47, PD48, PD49, PD50, PD51, PD52, PD53, PD54, PD55, PD56, PD57, PD58, PD63, PD64, PE65, PD67, PD68	Surface Water Management Plan Traffic Management Plan Invasive Species Management Plan Waste Management Plan	BPM1, BPM3, BPM4, BPM5, BPM6, BPM7, BPM8, BPM9, BPM10, BPM11	OCM1, OCM2, OCM3, OCM4, OCM5, OCM6, OCM7, OCM8, OCM9, OCM10, OCM11, OCM12, OCM13, OCM14, OCM17, OCM18, OCM19
110kV UGC works outside the Mountphilips Substation site	PD1, PD3, PD4, PD5, PD6, PD7, PD8, PD9, PD10, PD11, PD12, PD13, PD16, PD19, PD20, PD21, PD22, PD23, PD25, PD26, PD27, PD28, PD30, PD31, PD32, PD33, PD34, PD35, PD36, PD37, PD38, PD39, PD40, PD41, PD42, PD43, PD44, PD45, PD46, PD47, PD48, PD49, PD50, PD51, PD52, PD53, PD54, PD55, PD57, PD59, PD60, PD61, PD62, PD63, PD66, PD67, PD69	Surface Water Management Plan Traffic Management Plan Invasive Species Management Plan Waste Management Plan	BPM2, BPM3, BPM5, BPM6, BPM8, BPM9, BPM10, BPM11	OCM1, OCM2, OCM12, OCM13, OCM14, OCM15, OCM16, OCM17, OCM18, OCM19

Table 8 below identifies colour coding for each Works Section along the UWF Grid Connection from proposed Mountphilips Substation, along the proposed 110kV UGC, to the consented Upperchurch Windfarm Substation and shown on:

Relevant EMP Figures *(contained in in Section 7 of this report: Mapping and Figures)*:

Figure EMP 7: Colour Coding and identification Numbers for UWF Grid Connection Works Areas.

Table 8: Colour Coding and identification Numbers for UWF Grid Connection Works Areas

Classification
Mountphilips Substation Site
110kV UGC - Cable Trench and Joint Bay Works in Roads
110kV UGC - Bridge Works and Culvert Replacement Works
110kV UGC - Cable Trenching Over/Under The Other Existing Watercourse Crossings

5.1.4. Reporting

An EMP Compliance Report will be prepared weekly during the construction stage, issued to the Project Manager for distribution and will be presented at all site management meetings to ensure that 'live' issues are dealt with in a timely and efficient manner.

The EMP Compliance Report will detail the findings and recommendations of the preceding monitoring and auditing activities and will include a detailed response from the Contractor to any of the recommendations contained in the previous report.

Template reporting and record sheets are included in Section 6 of this EMP for:

- Non-Compliance Report
- Register of Non-Compliance Reports Issued
- Environmental Training Record
- Register of Environmental Training
- Environmental Incident Record Sheet
- Register of Environmental Incidents
- Environmental Complaint Record
- Register of Environmental Complaints
- Control of Spread of Invasive Species Record Sheet

5.1.5. Corrective Actions

Where non-compliance is detected, a system of follow up and corrective action will be implemented. Corrective Action Requests (CARs) will be issued to the Contractor to ensure that prompt action is agreed and committed to, with a view to the effective resolution of any deviations from the EMP requirements.

Corrective Action Requests may be raised as a result of:

- A compliance audit; or
- A suggestion for improvement by a Statutory Body; or
- An incident or potential incident; or
- An internal or external communication.

All Corrective Action Requests will be numbered and logged.

6. Records & Reporting

6.1. Non-Compliance Record Sheet

Non-Compliance Record Sheet		
Date	Time	Logged By
Contractor or Subcontractor Details: Contractor Name: Contact Name: Telephone:		
Nature of Non-Compliance (specify Environmental Protection Measure breached)		
Time Specified for becoming compliant:		
Contractor or Subcontractor's confirmation of receipt of NCR Yes ☐ No ☐ Contractors or Subcontractors signature: _____ Date of Signing: _____		

6.2. Register of Non-Compliance issued

Register of Environmental Training											
Date Issued	Time	NCR Report No.	Contractor Name	Contact Name	Contact Telephone	Nature of Non-Compliance (Specify Procedure(s) contravened)	Time specified for becoming compliant	Contractor's Conformation of receipt of NCR (Y/N)	Date of Contractor's Conformation of receipt of NCR	Compliant within time given (Y/N)	If yes ---------- Nature of corrective / preventative action

6.3. Environmental Training Record Sheet

Environmental Training Record Sheet			
Training Title:			
Description			
External Trainers ☐	Name of Company:		
Internal Instruction ☐	Name and Signature of Trainer:		
Date:			
Duration of Training:			
Name	**Job Title**	**Signature** **(Employee receiving training)**	

6.4. Register of Environmental Training

Register of Environmental Training								
Date	Training Title	Training Description	External Trainers	Name of Training Company	Name of Trainer	Duration	Name of Trainee	Job Title of Trainee

6.5. Environmental Incident Record Sheet

Environmental Incident Record Sheet		
Date	Time	Logged By
How was Incident Detected?		
Nature of Incident (e.g. Water pollution/Dust/Noise/Fuel Spill)		
Investigation Findings		
Corrective/Preventative Action Taken/Contingency Measures Employed		

Follow up reporting:

EPA	Letter ☐	Phone ☐	Date:_____
Tipperary County Council	Letter ☐	Phone ☐	Date:_____
Office of Public Works	Letter ☐	Phone ☐	Date:_____
Inland Fisheries Ireland	Letter ☐	Phone ☐	Date:_____

Signed: _____

6.6. Register of Environmental Incidents

Register of Environmental Incidents								
Date	Time	How was Incident detected	Nature of Incident	Nature of Complaint	Investigation findings	Corrective / preventative action	Follow up Reporting	Incident logged by

6.7. Environmental Complaint Record Sheet

Environmental Complaint Record Sheet		
Date	Time	Logged By

Complainants Details *(if known)*

Name: _____ Address: _____

Telephone Number: _____

Mode of Complaint: _____ (e.g. telephone/letter/verbal/via statutory body)

Nature of Complaint (e.g. Water pollution/Dust/Noise/Fuel Spill)

Response to Complaint

(including investigation findings, corrective actions/preventative action taken if required)

Corrective/Preventative Action Taken/Contingency Measures Employed

Follow up correspondence:

To complainant/_____: Letter ☐ Phone ☐ Date:_____

Further correspondence from complainant: Letter ☐ Phone ☐ Date:_____

Signed: _____

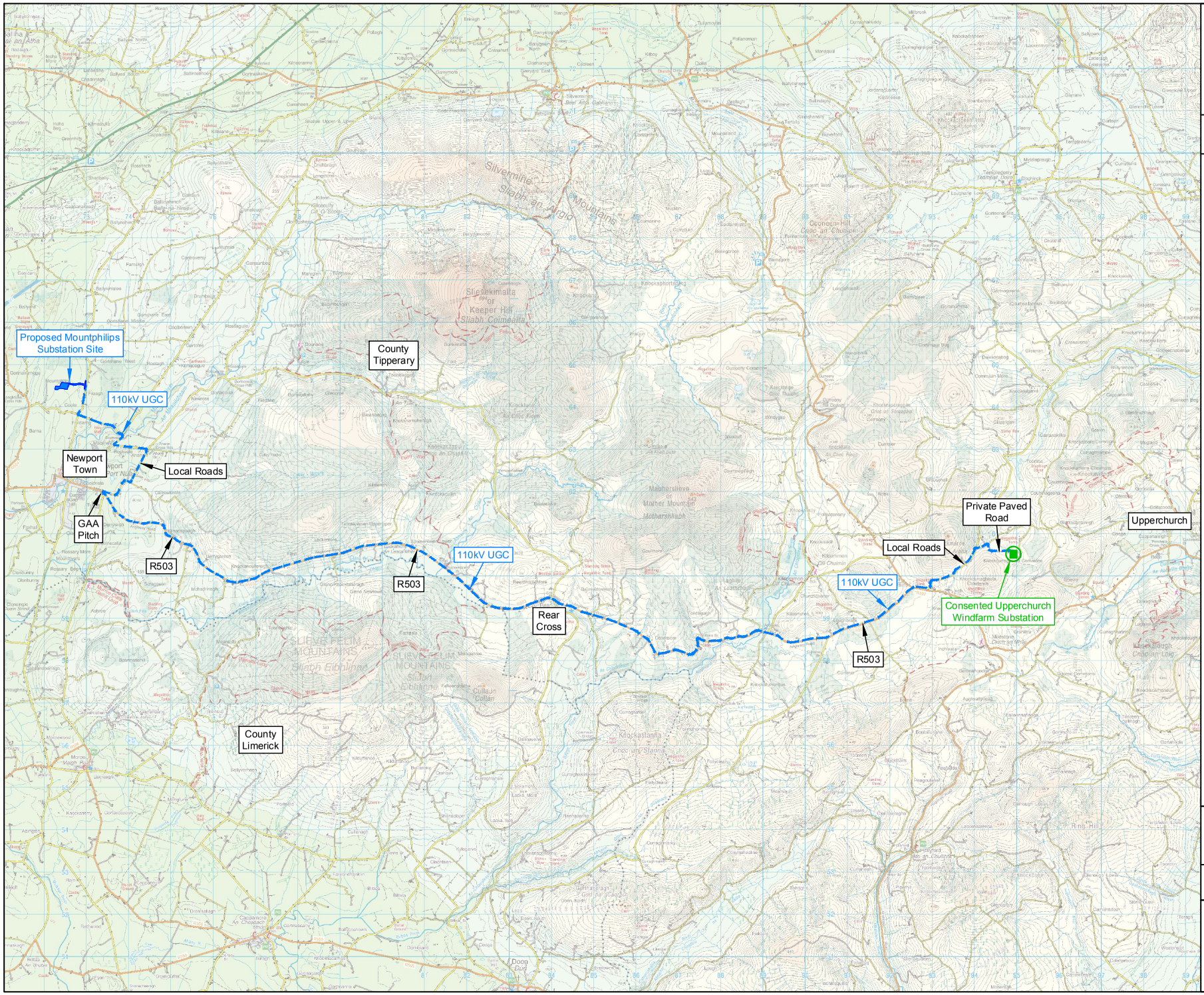
6.8. Register of Environmental Complaints

Register of Environmental Complaints								
Date	Time	Complainant's Details	Mode of complaint	Nature of Complaint	Responder to Complaint	Follow up correspondence	Complaint logged by	Date

6.9. Control of Spread of Invasive Species Record Sheet

Contractor/Employee Name:		
Contractor Equipment List: (list all main equipment cleaned)		
Construction Location: (tick as appropriate)	• • (Specify exact location)	☐ ☐
Cleaning Location (specify location where cleaning took place, e.g. name of garage)		
Method of Cleaning (Specify nature of cleaning e.g. High-pressure steam, manual removal of vegetation, high pressure power hose, disinfection etc.)		
Date of Cleaning:		
Contractor Declaration: I hereby declare that all equipment used at the construction location indicated above has been thoroughly cleaned in accordance with the cleaning methodology set out above before entering the construction site. The machine I am using has not left site and re-entered since it was cleaned. Signed: _____ Date:		

7. Mapping & Figures



EMP: Main Plan

Figure EMP 1

Location of the UWF Grid Connection on OSI Discovery Mapping

Map Number:

Overview Map

Legend:

- UWF Grid Connection - 110kV UGC
- UWF Grid Connection - Mountphilips Substation
- Consented Upperchurch Windfarm Substation

Project:

UWF Grid Connection (2019)

Drawn by:	Checked by:	Date:	Sheet Size:
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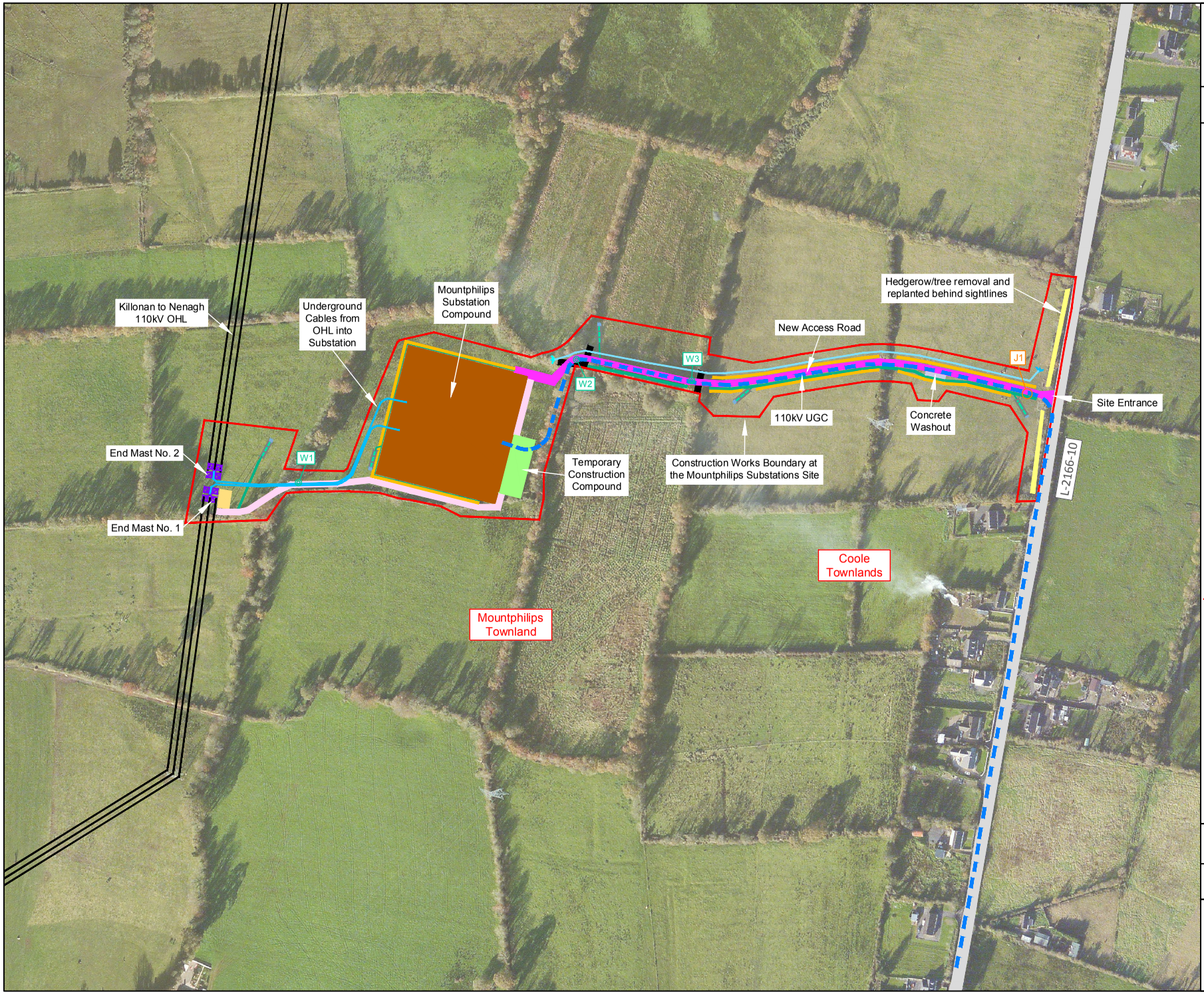

EMP: Main Plan

Figure EMP 2

Layout of the Mountphilips Substation Site on Aerial Photography Mapping

Map Number:
Map 1 of 1

Legend:

PROPOSED

- UWF Grid Connection - 110kV UGC
- 110kV Substation Compound
- Joint Bay Locations
- New Permanent Access Roads
- Permanent Berms with new hedgerow planted
- Underground Cable from Killonan to Nenagh 110kV OHL into Mountphilips Substation
- End Masts
- End Masts temporary crane hardstands
- Water Crossing
- Concrete Washout
- Dirty water drain
- Settlement Pond
- Clean water drain
- Hedgerow/tree removal at site entrance within visual splay and replanted behind sightlines
- Permanent hedge/tree removal at watercourse crossings W2 and W3
- Temporary Construction Compound
- Temporary Access Road
- Mountphilips Substation Site Construction Works Boundary

EXISTING

- Existing Killonan to Nenagh 110kV OHL
- Public Road Identification Number
- Public Road
- Townlands

N

Project:
UWF Grid Connection (2019)

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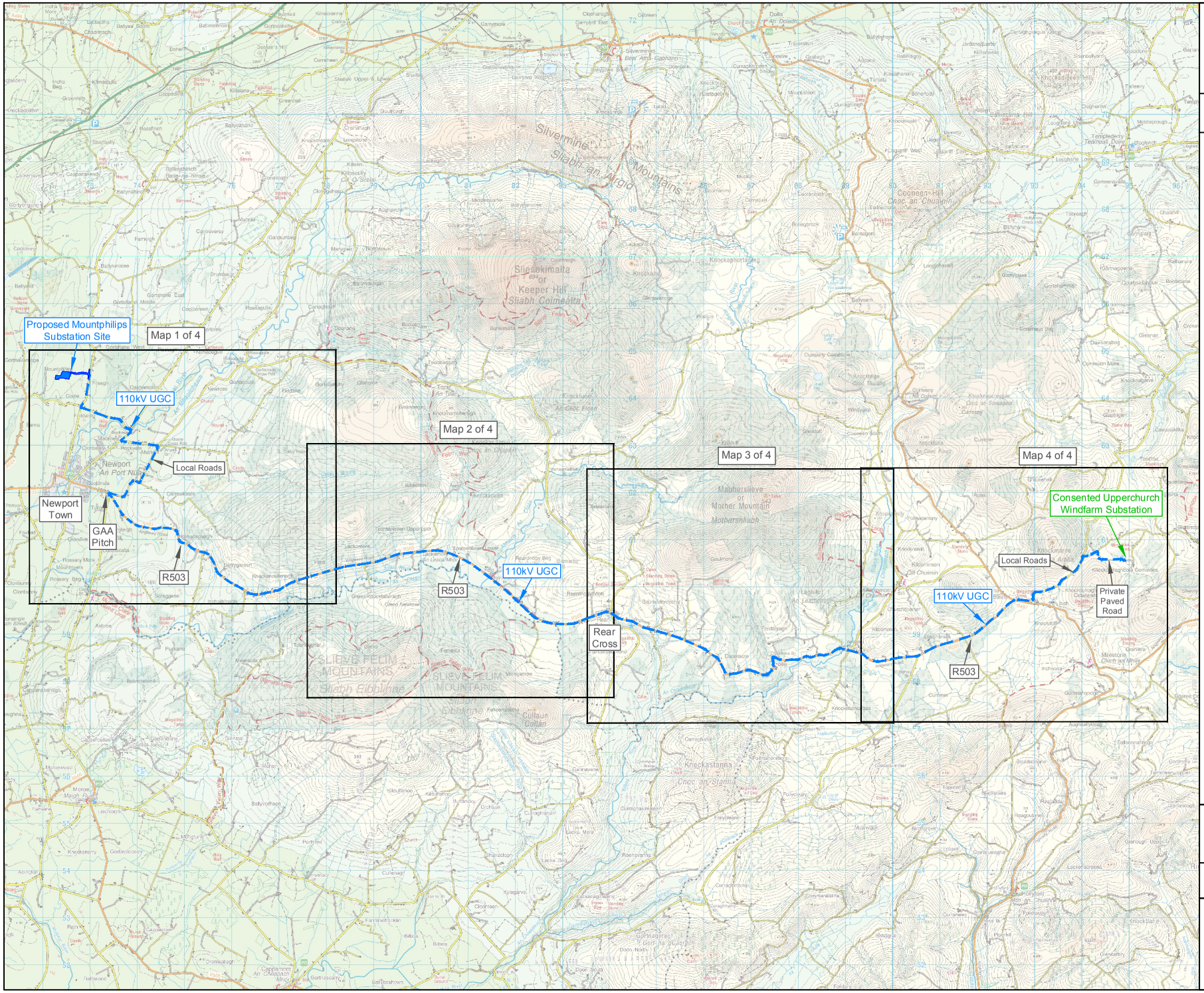

EMP: Main Plan

Figure EMP 3

Layout of the 110kV UGC outside of the Mountphilips Substation Site

Map Number:

Overview Map

Legend:

- UWF Grid Connection - 110kV UGC
- UWF Grid Connection - Mountphilips Substation
- Consented Upperchurch Windfarm Substation
- Map 1 of 4 — Map 1 of 4

Project:

UWF Grid Connection (2019)

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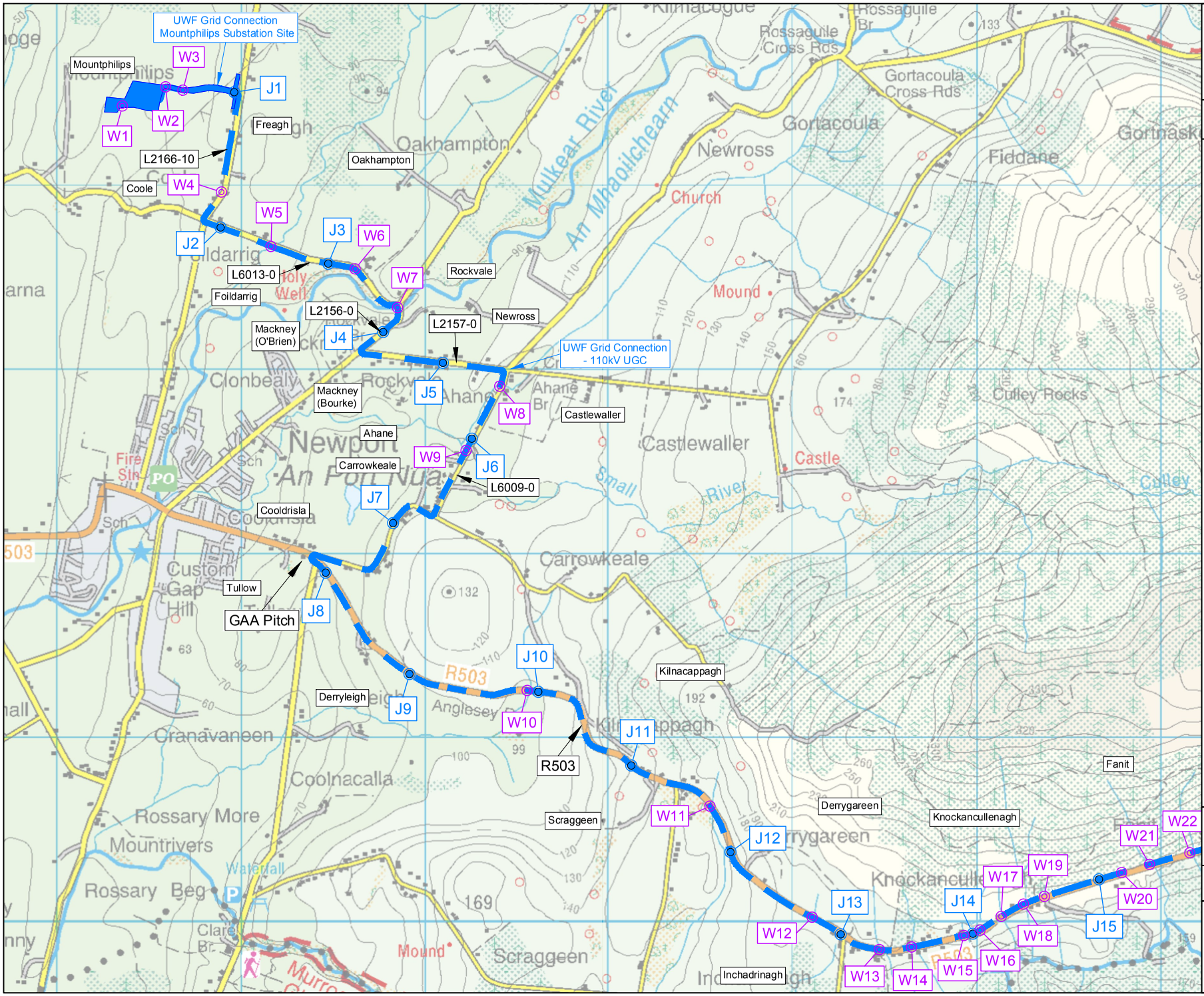

EMP: Main Plan

Figure EMP 3

Layout of the 110kV UGC outside of the Mountphilips Substation Site

Map Number:
Map 1 of 4

Legend:

- UWF Grid Connection - 110kV UGC
- UWF Grid Connection - Mountphilips Substation
- W62 Watercourse Crossing Locations
- J16 Joint Bay Locations
- Coole Townlands

N

Project:
UWF Grid Connection (2019)

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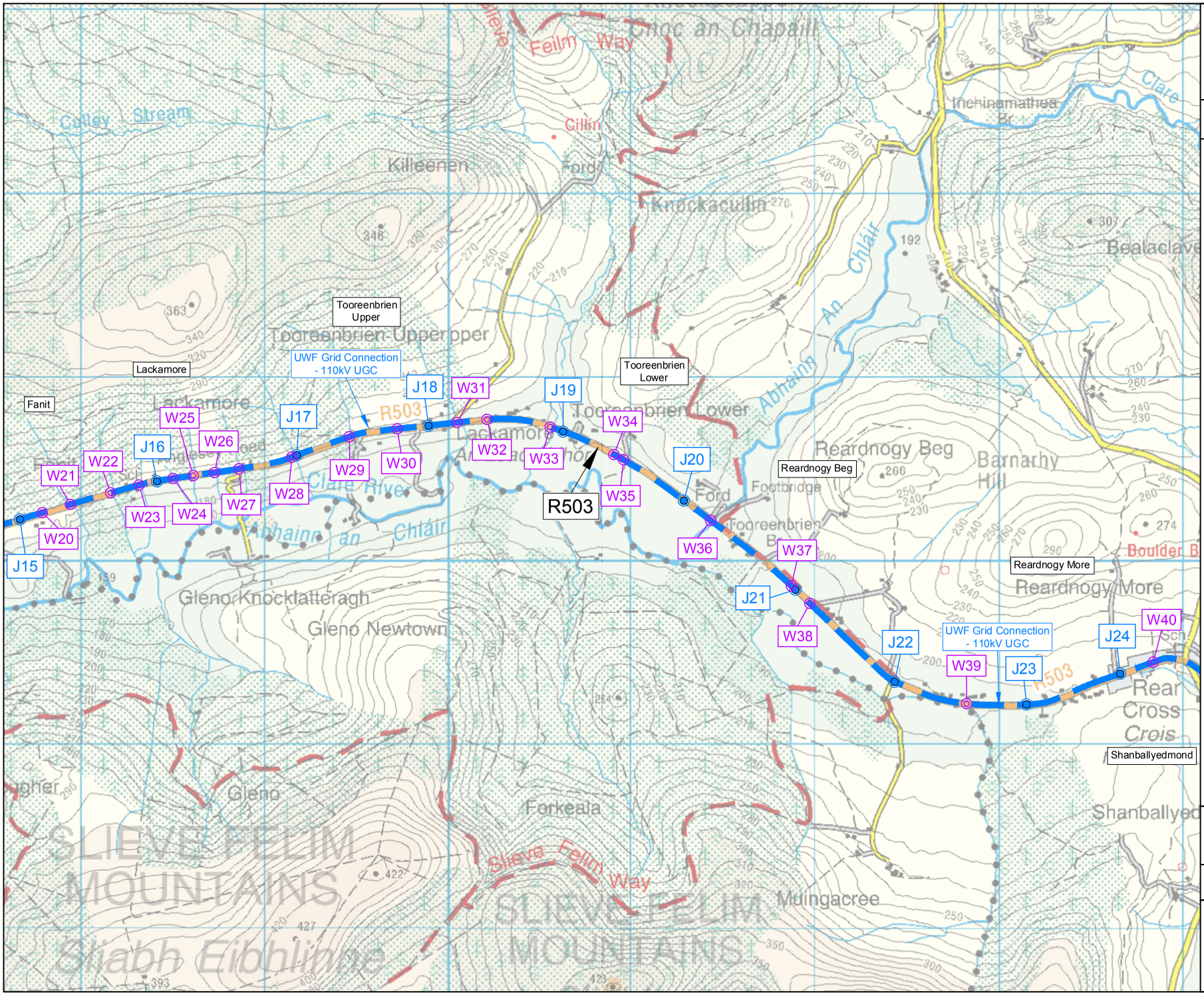

EMP: Main Plan

Figure EMP 3

Layout of the 110kV UGC outside of the Mountphilips Substation Site

Map Number:
Map 2 of 4

Legend:

- UWF Grid Connection - 110kV UGC
- W62 Watercourse Crossing Locations
- J16 Joint Bay Locations
- Coole Townlands

N

Project:

UWF Grid Connection (2019)

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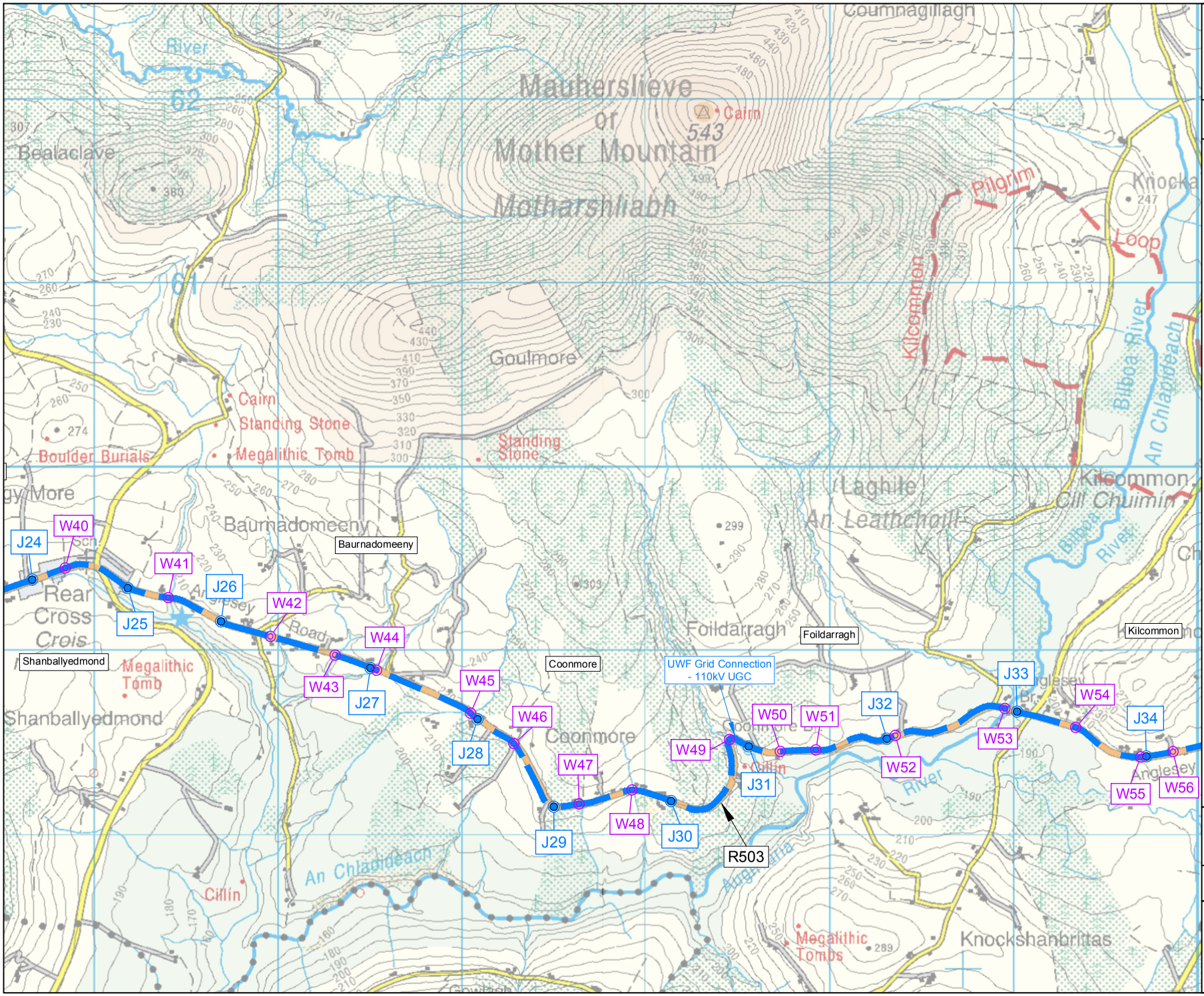

EMP: Main Plan

Figure EMP 3

Layout of the 110kV UGC outside of the Mountphilips Substation Site

Map Number:
Map 3 of 4

Legend:

- UWF Grid Connection - 110kV UGC
- W62 Watercourse Crossing Locations
- J16 Joint Bay Locations
- Coole Townlands

Project:

UWF Grid Connection (2019)

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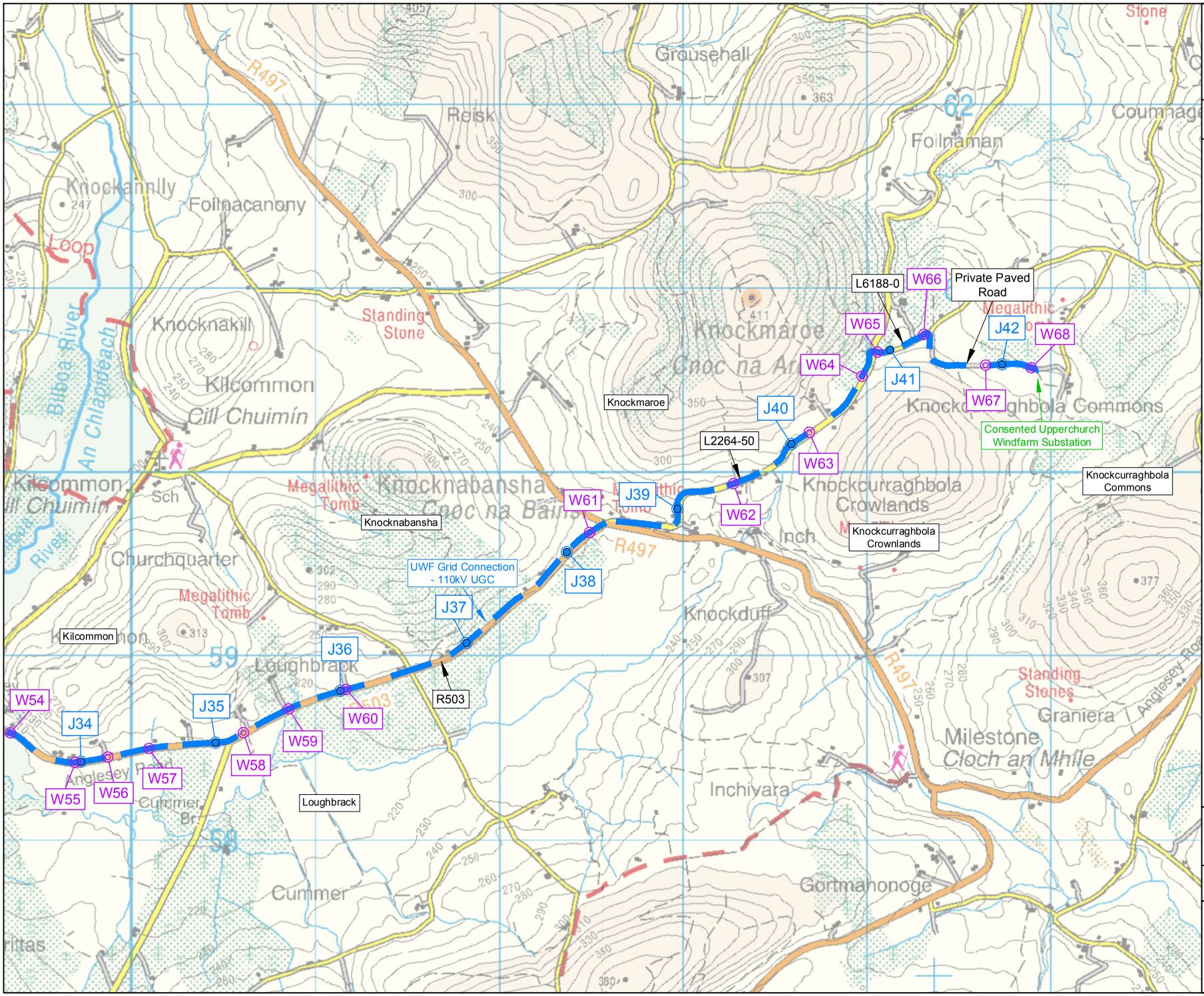

EMP: Main Plan

Figure EMP 3

Layout of the 110kV UGC outside of the Mountphilips Substation Site

Map Number:
Map 4 of 4

Legend:

- UWF Grid Connection - 110kV UGC
- W62 Watercourse Crossing Locations
- J16 Joint Bay Locations
- Coole Townlands

N

Project:

UWF Grid Connection (2019)

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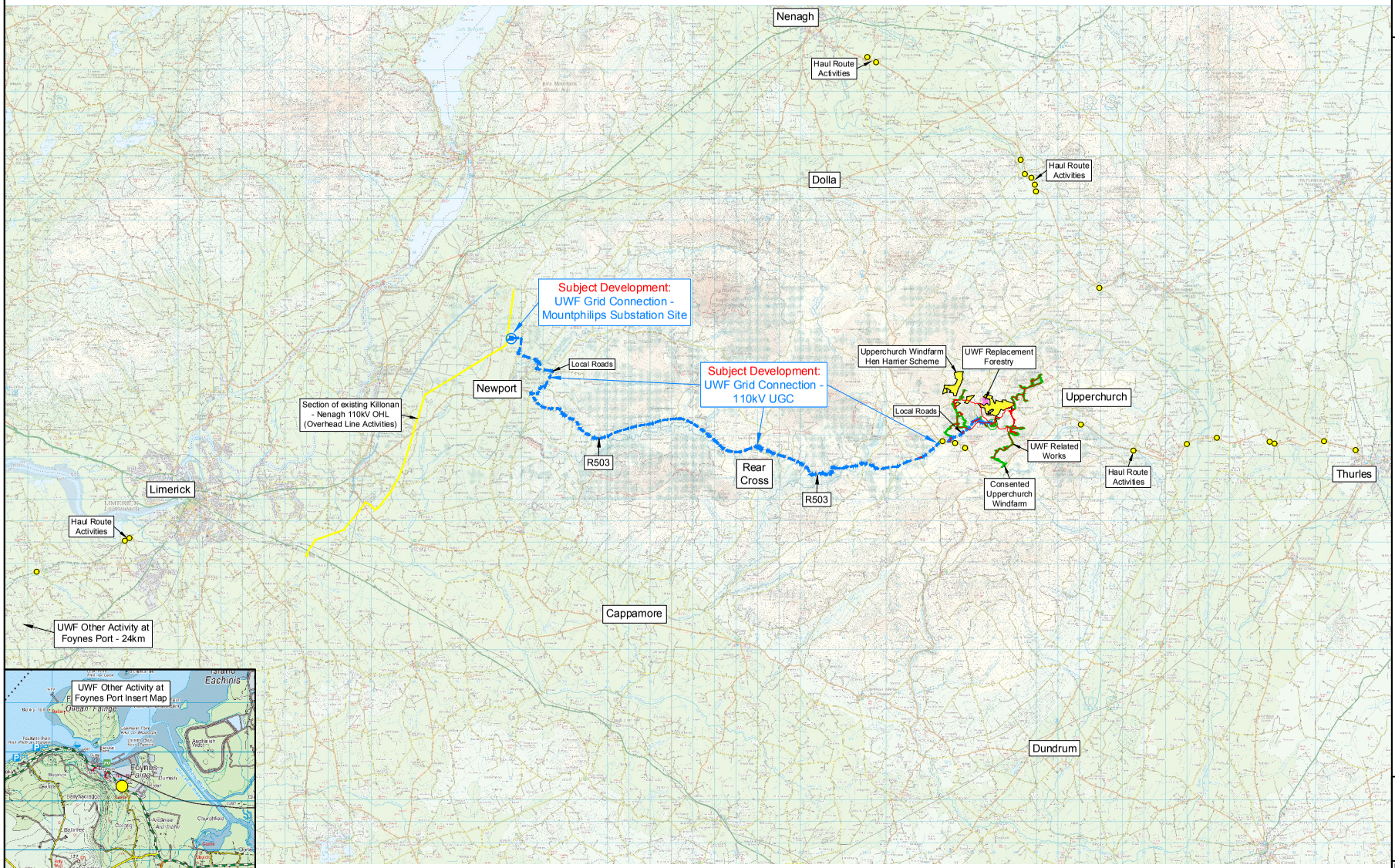
EMP: Main Plan

Figure EMP 4

Location of the UWF Grid Connection and the Other Elements of the Whole UWF Project on OSI Mapping

Map Number:
Map 1 of 1



Legend:

Subject Development:

- UWF Grid Connection - 110kV UGC
- UWF Grid Connection - Mountphilips Substation

Other Elements of the Whole UWF Project:

- UWF Related Works
- Upperchurch Windfarm
- UWF Replacement Forestry

UWF Other Activites

- Haul Route Activities
- UWF Hen Harrier Scheme
- Overhead Line Activities

N

Project:

UWF Grid Conenction (2019)

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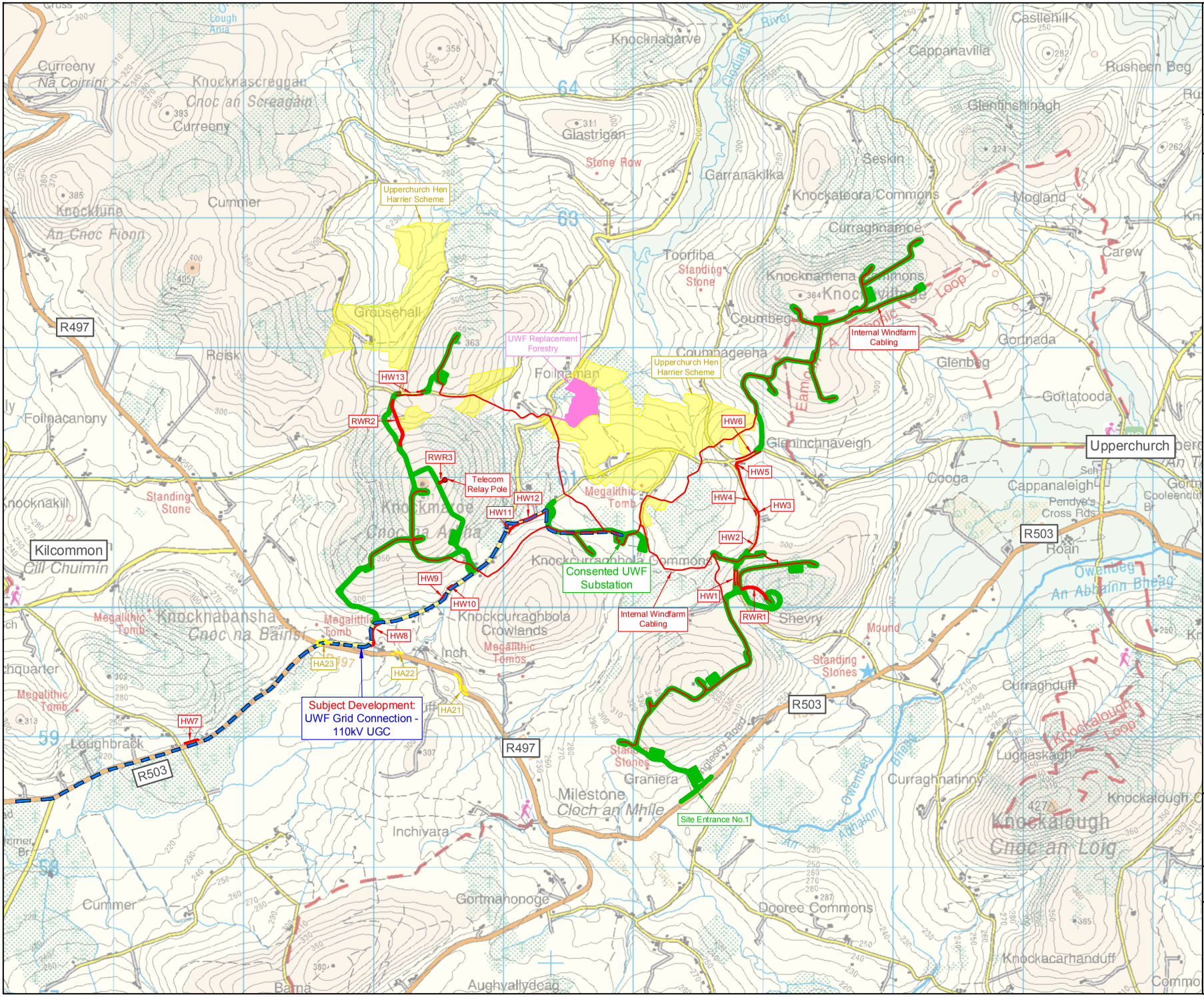

EMP: Main Plan

Figure EMP 5

UWF Grid Connection and the Other Elements of the Whole UWF Project in the vicinity of Upperchurch Windfarm

Map Number:
Map 1 of 1

Legend:

UWF Grid Connection:(Subject Development)

- UWF Grid Connection - 110kV UGC

UWF Related Works:

- 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

UWF Replacement Forestry:

- UWF Replacement Forestry

Upperchurch Windfarm:

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

UWF Other Activities:

- Haul Route Activities
- HA22 Haul Route Activities Number
- Upperchurch Hen Harrier Scheme
- R503 Regional Road Number

N

Project:

UWF Grid Conenction (2019)

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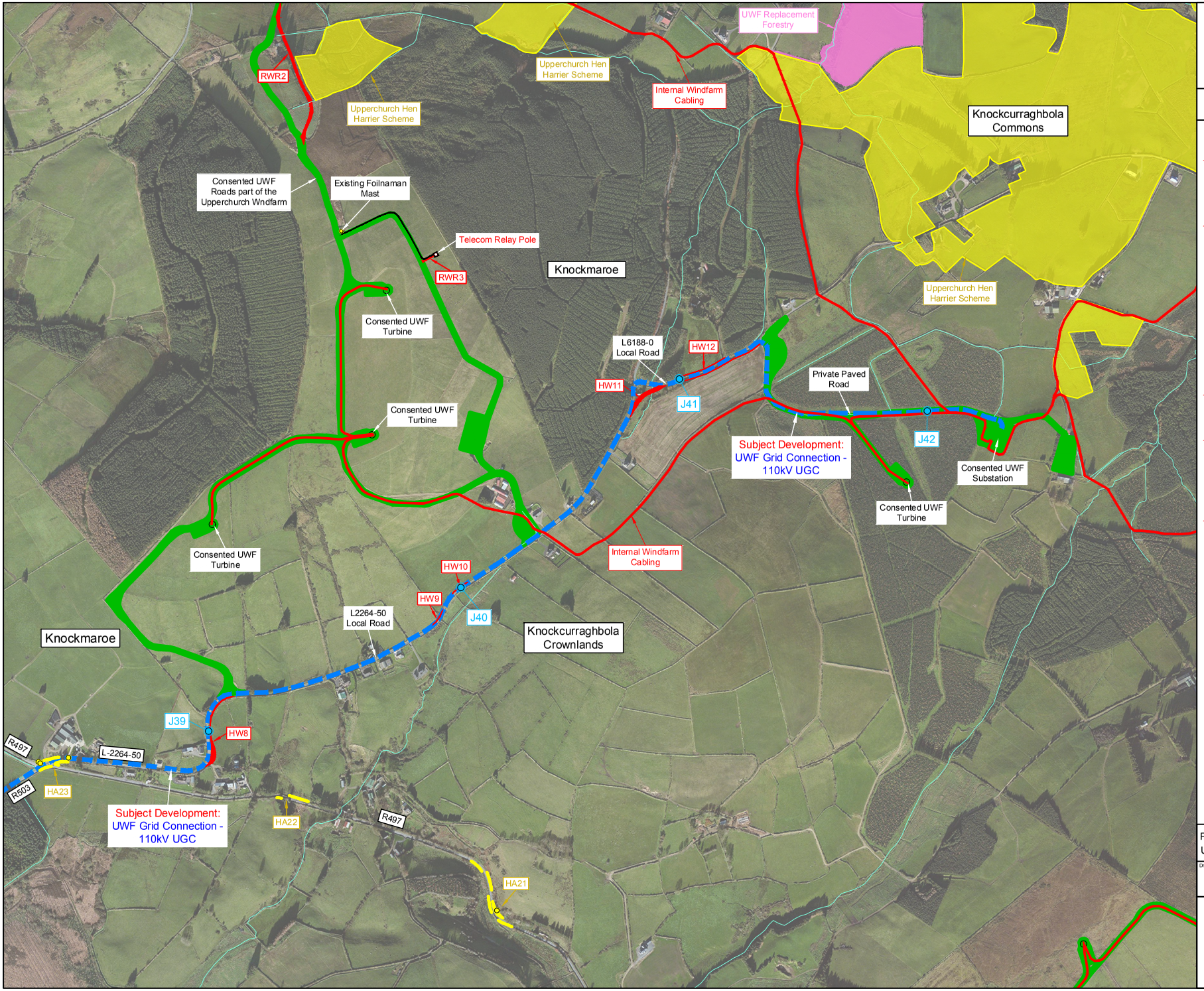

EMP: Main Plan

Figure EMP 6

UWF Grid Connection and the Other Elements of the Whole UWF Project in Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola Crownlands

Map Number:
Map 1 of 1

Legend:

UWF Grid Connection:(Subject Development)
- UWF Grid Connection
- J42 Joint Bay Location

UWF Related Works:
- Haul Route Works
- HW1 Haul Route Works Numbers (HW8 - HW12)
- Realigned Windfarm Road
- RWR1 Realigned Windfarm Road Numbers (RWR2 - RWR3)
- Internal Windfarm Cabling
- Telecom Relay Pole

UWF Replacement Forestry:
- UWF Replacement Forestry

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
- HA22 Haul Route Activities Number
- Upperchurch Hen Harrier Scheme

- Watercourse
- R503 Regional Road Number

N

Project:
UWF Grid Conenction (2019)

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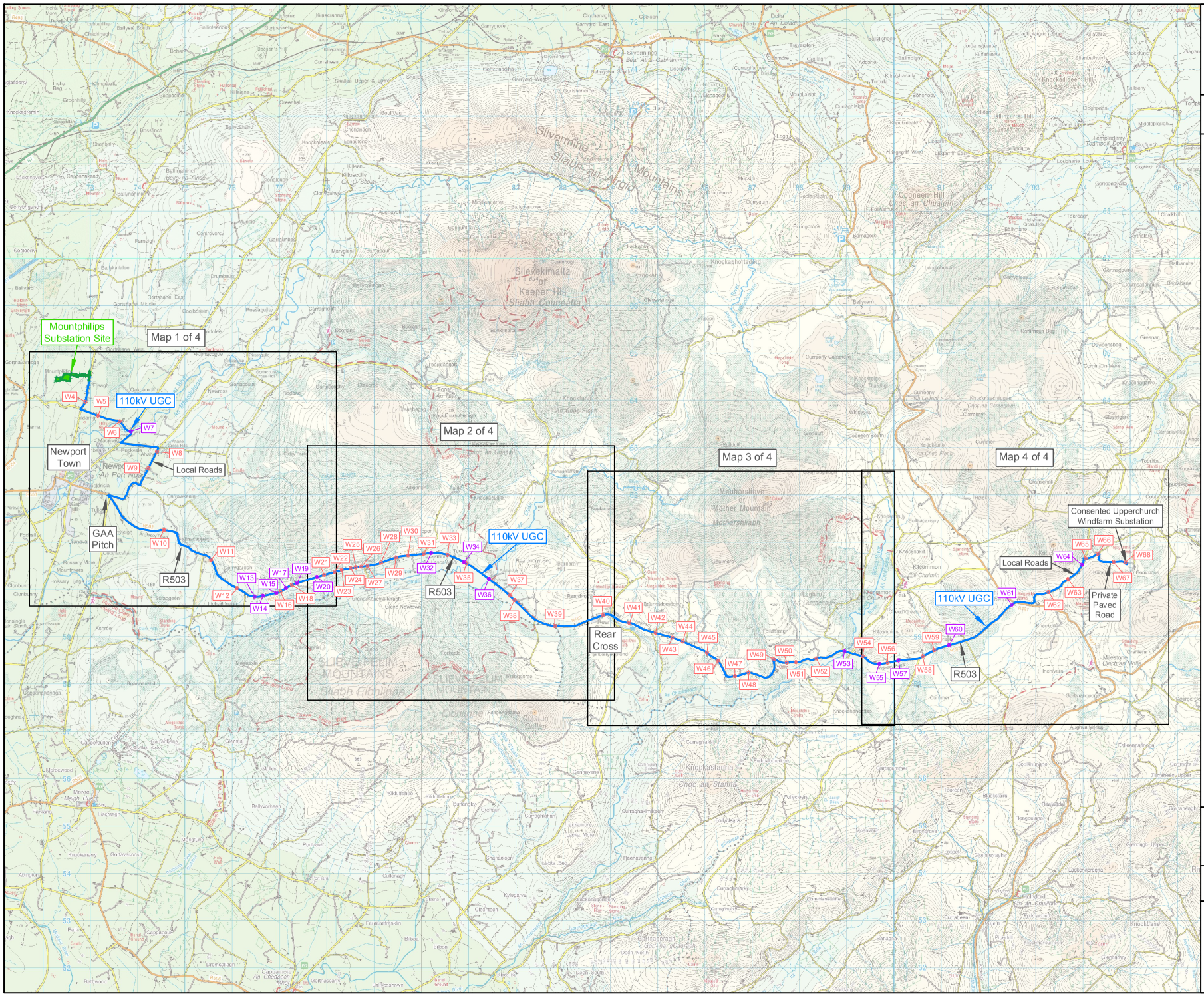

EMP: Main Plan

Figure EMP 7

Colour Coding and identification Numbers for UWF Grid Connection Works Area

Map Number:

Overview Map

Legend:

- Mountphilips Substation Site
- 110kV UGC - Cable Trench
- 110kV UGC - Bridge Works and Culvert Replacement Works (W14)
- 110kV UGC - Cable Trenching Over/Under the Other Existing Watercourse Crossings (W16)

N

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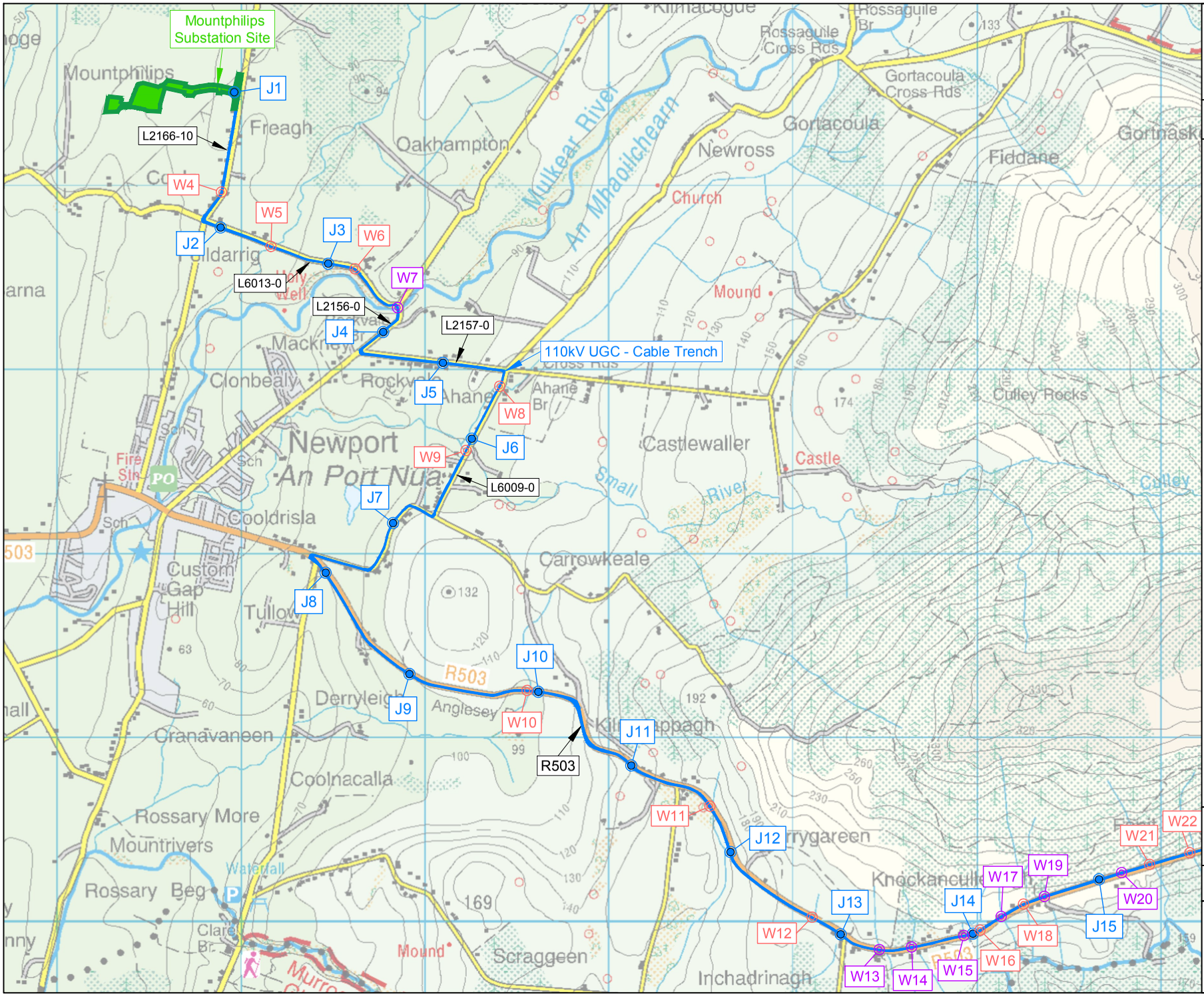

EMP: Main Plan

Figure EMP 7

Colour Coding and identification Numbers for UWF Grid Connection Works Area

Map Number:
Map 1 of 4

Legend:

- Mountphilips Substation Site
- 110kV UGC - Cable Trench and Joint Bay Works in Roads
- 110kV UGC - Bridge Works and Culvert Replacement Works
- 110kV UGC - Cable Trenching Over/Under the Other Existing Watercourse Crossings

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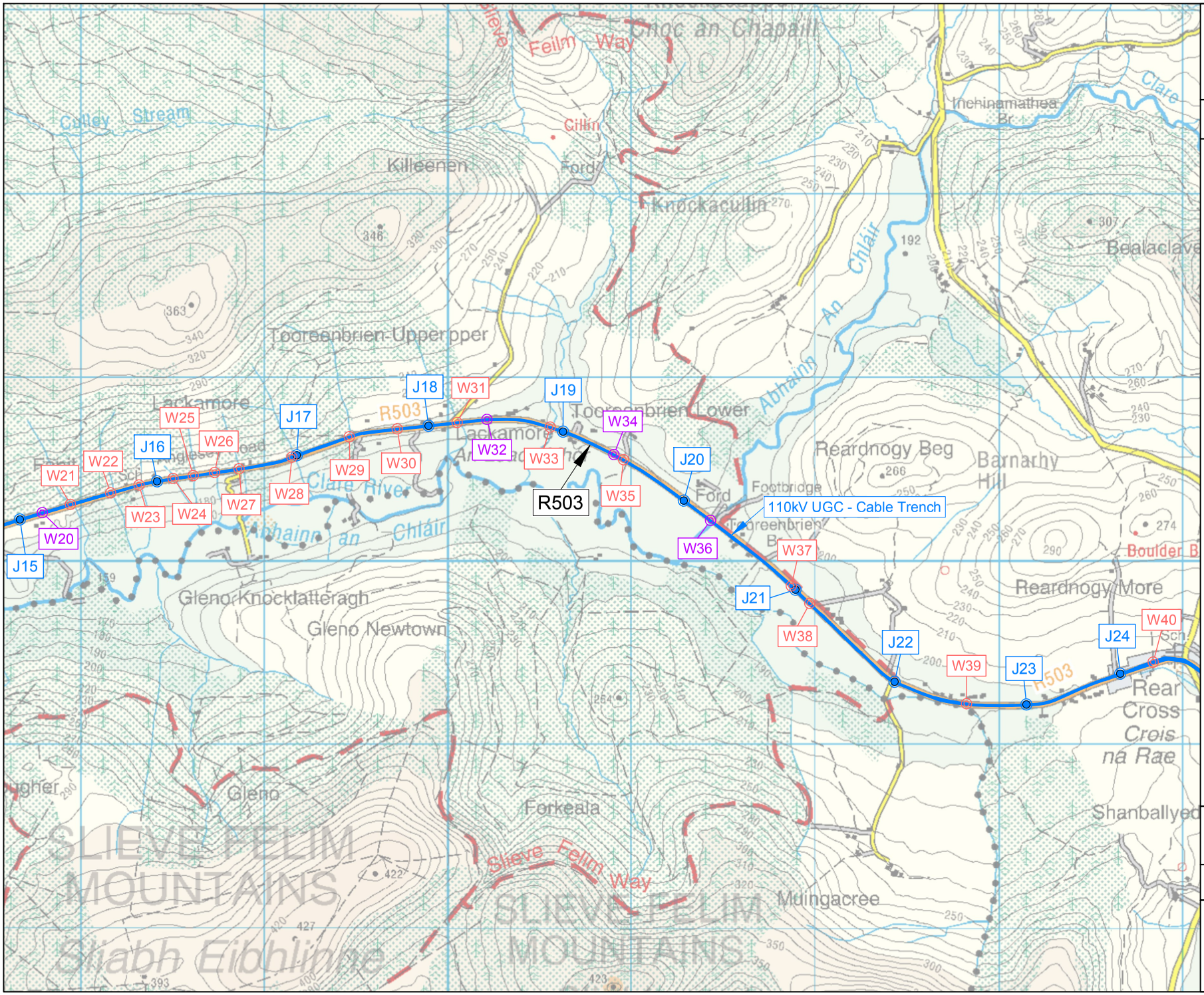

EMP: Main Plan

Figure EMP 7

Colour Coding and identification Numbers for UWF Grid Connection Works Area

Map Number:
Map 2 of 4

Legend:

- 110kV UGC - Cable Trench and Joint Bay Works in Roads
- 110kV UGC - Bridge Works and Culvert Replacement Works
- 110kV UGC - Cable Trenching Over/Under the Other Existing Watercourse Crossings

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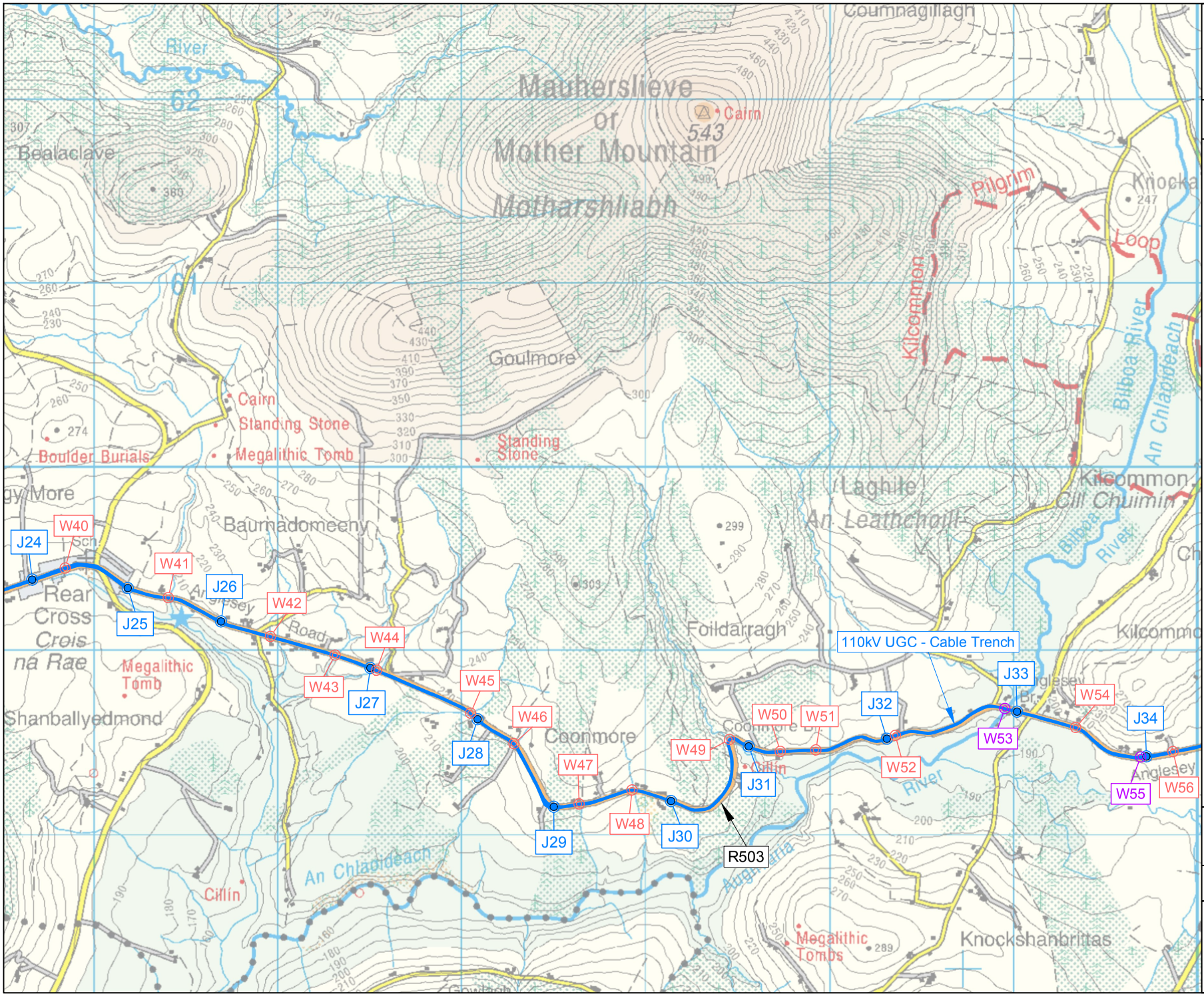

EMP: Main Plan

Figure EMP 7

Colour Coding and identification Numbers for UWF Grid Connection Works Area

Map Number:
Map 3 of 4

Legend:

- 110kV UGC - Cable Trench and Joint Bay Works in Roads (J16)
- 110kV UGC - Bridge Works and Culvert Replacement Works (W14)
- 110kV UGC - Cable Trenching Over/Under the Other Existing Watercourse Crossings (W16)

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UWF Grid Connection (2019)

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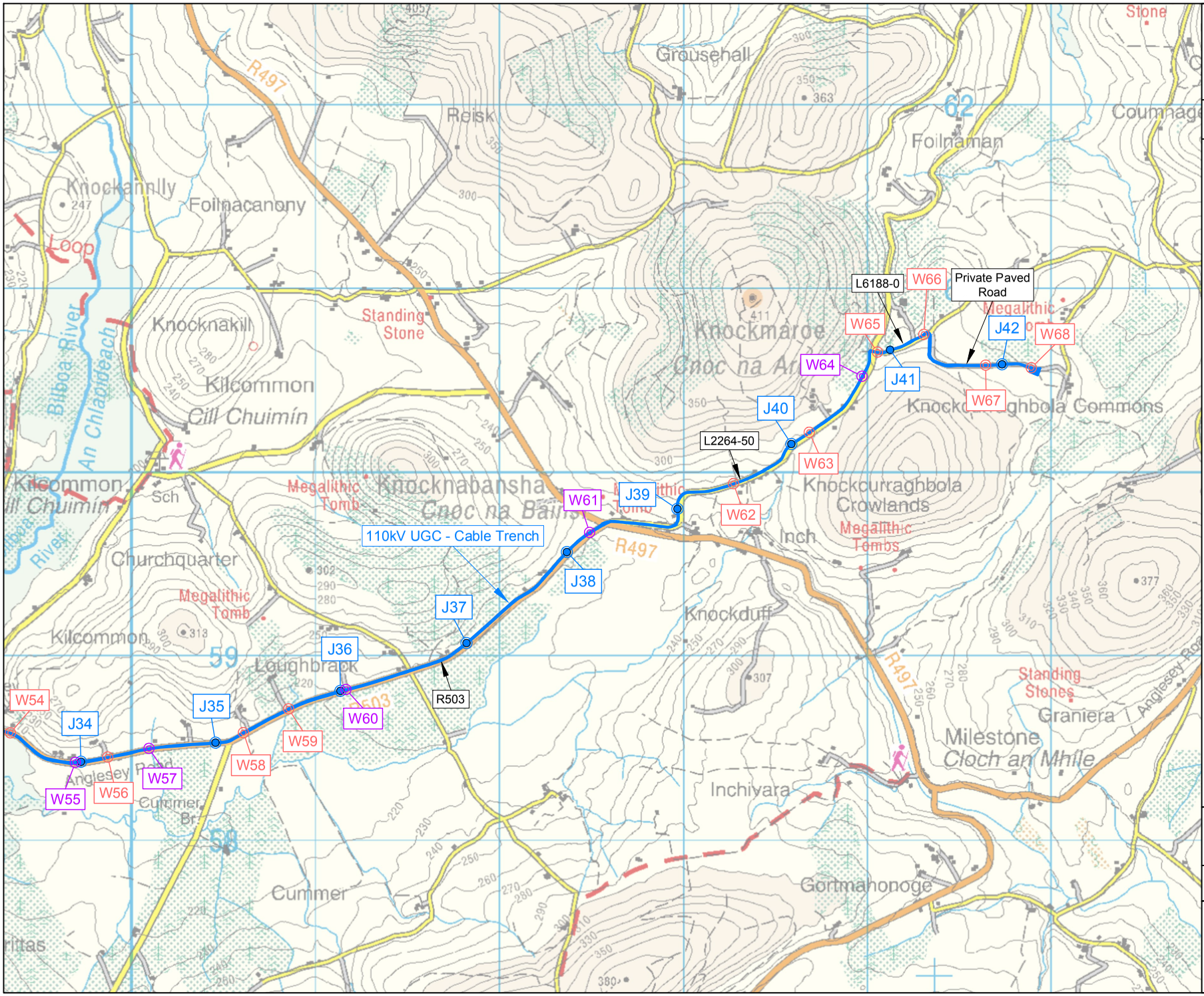

EMP: Main Plan

Figure EMP 7

Colour Coding and identification Numbers for UWF Grid Connection Works Area

Map Number:
Map 4 of 4

Legend:

- 110kV UGC - Cable Trench and Joint Bay Works in Roads
- 110kV UGC - Bridge Works and Culvert Replacement Works
- 110kV UGC - Cable Trenching Over/Under the Other Existing Watercourse Crossings

N

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UWF Grid Connection
Environmental Management Plan (2019)

Tab 1
Project Design Measures

ECOPOWER

October 2019

PD ID	UWF Grid Connection Project Design Measure (PD)
PD01	UWF Grid Connection construction works during the Hen Harrier breeding season (March to August inclusive) will only take place at the Mountphilips Substation Site; construction of the 110kV UGC between the Mountphilips Substation site and the Consented UWF Substation compound will be carried out during the months of September to February inclusive.
PD02	If works at Mountphilips Substation site 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 entire construction works area boundary. These surveys will be completed prior to the start-up of all construction activities. No works will take place within 2 km of any identified active Hen Harrier nest during the hen harrier breeding season.
PD03	Although no hen harrier roosts are currently known to occur within 1km of UWF Grid Connection, confirmatory surveys will be completed to record any roosting locations within 1km of UWF Grid Connection. Should a hen harrier roost occur within 1km of UWF Grid Connection works, then construction works within 1km of a roost will be limited to the period between 'one hour after sunrise' to 'one hour before sunset' during the Hen Harrier roosting season (October to February inclusive).
PD04	All construction works will be carried out during daylight hours.
PD05	At the Mountphilips Substation site, construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted. A speed limit of 25km/hr for all traffic/machinery will be implemented at the Mountphilips Substation site. Outside of Mountphilips Substation site, all construction will be restricted to the paved road surfaces or built surfaces along the 110kV UGC. A speed limit of 50km/hr for all delivery and construction traffic will be implemented on Local Roads ('L' roads).
PD06	Construction works will not be carried out within 150m of Rear Cross National School or Lackamore National School, during school hours. In addition, the project Community Liaison Officer will keep each school informed of construction timetables and scheduling.
PD07	110kV UGC construction works along the local roads L2264-50 and L6188-0, will not take place at the same time as the UWF Related Works Haul Route Works on these roads. The 110kV UGC construction works will also be scheduled so that the works do not occur on the same days as concrete deliveries for Consented UWF Turbines along these local roads.
PD08	Confirmatory consultations with Irish Water, Eir and ESB and review of all relevant infrastructure mapping before works, along with 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 banksman will accompany each excavator to oversee all excavation works.
PD09	Close contact with the local Newport Regional Supply office at Newross will be maintained by the Environmental Clerk of Works throughout the construction of the 110kV UGC. The Environmental Clerk of Works will keep the Newport Regional Water Supply office up-to-date with the location and schedule of works. To reduce risk of damaging water mains; pre-construction confirmatory surveys will be carried out, and excavations will be hand dug within 500mm of pipes. So that any damage (should it occur) can be fixed immediately, a supply of water mains repair materials will be kept at the Mountphilips Substation compound and at each works location on the public road network.
PD10	Flag-men will be used at 110kV UGC works locations on the public roads subject to one lane closures. These flagmen will control the movement of traffic on the public road, so that road users can continue to use the public road network in a in a safe and efficient manner. The works will be carried out according to the Traffic Management Plan for UWF Grid Connection. The Traffic Management Plan forms part of the Environmental Management Plan.
PD11	Construction works for the 110kV UGC in Knocknabansha, Knockmaroe, Knockcurraghbola Crownlands 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 where those works also occur within 350m.
PD12	As requested by the Roads Department of Tipperary County Council, during pre-planning consultations, the works along the public road network will be scheduled to minimise impacts on schools and local businesses. The works will be scheduled so that they do not disrupt or interfere with Tipperary County

PD ID	UWF Grid Connection Project Design Measure (PD)
	Council's road works programme on the R503 through Newport town.
PD13	As requested by the Roads Department of Tipperary County Council, during pre-planning consultations, the Promoter will fund the costs of Tipperary County Council engaging a chartered Civil Engineer to oversee quality control and compliance with drawings, specifications and road opening conditions for the duration of the works
PD14	All initial groundworks within 500m of an RMP or NIAH site, 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.
PD15	Where excavations occur at culvert replacement locations along the 110kV UGC, and at the 3 No. new watercourse crossing at the Mountphilips Substation site, excavations will be monitored by an appropriately qualified archaeologist under license from the National Monuments Service, the excavated material will be examined for any evidence of archaeological material and metal detected as part of a finds retrieval strategy.
PD16	No refuelling of plant or equipment will be permitted within 100m of identified water supply wells
PD17	At Mountphilips Substation, water for operational stage 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.
PD18	The new substation compound and the new permanent access road at the Mountphilips Substation site will have a permanent surface water drainage network in place which will include check dams. These check dams will allow the settlement of suspended solids in water runoff while also slowing down the rate of water run-off from these areas.
PD19	At Mountphilips Substation location, where dewatering of trenches or excavations is required, there will be no direct discharge of untreated 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 to the volume of water requiring treatment (if any) to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.
PD20	At Mountphilips Substation site, all excavated material will be removed for temporary or permanent storage at designated berms, which will be located more than 25m away from the watercourses on Mountphilips Substation site. All storage berms will be graded and sealed following emplacement. The berms will be covered if there is a risk of erosion. Temporary silt control methods such as silt fencing will be placed around all overburden storage areas. The existing vegetative buffer between the berms and the nearest watercourses will be maintained and no works will occur in the buffer zone.
PD21	At Mountphilips Substation site, the permanent storage berms will be along the new access road and around the substation compound will be planted with local provenance native fruiting hedge species, with grasses and native flower species common to the surrounding vegetation sown along the sides of the berms. Local provenance native wildflower seed of flowering plants like clovers, vetches and knapweed will be included. Revegetation works will take place at the soonest practicable opportunity after emplacement.
PD22	Outside of the Mountphilips Substation site, there will be no storage of overburden and all excavations from road trenches will be removed to licensed waste facilities in accordance with the UWF Grid Connection Waste Management Plan. Loads of excavated material will be covered during transportation to prevent spillages of excavated material.
PD23	All Joint Bays for the 110kV UGC will be located at least 50m from a Class 1 or Class 2 watercourse and at least 25m from Class 3 or Class 4 watercourses.
PD24	Outside of the Mountphilips Substation site, where dewatering of trenches or excavations is required for the 110kV UGC, there will be no direct discharge of treated water into any watercourse or drain. Rather

PD ID	UWF Grid Connection Project Design Measure (PD)
	all pumped water will be treated using a mobile water treatment train and then discharged via a silt bag to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.
PD25	Construction works along the 110kV UGC route will cease during heavy or prolonged rainfall events, and any open trenches or excavations will be covered. Use of weathering forecasting will be undertaken in advance of works.
PD26	A phased approach will be undertaken in relation to excavations, excavation dewatering and any culvert replacement works, where these works occur within 50m of a watercourse. The phased approach will only permit one of main potential sediment producing activities (i.e. excavations, excavation dewatering or culvert replacement works), to be carried out within 50m of a watercourse, at any one time.
PD27	At Mountphilips Substation site, works within 50m of watercourses, 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.
PD28	Along the 110kV UGC on the public road, where works will take place within 50m of a watercourse, additional mitigation measures will be implemented which include silt fencing and placement of sandbag arrangements along preferential surface water flowpaths on the road pavement. Following works on any particular section, any works debris will be removed from the road before the sandbags and silt fences are removed.
PD29	Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff. None of these 110kV UGC sections are within the Lower River Shannon SAC.
PD30	Lines of silt fencing and sandbags will be erected along the edge of the road so that surface water runoff from adjacent construction works areas is captured and directed to the excavated trench, where it can be pumped and treated before being released, as per PD24.
PD31	Works to bridge parapet walls at watercourse crossings W7, W36, W53 will be carried out during dry weather, and debris netting will be fixed to the outside of the walls in order to prevent any debris falling into the watercourse below.
PD32	At Mountphilips Substation site, instream construction works at the watercourse crossings W1, W2 and W3 will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). 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 margins to stabilise banks, add flood protection and provide riparian buffer; and the use of deflector plates during the restoration of flow. Instream works at W1, W2 and W3 at the Mountphilips Substation site will be undertaken during dry weather within the IFI instream works window (July – September inclusive). As per PD41, instream works at W1, W2 and W3 will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed. Although intended for the purpose of the WFD, this measure will also indirectly contribute to downstream water quality protection in the SAC.
PD33	All new permanent watercourse culverts at the Mountphilips Substation site and any replacement culverts along the public road for the 110kV UGC will be sized to cope with a minimum 100-year flood event.
PD34	Only precast concrete culverts or structures will be used at the watercourse crossing locations at Mountphilips Substation site and for any culvert replacements along the 110kV UGC. Only precast

PD ID	UWF Grid Connection Project Design Measure (PD)
	concrete chambers will be used at Joint Bay locations. No batching of wet cement will take place on-site.
PD35	Concrete pours will be required for the 110kV UGC cables trench. Only chutes will be washed out at the works locations into the cable trench, with the washout of the tank taking place at the concrete supplier depot. Concrete chute washouts within the SAC boundary will take place into designated bins for removal to the designated concrete wash settlement pond at the Mountphilips Substation site.
PD36	The sections of 110kV UGC trenches that overlap the Lower River Shannon SAC will be lined with an impermeable geotextile material to prevent potential migration of cement from the trench base or sides into the SAC.
PD37	In addition to PD22, there will be no storage of overburden within the Lower River Shannon SAC.
PD38	110kV UGC works outside of Mountphilips Substation site will be carried out entirely on paved roads and where the 110kV UGC crosses watercourses, the works will be carried out over the existing bridges and over/under existing culverts. No in-streams works are proposed at any watercourse crossing points (including the Newport River and Bilboa River crossings) within the boundary of the Lower River Shannon SAC and therefore there will be no placement of cement or other materials within the river channels or on the river banks within the SAC.
PD39	In addition to PD42, there will be no refuelling of vehicles or plant, no storage of fuels and no overnight parking permitted within 100m of the boundary of the Lower River Shannon SAC.
PD40	In addition to PD29, all 110kV UGC works within the boundary of the Lower River Shannon SAC will only be completed during dry weather in the dryer months of the year – i.e. February to September included.
PD41	The instream works at W1, W2 and W3 at Mountphilips Substation site, and the culvert replacement works at the 13 existing culverts on the public road, and all works (including concrete placement) within the boundary of the Lower River Shannon SAC, will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice Measures are followed.
PD42	There will be no refuelling of vehicles or plant permitted within 100m of a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
PD43	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 at the Mountphilips Substation site. All fuel will be stored in bunded, locked storage containers. The designated storage location will be greater than 100m from a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored at the designated location in the temporary compound and all operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
PD44	Overnight parking of plant and machinery will only be permitted at the temporary compound at the Mountphilips Substation site and at a distance greater than 50m from watercourses.
PD45	The horizontal directional drilling works at W8 and W9 will be carried out by an experienced Drilling Contractor and supervised and managed by a competent and experienced Mud Engineer who understands the technicalities and challenges of drilling works. The Mud Engineer will advise the Construction Manager on the selection of competent drillers for the HDD works; monitor the watercourse bed during drilling works, and will supervise the drilling works including the drilling pressures and the implementation of any contingency measures. From a surface water quality protection perspective, the area around the launch/reception pit, bentonite batching, pumping and recycling plant will be bunded using appropriate terram geotextile and/or sandbags in order to contain any spillages. Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area. Spills of drilling fluid will be cleaned up immediately and stored in an adequately sized water tight skip before being taken off-site to a suitably licensed waste facility. In the event of a break-out occurring, the Environmental Emergency Response Procedure for Frac-Out will be implemented which includes the

PD ID	UWF Grid Connection Project Design Measure (PD)
	following contingency measures; In the event of break-out occurring in the river bed, the rig will immediately shut off the pumps and the drilling assembly will be pulled off to reduce annular pressures; In the event of break-out on the road an excavator will be available to dig a pit to contain fluid with vacuum trucks/pumps available to transfer drill fluid from the containment point back to the recycling point; and in either scenario, drilling fluid additives designed to plug the formation will be introduced to the circulation system and let set. Environmental Emergency Response Procedures are included in the UWF Grid Connection Environmental Management Plan (see Volume D).
PD46	All construction works will be monitored on a daily basis by the Environmental Clerk of Works and by members of the Environmental Clerk of Works team (for example Site Ecologist) as required, for compliance with the Environmental Commitments, which include the Project Design Measures, as per the UWF Grid Connection Environmental Management Plan (see Volume D).
PD47	Surface water quality monitoring of the main watercourses downstream of the works will be carried out to ensure that the downstream water quality status in the receiving water is maintained and that there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009. Where non-compliance in water quality is measured or recorded, works will stop until the issue is resolved. The surface water monitoring locations and sampling programme are defined in the Surface Water Management Plan for UWF Grid Connection. The Surface Water Management Plan is part of the UWF Grid Connection Environmental Management Plan (see Volume D).
PD48	The new permanent cross structures at the Mountphilips Substation site and the replacement culvert at W14 along the R503 will be bottomless or clear spanning.
PD49	In-stream works at Mountphilips Substation site and culvert replacement works at W14 along the R503 Regional Road will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
PD50	Culvert replacement works along the 110kV UGC will not be undertaken without isolation of flow within the watercourse. Isolation of flow will be achieved through the use of sandbags filled with clean, washed sand. Any fish within the isolated section will be removed prior to works commencing. This will require the engagement of licensed fisheries personnel to deplete the works area 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 using a flume (pipe), with deflector plates used on the downstream side of the flume to reduce the hydraulic power of the water. Construction works at the crossing will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilization measures, reinstatement of bank slope and character; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and the use of deflector plates during the restoration of flow. As per PD41, culvert replacement works will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed. These measures will ensure that the baseline character is maintained and will ensure that a deterioration in morphology is avoided, as required under the Water Framework Directive. This in turn will protect Aquatic Ecology.
PD51	The sections of the 110kV UGC trench within the R503, in the central part of the 110kV UGC where the adjacent lands comprise predominantly peaty soils, will be lined with a geotextile membrane which will provide support to the cables trench and the road structure.
PD52	Confirmatory surveys for active Otter holts and breeding activity will be carried out 150m upstream and downstream of watercourse crossing locations including those watercourses evaluated as unsuitable for Otter in the current appraisal.
PD53	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 and outside of 1 hours after sunrise or before sunset during winter.

PD ID	UWF Grid Connection Project Design Measure (PD)
PD54	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 breeding females or cubs are present in the holt and NPWS will be notified immediately
PD55	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 will not take place within 15m of such holts, except under license.
PD56	The prohibited area associated with otter holts, should they be located in confirmatory surveys, will, where appropriate, be protected from any inadvertent disturbance from any works or personnel occurring nearby such as at a bridge and declared as 'Ecology Restriction Zone' with no mention of otters to any onsite staff. Appropriate awareness of the purpose of the excluded area will be conveyed through toolbox talks with site staff and sufficient signage will be placed on each possible access point. All contractors or operators on site will be made fully aware of the procedures pertaining to Ecology Restriction Zones 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.
PD57	All excavation works will take place in line with protective measures required to avoid damage to trees during the construction phase of road projects, as stipulated in the NRA document 'Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub prior to, during and post construction of National Road Schemes'. This will include consultation with a qualified arborist, where appropriate to ensure works within the Root Protection Area (RPA) avoid any significant damage to tree roots. Exposed tree roots will be protected where required and excavation methods will be appropriately undertaken so as to avoid damage to RPA's. All excavation works in the RPA will be overseen by the Project Ecologist.
PD58	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. This includes hedgerow and scrub removal in addition to hedgerow trimming.
PD59	Works will not take place at any bridge during the Dipper breeding season (Feb-June inclusive) without a confirmatory survey to determine Dipper presence or absence. If Dippers are present, where possible works will not proceed until breeding has completed. All works at these and other bridges will be overseen by a project ecologist to ensure the requirements of the Wildlife Acts are being met. During culvert replacement works at W13, a Dipper nest box will be fitted to the new crossing structure. Additional nest boxes (c.10) will be provided for Dipper at suitable bridges to provide a net gain for this species.
PD60	Where works will be carried out at parapet walls, no works will take place between the period April-August without confirmatory survey as to the presence or absence of breeding Grey Wagtail. If breeding Grey Wagtail is present, then works will be overseen by a suitably qualified ecologist to ensure no effects occur to Grey Wagtail present in adherence to the requirements of the Wildlife Act. Works at all bridges will be overseen by the project Ecologist. Nest boxes (c.10) will be provided for Grey Wagtail at suitable bridges to provide a net gain for this species.
PD61	Works will not take place at any bridge during the Kingfisher breeding season (March to July inclusive) without a confirmatory survey to determine the presence of nesting Kingfisher within 150m upstream or downstream of the bridge. If nesting Kingfishers are present, works will not proceed until breeding has completed.
PD62	All bridges/structures where works are proposed will be subject to confirmatory surveys for General breeding birds prior to works commencing. All works will be supervised by the project Ecologist.
PD63	All construction works will be carried out during daylight hours. Security lighting will be used at the temporary compound at Mountphilips Substation site. 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.
PD64	Tree felling only pertains to the Mountphilips Substation site. Confirmatory surveys will be carried out at all trees that will require felling or other major modifications (e.g. removal of rotten branches) in order to confirm the findings of the 2016 / 2017 surveys regarding the suitability of the trees for roosting bats.

PD ID	UWF Grid Connection Project Design Measure (PD)
	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.
PD65	While it is not expected that any trees with high suitability for roosting bats will be felled, the following measures will be implemented where a tree with moderate or high bat suitability is to be felled: a presence/absence bat surveys will be carried out; 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; and 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. Bat boxes will be placed on an exposed section of tree trunk at a minimum height of 4-5m, providing a clear space in front of the box for bats to enter and exit. Boxes will be placed in locations that will receive at least 6-7 hours of sunlight during summer months, and will be placed on the southern side of the tree. The Project Ecologist will supervise the installation of bat boxes in order to ensure that they are sited appropriately.
PD66	All bridges of moderate suitability for bats will be subject to a confirmatory survey prior to the commencement of construction works. Bridges of negligible or low suitability do not need to be surveyed, but this will be reviewed by the Environmental Clerk of Works and Project Ecologist. If a bat roost is found, the Project Ecologist will review the proposed works at that bridge, and determine whether there could be a risk of impacts on the roost. If there is a risk of impact on a bat roost in a bridge, the Project Ecologist will develop a case-specific mitigation strategy and apply to the NPWS for a derogation licence. Bats will be excluded from the bridge for the duration of construction works (typically only a few days), and replacement roosting opportunities (i.e. wall-mounted bat 'tubes' or boxes) will be provided at a suitable location nearby. When construction work is complete, bats will be able to return to their former roosting site.
PD67	No badger setts were recorded within 50m of the UWF Grid Connection during pre-planning surveys. Confirmatory surveys will be carried out within 50 m of either side of the construction works area boundary 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. Should a badger sett be confirmed, the following measures will be implemented: NWPS will be notified immediately of any new active setts which are 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); No construction works will be carried within 50m of an active badger sett during the main breeding season (December 1st to June 30th); and Construction activity in the environs of an 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 will not take place within 10m of sett entrances.
PD68	As amphibians and reptiles will use brash piles for refuge and hibernation, all logs/brash created from hedgerow/tree removal at the Mountphilips Substation site will be removed off site immediately to prevent disturbance to amphibians/reptiles which may use brash piles if left in situ.
PD69	All covering of vegetative invasive knotweed infestations with high density polyethylene grass carpet terram will take place, at all identified locations prior to any works commencing on UWF Grid Connection or any other element of the Whole UWF Project. The covering of infestations will be completed on sections seven days in advance of works occurring on those sections. The infestations will be covered so that their full extent plus 1 metre is covered entirely and no vegetation is visible. The covering of these infestations will only be carried out under the direct supervision of an ecologist with prior experience of this type of work i.e. this work cannot be carried out by any general construction staff. No posts will be used to secure the coverings i.e. there will be no ground interference during any of these operations.

UWF Grid Connection

Environmental Management Plan (2019)

Tab 2

Traffic Management Plan

ECOPOWER

October 2019

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LIST OF FIGURES

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

LIST OF TABLES

Traffic Management Plan

1.1 Introduction

This Traffic Management Plan (TMP) will be a key construction contract document, the implementation of which will reduce the potential for impacts to Public Roads and to Road Users which may occur due to the presence of construction traffic.

1.1.1 Objective of the Traffic Management Plan

The objective of this preliminary Traffic Management Plan (TMP) is to control and minimise the traffic impacts of construction insofar as it may affect the road network, local residents and the travelling public on the public roads close to and adjacent to the UWF Grid Connection construction site, through measures to maximise road safety while keeping traffic flowing as freely as possible.

1.1.2 Scope of TMP

This TMP **concentrates on the construction stage** of the UWF Grid Connection which is the critical phase in the context of safe and effective traffic management on the public roads and describes the traffic management for the transportation of construction materials and personnel along the public road network.

This TMP details the traffic management measures to be undertaken on the public roads;

- at and on approach to road works locations;
- at and on approach to the site entrance on the L2166-10 at Coole for the Mountphilips Substation, temporary compound and construction works at the Mountphilips Substation site;
- along local roads on the routes of concentrated construction traffic;
- on the R503, at and on approach to the junction of the local roads (routes of concentrated construction traffic) with the R503
- at any points along the route where road repairs are required following completion of the works.

Control measures for traffic management at off-road construction works locations (i.e. within the Mountphilips Substation site) are outside the scope of this TMP and will be included in the Risk Assessment and Method Statements (RAMS) for the construction stage, which will be developed by the PSCS for the Appointed Contractor prior to the commencement of construction works.

The operational stage of the UWF Grid Connection is also outside the scope of this TMP. In contrast to the construction stage, negligible traffic is associated with the operational stage of the UWF Grid Connection. Operational traffic will involve a monthly site visit by ESB Personnel to the Mountphilips Substation, along with annual maintenance at the Substation. Along the route of the 110kV Underground Cables, a yearly inspection will be carried out by an ESBN team who will travel along the route in a short vehicle – most likely a van. In total c.17 trips per year are expected for routine maintenance of the UWF Grid Connection. Very occasional maintenance or repair work may be required along the UWF Grid Connection route to replace a damaged cable section, this would require the delivery of an excavator and/or new cables and a cable pulling machine to some joint bay locations. Traffic management for the operation of UWF Grid Connection will be incorporated into the ESB Networks safe system of work.

1.1.3 Responsibilities

This TMP will be updated from time to time to include any relevant planning conditions in addition to any new information on 3rd party road works or events, which could affect the timing, route or control measures for construction material deliveries.

The Appointed Contractor will be responsible for carrying out and managing the construction activities in accordance with the TMP.

The Environmental Clerk of Works will be responsible for monitoring the compliance with the TMP throughout the construction stage, through weekly auditing and point of interest inspections.

The Community Liaison Officer will be responsible for communicating with the local community and wider public during the construction stage, including keeping the local community informed of project progress and any construction activities which may cause inconvenience to them. Contact will be maintained with local residents on the day-to-day timing of, and traffic arrangements around, road works.

1.2 Overview of the proposed UWF Grid Connnection project

UWF Grid Connection, comprises the following elements:

- A new 110kV electrical substation at Mountphilips townland (to be called Mountphilips Substation)
- A new 110kV underground electrical cable connecting the Mountphilips Substation to the consented UWF substation (to be called Mountphilips – Upperchurch 110kV UGC or 110kV UGC), and
- ancillary works, which include a new permanent access road, a permanent site entrance and temporary site compound at the Mountphilips Substation site.

The layout of the UWF Grid Connection is illustrated on Figure TMP 1: Location of the Grid Connection on OSI Discovery Mapping, which is included at the end of this plan (Section 1.6).

The purpose of UWF Grid Connection is to connect the Consented UWF Substation at Upperchurch Windfarm (UWF) to the proposed Mountphilips 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.

This Traffic Management Plan forms part of the UWF Grid Connection Environmental Management Plan, which is appended to the UWF Grid Connection EIA Report (2019). The characteristics of the UWF Grid Connection are described in more detail in the EIA Report, see Chapter 5: Description of Development (UWF Grid Connection), in Volume C2 EIAR Main Report.

1.3 Overview of the Construction Stage of the UWF Grid Connection

1.3.1 Construction Process

The construction process for the UWF Grid Connection, is a relatively straightforward civil build. A number of separate dedicated 'crews' will work on different parts of the UWF Grid Connection. The workers will arrive and depart daily to and from the temporary construction compound at Mountphilips Substation site, parking spaces will be provided at the Temporary 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 Temporary Compound 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.

1.3.2 Duration & Timing

The duration and timing of the main civil and electrical construction activities for the construction of UWF Grid Connection is expected to take 12 to 18 months, and is projected to commence in 2020/2021.

The actual duration of works 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.

1.3.3 Construction Hours of Work

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

1.3.3.1 Scheduling of Works

Scheduling of Works requirements main arise from the Project Design Measures (PDs). The Scheduling of Works PDs relevant to traffic management are listed below. This list will be updated with any further scheduling requirements of planning conditions or road opening licences.

- PD04: All construction works will be carried out during daylight hours.
- PD06: Construction works will not be carried out within 150m of Rearcross National School or Lackamore National School, during school hours. In addition, the project Community Liaison Officer will keep each school informed of construction timetables and scheduling.
- PD07: 110kV UGC construction works along the local roads L2264-50 and L6188-0, will not take place at the same time as the UWF Related Works Haul Route Works on these roads. The 110kV UGC construction works will also be scheduled so that the works do not occur on the same days as concrete deliveries for Consented UWF Turbines along these local roads.
- PD10: Flag-men will be used at 110kV UGC works locations on the public roads subject to one lane closures. These flagmen will control the movement of traffic on the public road, so that road users can continue to use the public road network in a in a safe and efficient manner. The works will be carried out according to the Traffic Management Plan for UWF Grid Connection. The Traffic Management Plan forms part of the Environmental Management Plan.
- PD11: Construction works for the 110kV UGC in Knocknabansha, Knockmaroe, Knockcurraghbola Crownlands 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 where those works also occur within 350m.

- PD12: As requested by the Roads Department of Tipperary County Council, during pre-planning consultations, the works along the public road network will be scheduled to minimise impacts on schools and local businesses. The works will be scheduled so that they do not disrupt or interfere with Tipperary County Council's road works programme on the R503 through Newport town.

1.3.4 Road Works Locations

Road works will be required along the 110kV UGC where the route is aligned along the public road network. In total the 110kV UGC is routed along 8 no. public roads, as described in Table 1.

Table 1: Road Works associated with UWF Grid Connection

Road No.	Location	Extent of trenching	Duration of Road Works	Traffic Management
L2166-10	Coole / Freagh	0.7km	2 weeks	One lane closure
L6013-0	Foildarrig / Oakhampton	1.2km	3 weeks	Road Closure
L2156-0	Rockvale / Mackney (O'Brien)	0.4km	1 week	One lane closure
L2157-0	Mackney (Bourke) / Ahane / Newross	0.8km	2 weeks	One lane closure
L6009-0	Castlewaller / Carrowkeale / Derryleigh	1.8km	1 month	Road Closure
R503	Tullow / Cooldrisla, Kilnacappagh / Scraggeen / Derrygareen, Inchadrinagh / Knockancullenagh Inchadrinagh / Fanit Inchadrinagh / Lackamore Inchadrinagh / Tooreenbrien Upper Inchadrinagh / Tooreenbrien Lower Inchadrinagh / Reardnogy Beg Inchadrinagh / Reardnogy More Inchadrinagh / Shanballyedmond Inchadrinagh / Baurnadomeeny, Coonmore Inchadrinagh / Foildarragh Inchadrinagh / Kilcommon, Loughbrack, Knocknabansha	22.1km	9 months	One lane closure
L2264-50	Knockmaroe / Knockcurraghbola Crownlands	1.9km	1 month	One lane closure
L6188-0	Knockmaroe	0.3km	1 week	Road Closure

Road Closure: As outlined in Table 1 above, it is expected that the L6013-0 in Foildarrig / Oakhampton will be closed for c.3 weeks, the L6009-0 in Castlewaller / Carrowkeale / Derryleigh will be closed for c.1 month and the L6188-0 in knockmaroe will be closed for c.1 week, to accommodate the construction works. The closures will not be continuous throughout a given day, but will occur during daylight hours but outside of local peak or important traffic periods. There are alternative traffic routes to avoid the works available on all of these roads, and a diversion for road traffic will be setup for the duration of the closure. Signage of this diversion will be in accordance with Chapter 8: Temporary Traffic Measures and Signs for Roadworks of the Department of Transport, Tourism and Sport Traffic Signs Manual, November 2015.

One lane closures**:** The works on the public roads L2166-10 , L2156-0, L2157-0, R503 and L2264-50, can be accommodated with one-lane closures. Traffic flow will be maintained using a stop/go system with flagmen.

Relevant Traffic Management Plan Figures (included in Section 1.6):

Figure TMP 2: Location of Road Closures and One-Lane Closures along the 110kV UGC

1.3.4.1 Licences

All road closures and one land closures will be subject to Road Closure application to Tipperary County Council. All road closures will be subject to Road Closure Licence application to Tipperary County Council; will be carried out in accordance with the Department of Transport, Tourism & Sport Guidelines for Managing Openings in Public Roads (April 2017)

1.3.4.2 Flagmen at Road Works

Flagmen will be employed at 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.

1.3.4.3 Advance Warning Signage for Road Works

Advance warning signage will be erected on both approaches to 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.

Relevant Traffic Management Plan Figures (included in Section 1.6):
Figure TMP 3: Advance Warning Signage for Road Works on 50km/hr Roads
Figure TMP 4: Advance Warning Signage for Road Works on 80km/hr Roads

1.3.4.4 Maintaining Access to Properties

Where works take place in the vicinity of a property entrance (house/farms/businesses/sports facilities), traffic flow will be maintained by placing a steel plate over the 110kV UGC trench to allow traffic to pass over.

1.3.4.5 Engagement with Local Residents

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.

1.3.1 Reinstatement of Public Roads

Along the 110kV UGC route on the public road, confirmatory condition surveys involving pre-construction and post-construction inspections, high definition video surveys and FWD surveys will be undertaken. The road pavements/built surfaces will be reinstated according to the conditions of the Road Opening Licence, and will involve a combination of carriage lane reinstatement and full road reinstatement, per:

Reinstatement of Trenches: The construction works will proceed in a linear manner with on average 80m to 100m completed at each location, each day. At the end of each day, the completed sections will be reinstated with a temporary surface for road safety and trench integrity purposes. Full permanent reinstatement of the road surface/built surface will take place at the end of construction works.

Reinstatement of Joint Bays: Joint Bays are temporarily reinstated more than once; after the joint bay is constructed; after cable pulling; and after cable jointing. Following the electrical commissioning, the road surface/built surface over the Joint Bays will be permanently reinstated.

Trenches within road pavements will be reinstated in accordance with the Department of Transport, Tourism & Sport *Guidelines for Managing Openings in Public Roads* (April 2017).

Relevant Volume C3 EIAR Figures:
Figure TMP 5: Cross Section of 110kV UGC in the Public Road

1.3.2 Site Entrances

1.3.2.1 Permanent Site Entrance

The requirement for one new permanent site entrance on the L2166-10 at Coole for the Mountphilips Substation, temporary compound and construction works at the Mountphilips Substation site. This site entrance will be constructed at the location of an existing farm field entrance.

This entrance will be used to access the Mountphilips Substation (construction and operation stages) and the temporary construction compound (construction stage only). The existing farm entrances will be widened to 10m, with a visibility splay of 160m. 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. The entrance will be fenced with post and rail and an entrance gate will be installed set back 4.5m from the road edge.

Relevant Traffic Management Plan Figures (included in Section 1.6):

Figure TMP 6: Plan View of Permanent Site Entrance at Coole (Mountphilips Substation Site Entrance)

Figure TMP 3: Advance Warning Signage for Road Works on 50km/hr Roads

1.3.2.1.1 Concealed Drain at Entrance

A permanent concealed drain will be installed at the substation entrance on the Local Road to prevent water runoff from construction areas, flowing onto the road. This drain will be directed into an infiltration trench. Existing roadside drainage which occurs close to road works associated with the substation entrance will be piped to maintain flow if necessary

1.3.2.1.2 Road Cleaning

The public road at the permanent site entrance will be regularly cleaned by a road sweeping machine.

1.3.2.2 Transition from public road to private paved road at Knockcurraghbola Commons

At the eastern end of the 110kV UGC, the route is along the public road L6188-0 and then along a private paved road to the Consented UWF Substation location. This private road is paved, similar to the public road, including at its junction with the public road. There is no requirement to widen the junction of the private road with the public road to install the 110kV UGC. The junction of the private paved road with the public road does not required any widening or sightline works. It already has the required sightlines of 70m, which satisfies the sightline requirements as set out in Table 10.1 of the North Tipperary County Development Plan 2010 (as amended).

Relevant Traffic Management Plan Figures (included in Section 1.6):

Figure TMP 7: Plan View of 110kV UGC at junction of L6188-0 with private paved road in Knockcurraghbola Commons

1.3.3 Construction Material Haulage Routes

The construction materials for the UWF Grid Connection are listed in Table 2 along details of the quantity and source of the materials.

Table 2: Quantities, type and source of construction materials

Materials	Quantity	Source of Materials
Concrete	10,870m³ / 1360 No. loads	Roadstone Killough, Co Tipperary Roadstone Bunratty, Co Clare
Aggregate (crushed stone and sand)	16,220m³ / 1350 No. loads	Rear Cross Quarry, Shanballyedmond, Rear Cross Co Tipperary
Surface dressing (public road sections)	2,250m³ / 210 No. loads	Oranmore, Co. Galway
Lattice towers (End Masts)	4 No. loads	Cork
Electrical cabling and plant	5 No. loads	EU
Switchgear	5 No. loads	EU
Communication cabling and equipment	2 No. loads	EU
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	140 No. loads	Cork
HDPE Comms Ducting	80 No. loads	Cork
110kV electrical cable	29 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
General building materials	11 No. loads	Various Irish Suppliers
Control Building doors	1 load	Tullow, Co Carlow
Reinforcing Steel	5 No. loads	Various Irish Suppliers
Geotextile material	2 No. loads	Nenagh
Hedging and tree species	1 No. load	Established nurseries in Ireland
Fencing materials, posts, rails, wire	1 No. load	Arrabawn Co-Op, Reiska
Sand (clean) bags	1 No. load	Newport, Co Tipperary
Splash plate	1 No. load	Cork
Clean rockfill for watercourse works	1 No. load	Roadstone, Killough or Bunratty

1.3.3.1 Delivery Vehicles - Axles

Delivery machinery will comprise

- Tractor units with 2-4 axel articulated flat-beds or tautliners.
- Standard 4-axel rigid tipper units for aggregate and concrete deliveries
- vans for smaller deliveries

1.3.3.2 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. The HGVs delivering this material will travel to the works areas along both the regional and local road networks, using the haul routes specified in Figure TMP 8: Haul Routes for Stone and Concrete Deliveries, which is included at the end of this plan.

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 Compound vat Mountphilips Substation site via the national and regional road network.

This material will be stored at the Temporary Compound 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 TMP 8.

1.4 Traffic Management Measures

Traffic will be managed to ensure that the construction traffic for the UWF Grid Connection works will travel safely and efficiently along the public road network.

1.4.1 Hazards Identified

The critical hazards identified in relation to traffic management are:

- Deliveries of construction materials,
- Access and egress at Mountphilips Substation site Entrance,
- Spoil and dust deposited on the public,
- Diversion of local traffic due to road closures for 110kV UGC trenching works, and
- Stop/Go systems due to one lane closures for 110kV UGC trenching works.

Measures to address the above indentified hasards are outlined below. These include measures dealing with roles and responsibilities, communication and information, on-going communication with Tipperary County Council Roads Section, materials deliveries, site personnel, scheduling of works, protection of the public road network from surface water run-off, minimizing debris on the road, repair and reinstatement of the road surface, signage and measures for road and lane closures.

Adavance warning signage for roads works are shown on Figures TMP 3: Advance Warning Signage for Road Works on 50km/hr Roads and on Figure TMP4: Advance Warning Signage for Road Works on 80km/hr Roads.

1.4.2 Traffic Management Measures

The control measures identified will be implemented during the construction of the UWF Grid Connection and the Environmental Clerk of Works will carry out weekly auditing to ensure the compliance with and the effectiveness of the Traffic Management Measures.

Title:	**Traffic Management Measures**
Environmental Commitment	
Manage construction works and construction traffic in order to control and minimise the traffic impacts of construction insofar as it may affect the road network, local residents and the travelling public on the public roads close to and adjacent to the UWF Grid Connection, through measures to maximise road safety while keeping traffic flowing as freely as possible.	
Responsibilities	
Project Manager	• Consult with Tipperary County Council • Consult with Gardaí • Agree Contractor arrangements regarding speed limits, alert beacons, haulage routes etc. • Oversee the implementation of the Traffic Management Plan
Design Engineer	• Design sight lines at permanent site entrance. • Design adequate drainage at permanent site entrance.
Construction Manager	• Install information, direction and warning signage in advance of road works, at site entrances and along haul routes. • Implement the Traffic Management Plan.

Environmental Clerk of Works	• Weekly auditing to ensure the compliance with and the effectiveness of the Traffic Management Measures.
Community Liaison Officer	• Act as point of contact with local community, • Keep the local community informed of construction and road works in their area.

Traffic Management Measures

Communication and Information

- The Project Manager will keep in contact with Tipperary County Council Roads Section, with a view keeping the Roads Section informed of up to date activities and to avoid any conflicting concurrent works and/or roads programmes and/or diversions that the Local Authority may have planned at the time of construction;
- Ahead of works in an area, the Community Liaison Officer will inform local residents and local community facilities (including schools) of the construction and delivery schedule. Residents and local community facilities will also receive a leaflet with an overview of the traffic schedule and the contact information for both the Community Liaison Officer and the Environmental Clerk of Works so that householders, local farmers and local community facilities can make enquiries to levels of usage and provide information on local events or work/activities which may conflict with the construction/delivery schedules.
- The Construction Manager will erect an information sign at the site entrance to the Mountphilips Substation site, at Derryleigh on the local road at junction with the R503, in Rear Cross village, and at Knockmaroe on the local road at the junction with the R503. This signage will give an overview of the construction traffic timetable; the contact numbers for the Environmental Clerk of Works and the Community Liaison Officer, and will serve as an advance warning to expect construction traffic on the roads.
- Directional signage will be installed at specific locations along the haul routes. The haul routes for construction materials deliveries to the Mountphilips substation works will have clear directional signs from Newport to the site. The haul routes for construction material deliveries to the UWF Grid Connection works will have clear directional signage to the work, and this signage will be relocated to indicate the location of the UWF Grid Connection works as the works progress along the grid connection route.

Measures for Delivery Personnel

- These Traffic Management Measures will be part of the induction to all haulage companies delivering to site.
- All machinery entering the site will have working rotating beacons and these beacons will be activated to indicate to other traffic of their intention to enter or exit the site.
- All companies delivering aggregate or concrete to works areas or delivering other materials to the temporary construction compound or Mountphilips Substation will be instructed to use the designated haul routes and will be informed of designated delivery hours for routine deliveries.
- A speed limit of 50km/hr on the Local Roads between the R503 and the works locations and site entrance at Coole will be implemented and communicated to the companies delivering materials to site.
- All material deliveries will have a maximum axle load of 12 tonnes per axle.

Measures for Site Personnel

- A speed limit of 50km/hr will be implemented and communicated to the personnel travelling on the Local Roads ('L' Roads) to Mountphilips Substation site, and to the works areas.
- There will be onsite parking for all construction personnel at the main compound.
- There will be no parking of any vehicles on the public road.

Protection of the Public Road Network from Surface water run-off

- To ensure that surface water run-off does not flow onto the public road surface, a concealed drain will be provided parallel to the public road network at the permanent site entrance at the Mountphilips Substation site.

Measures to protect Local Residents and Local Community
• All construction works will be carried out during daylight hours *(as per Project Design Measure PD04);* • Construction works will not be carried out within 150m of Rear Cross National School or Lackamore National School, during school hours; in addition, the project Community Liaison Officer will keep each school informed of construction timetables and scheduling, *(as per PD06).* • As requested by the Roads Department of Tipperary County Council, during pre-planning consultations, the works along the public road network will be scheduled to minimise impacts on schools and local businesses. The works will be scheduled so that they do not disrupt or interfere with Tipperary County Council's road works programme on the R503 through Newport town, *(as per PD12).* • 110kV UGC construction works along the local roads L2264-50 and L6188-0, will not take place at the same time as the UWF Related Works Haul Route Works on these roads. The 110kV UGC construction works will also be scheduled so that the works do not occur on the same days as concrete deliveries for Consented UWF Turbines along these local roads, *(as per PD07).* • Construction works for the 110kV UGC in Knocknabansha, Knockmaroe, Knockcurraghbola Crownlands 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 where those works also occur within 350m, *(as per PD11).* • Flag-men will be used at 110kV UGC works locations on the public roads subject to one lane closures. These flagmen will control the movement of traffic on the public road, so that road users can continue to use the public road network in a in a safe and efficient manner. The works will be carried out according to the Traffic Management Plan for UWF Grid Connection. The Traffic Management Plan forms part of the Environmental Management Plan , *(as per PD10).*
Measures to minimize debris on road
• In order to minimize mud and debris deposited on roadway surfaces there will be a dry wheel wash facility positioned at the Mountphilips Substation site entrances, as required, and will be used by trucks exiting the site. • In addition to this a road sweeper will operate at the site entrance, as required, for the duration of the construction of the UWF Grid Connection and in particular, during the importation of aggregates and concrete. • The road sweeper will keep the roads at the site entrance clean and clear of mud and debris.
Road Repair and Reinstatement
• Along the 110kV UGC route on the public road, confirmatory condition surveys involving pre-construction and post-construction inspections, high definition video surveys and FWD surveys will be undertaken • Following road works for cable trenching, road pavements will be reinstated according to the conditions of the Road Opening Licence and in accordance with the national MapRoad Roadworks Licensing (MRL) system, supported by the Road Management Office (RMO) on behalf of all local authorities and TII, in accordance with the DoTTS Guidelines for Managing Openings in Public. • Along the additional local road L5337-1 at Tullow, which will be used for construction materials haulage only (i.e. no trenching works), 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 works locations on the local road network. 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, • Any road repairs if required following the end of the construction stage will be by arrangement with Tipperary County Council.
Signage
• Signage will be according to the Chapter 8: Temporary Traffic Measures and Signs for Roadworks of the Department of Transport, Tourism and Sport Traffic Signs Manual, November 2015. • The signage layout will take the individual features of the site into consideration. All signs will be manufactured using retro-reflective material and will be a minimum of 750mm X 750mm size. All cones will be 1m high and have reflector sleeves for additional visibility and sand bags will be used to weight down cones.

- All temporary traffic signs for will be placed such that they;
  - do not obstruct sight lines;
  - do not obstruct other signs; and
  - are themselves not obstructed by other signs.
- Where signs could be obscured by bends, hills or dips in the road, additional warning signs will be put in place.

Information Signs

- Information signage will be erected to provide an overview of the construction traffic timetable; the Environmental Clerk of Works contact number, the Community Liaison Officer and will serve as an advance warning to expect HGVs on the road.
- These temporary signs will be provided at the Mountphilips Substation site entrance; Rear Cross village, at Derryleigh on the local road near the junction with the R503, and at Knockmaroe on the local road near the junction with the R503will be installed at the Mountphilips Substation site entrance. This sign will give an overview of the construction traffic timetable; the Environmental Clerk of Works contact number, the Community Liaison Officer and will serve as an advance warning to expect HGVs on the road.

Directional Signage

- Directional signage will be installed at specific locations along the haul routes. All directional signage will be black on white background.
- The haul routes for construction materials deliveries to the Mountphilips substation works will have clear directional signs from Newport to the site. The haul routes for construction material deliveries to the 110kV UGC works outside the Mountphilips Substation site will have clear directional signs and this signage will be relocated to indicate the location of the works as the works progress along the 110kV UGC route.

Warning Signage

- Advance warning signage will be erected on both approaches to the temporary site entrance no.2 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.

Measures for Road Closures

- Detour road signs will be erected on the closed road and along the detour route. The temporary traffic measures will be maintained during the works.
- Where necessary, cones, beacons, signs and reflectors will be cleaned and any signs knocked over or displaced will be reinstated.
- Access for local residents will be in place during the duration of the works. Construction personnel will attend barrier points during working hours.
- All construction vehicles will be parked so as not to cause obstruction or inconvenience to road users or local residents.
- In the event of emergency and should the need arise for the road to be fully opened, steel plates will be put in place across the excavation to all traffic to flow on both sides of the road. Steel plates will be kept on-site at all times.

Measures for Lane Closures

- The Construction Manager will ensure that layouts of lane closures consider the sight lines from perpective of both the road users and construction personnel, and ensure that provision of forward visibility and signing does not compromise the safety of either road users or construction personnels.
- An appropriate taper length will be implemented to reduce the width of the road to a single lane.
- An early indication will be given of the path that must be followed to avoid any obstruction in the carriageway.
- Temporary traffic signals will be implemented to allow road users safely through the roadworks by channelling them onto the open side of the road. The traffic signals will be in place prior to the works commencing and will remain in place until after the works are completed.
- A STOP/GO system will be operated by two flagmen who will be in radio contact with each other.
- Provision will be made for the availability of safe parking for traffic management and construction vehicles and

equipment.

- Where road works are situated near a bend in the road, and especially a left hand bend, adequate advanced warning will be given to the approaching drivers because of the reduced visibility.

On-going communication with Tipperary County Council Roads Section

The Project Manager for the construction of UWF Grid Connection will ensure that close communication with Tipperary County Council Roads Section will be maintained throughout the construction stage. Such communications will include:

- the specific traffic management measures to be implemented; and the manner in which road works and any road reinstatements will be carried out;
- Ongoing reporting relating to the condition of the road network and updates to construction programming will be provided to Tipperary County Council; and
- Identify any other works being carried out in the vicinity of the Upperchurch Grid Connection works, e.g. road surfacing works, and will co-ordinate the works with the local authorities so as to mitigate against any impacts arising from conflicting works.

References

- Department of Transport - Traffic Signs Manual: Chapter 8 - Temporary Traffic Measures and Signs for Roadworks of the Department of Transport, Tourism and Sport Traffic Signs Manual, November 2015
- Department of Transport, Tourism and Sport Guidelines for Managing Openings in Public Roads; Guidelines for the Opening, Backfilling and Reinstatement of Openings in Public Roads (Purple Book, April 2017)

1.5 Emergency Procedures

1.5.1 Emergency Contact Numbers

The telephone numbers for the Emergency Services are listed in Table 3 below;

Table 3: Emergency Contact Numbers

Emergency Service	Contact Number
Fire Brigade, Gardaí and Ambulance	Dial 112
Local hospital (University Hospital Limerick)	Dial 061 301111 (Main Switch) or 061 482343 (A&E)
Utilities - ESB Networks	Dial 1850 372 999
Utilities – Eir	Dial 1850 245 424
PSCS appointed by the construction contractor for the windfarm	TBC

These numbers will be prominently posted at the Mountphilips Substation site entrance and in the site offices. These numbers will also be displayed in machinery and works vehicles for works along the public road network.

1.5.2 Procedures in the case of incidents/emergencies

Emergency services vehicles will have priority over construction traffic vehicles at all times.

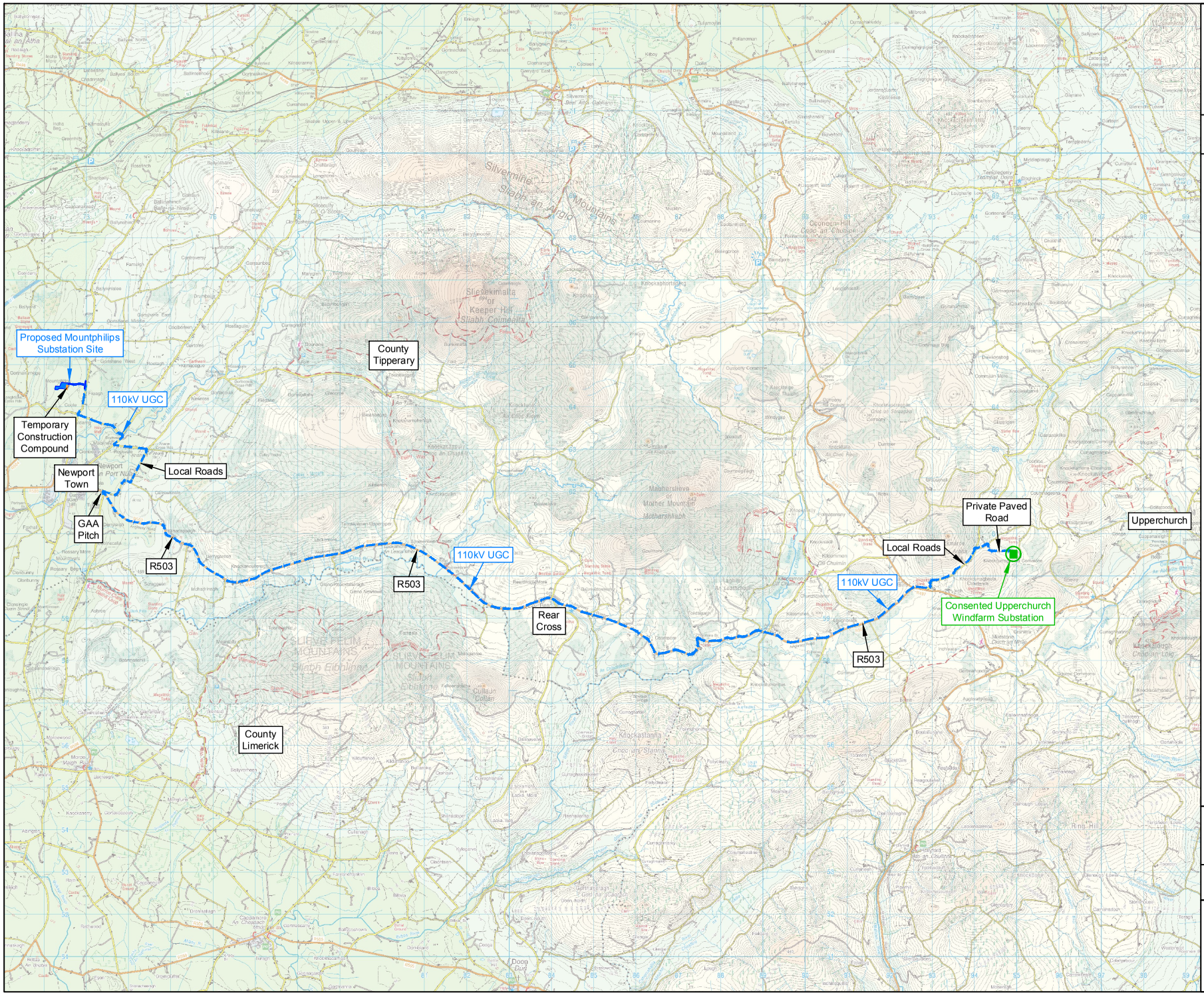
If an incident occurs due to construction traffic the PSCS (Project Supervisor Construction Stage) will provide all necessary assistance to the Gardaí, Ambulance and Fire Brigade services and local authority to deal with the emergency.

In the case of an emergency on the public road, the following incident management procedure will be followed:

- Emergency Services will be contacted immediately by dialling 112
- Exact details of the emergency / incident will be given by the caller to the emergency line operator to allow them to assess the situation and respond in an adequate manner
- The emergency will then be reported to the PSCS
- The PCSC will notify all other construction traffic in the area of the incident and
- The PCSC will ensure that personnel are available to guide the emergency services to the accident location.

All incidents will be recorded by the PSCS and remedial measures taken where appropriate. The incident management procedure will be part of the induction of all personnel coming onto the construction site including HGV drivers delivering to the site.

1.6 Figures and Mapping



EMP: Traffic Management Plan

Figure TMP 1

Location of the UWF Grid Connection on OSI Discovery Mapping

Map Number:

Overview Map

Legend:

- UWF Grid Connection - 110kV UGC
- UWF Grid Connection - Mountphilips Substation
- Consented Upperchurch Windfarm Substation
- Temporary Construction Compound

N

Project:

UWF Grid Connection (2019)

Drawn by:	Checked by:	Date:	Sheet Size:
AB	PK	October 19	A4

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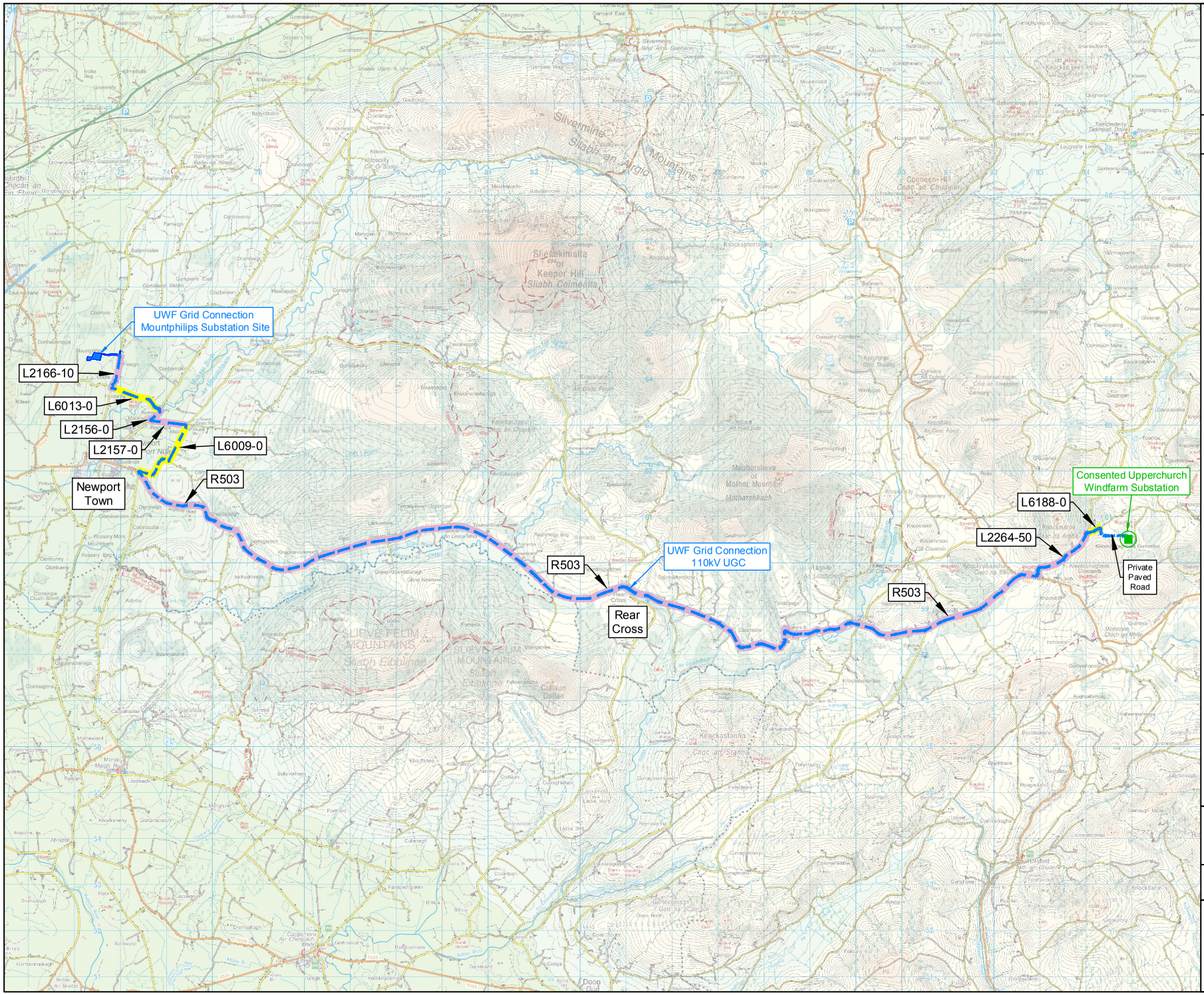

EMP: Traffic Management Plan

Figure TMP 2

Location of Road Closures and One-Lane Closures along the 110kV UGC

Map Number:

Map 1 of 1

Legend:

- UWF Grid Connection - 110kV UGC
- UWF Grid Connection - Mountphilips Substation
- Consented Upperchurch Windfarm Substation
- Public road subject to sequential one-lane closure during construction
- Public road subject to periodic road closure during construction
- L6188-0 Local Road Numbers

N

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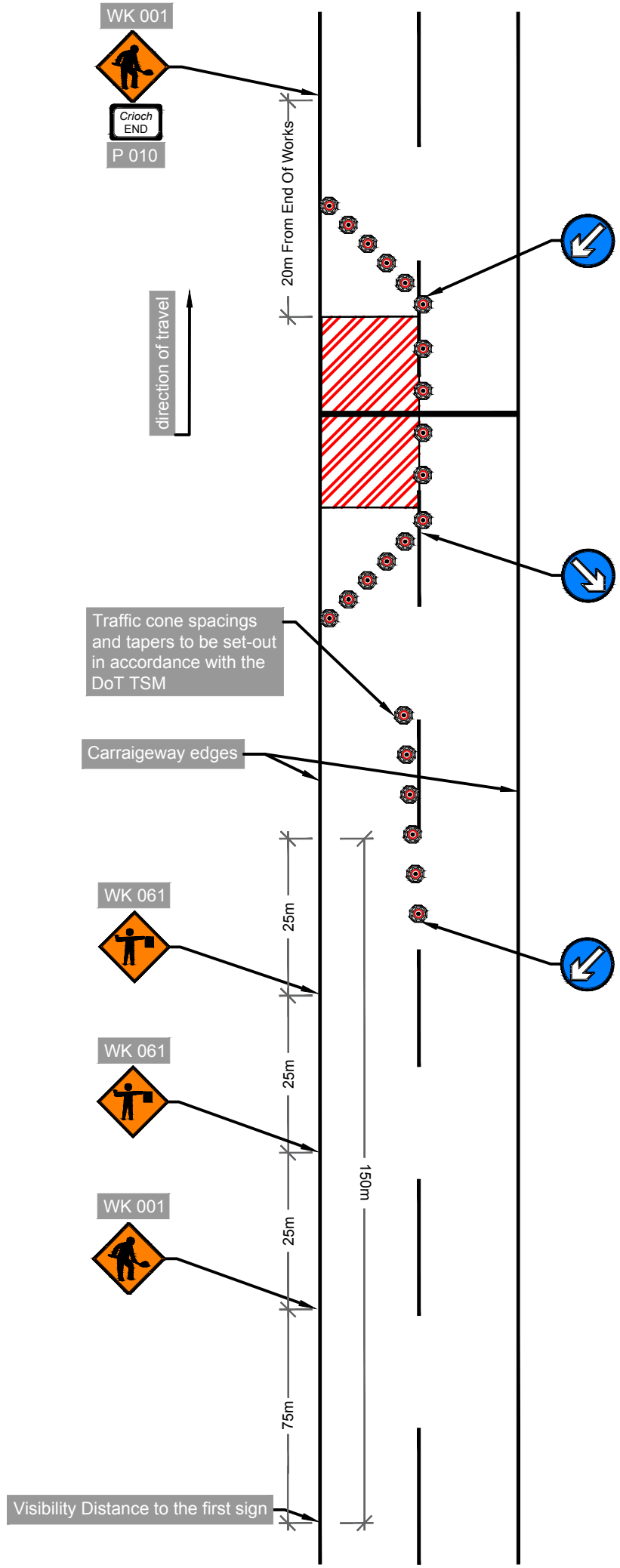

EMP: Traffic Management Plan

Figure TMP 3

Advance Warning Signage for Road Works on 50km/hr Roads

Designed in conjunction with

Malachy Walsh and Partners
Engineering and Environmental Consultants
Cork | Tralee | Limerick | London

Note: This drawing is not to scale

Department of Transport
Traffic Signs Manual 2010 (DoT TSM)

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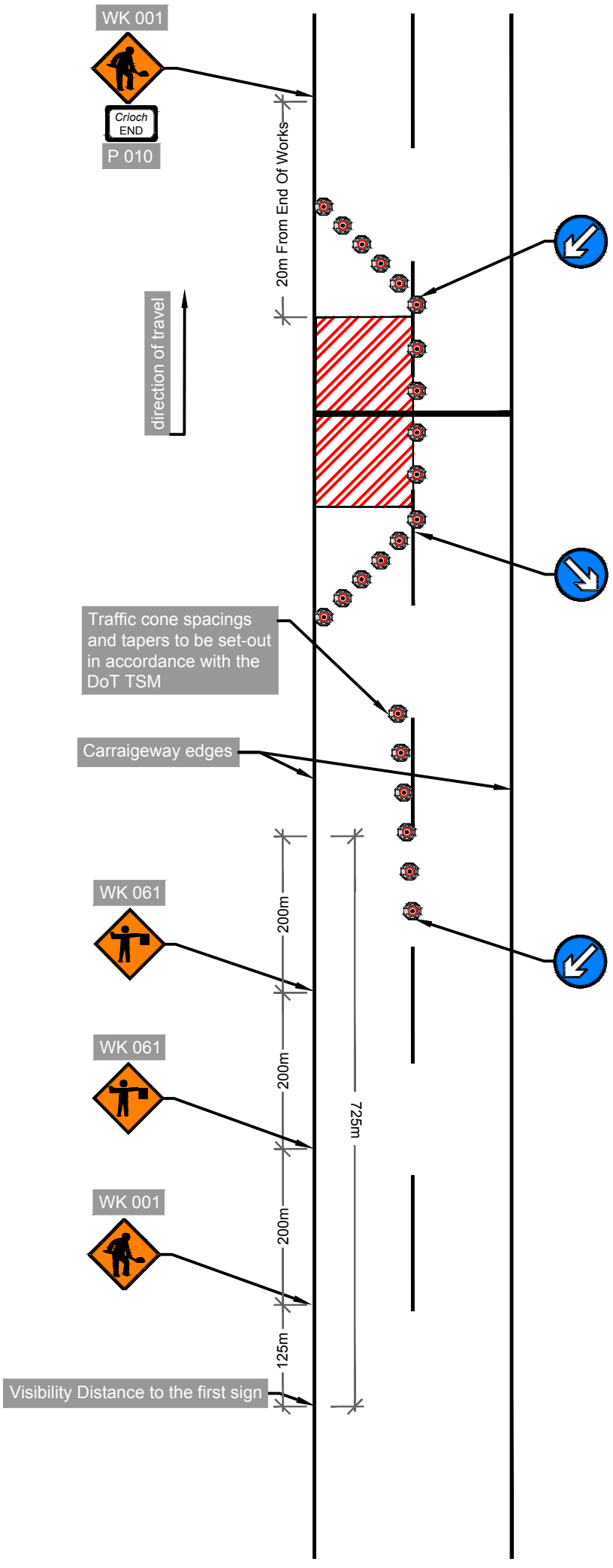

EMP: Traffic Management Plan

Figure TMP 4

Advance Warning Signage for Road Works on 80km/hr Roads

Designed in conjunction with

Malachy Walsh and Partners
Engineering and Environmental Consultants
Cork | Tralee | Limerick | London

Note: This drawing is not to scale

Department of Transport
Traffic Signs Manual 2010 (DoT TSM)

Project:

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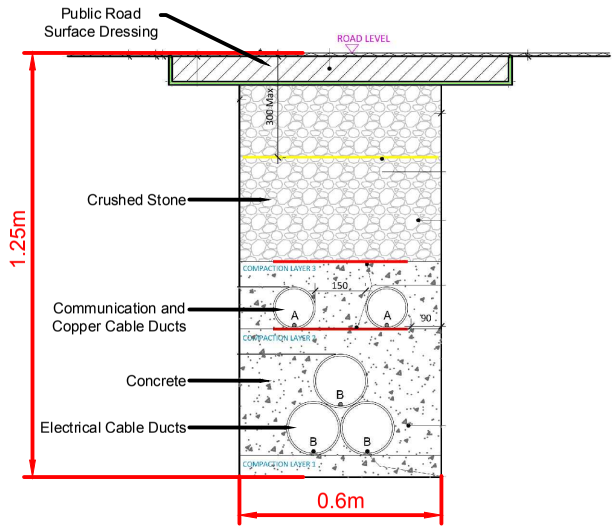
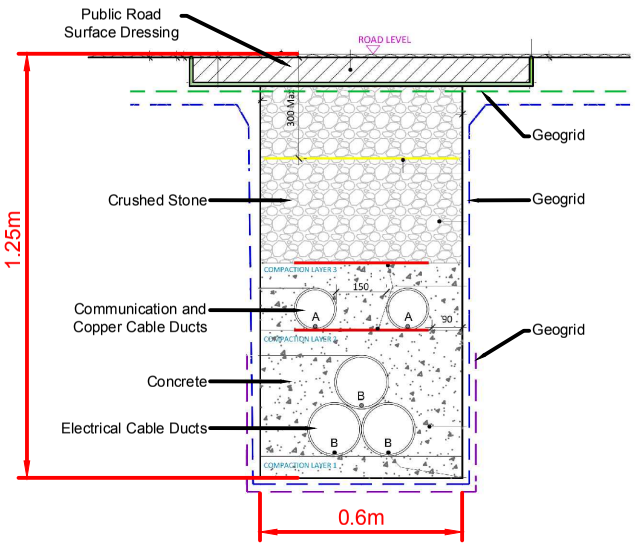
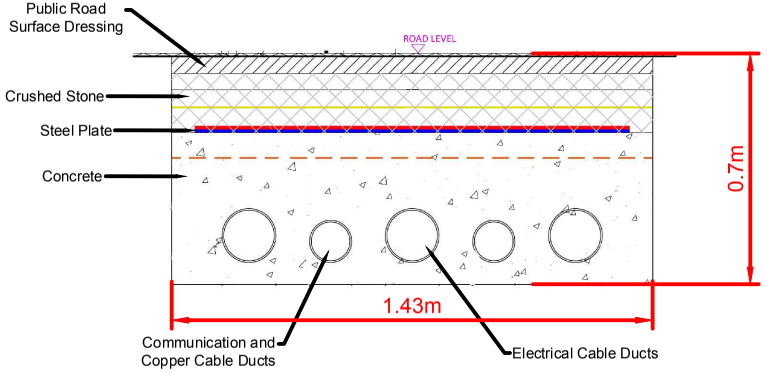


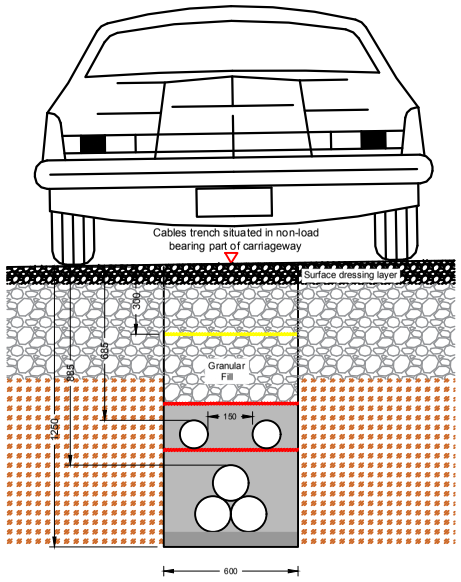
Elevation
110kV UGC
(along majority of UGC route)



Elevation
110kV UGC
(Supported trench through peat, if required)



Elevation
110kV UGC
(in Flat Formation over Bridges / Culverts / Services, if required)



TYPICAL SECTION OF 110kV CABLES TRENCH ALONG PUBLIC ROADS

EMP: Traffic Management Plan

Figure TMP 5

Cross Sections of 110kV
UGC in the Public Road

Map Number:
N/A

This figure is included as a scaled drawing in
Volume B: Planning Drawings
See drawings: 05652-529, 05652-530 & 05652-549

Project:

UWF Grid Connection (2019)

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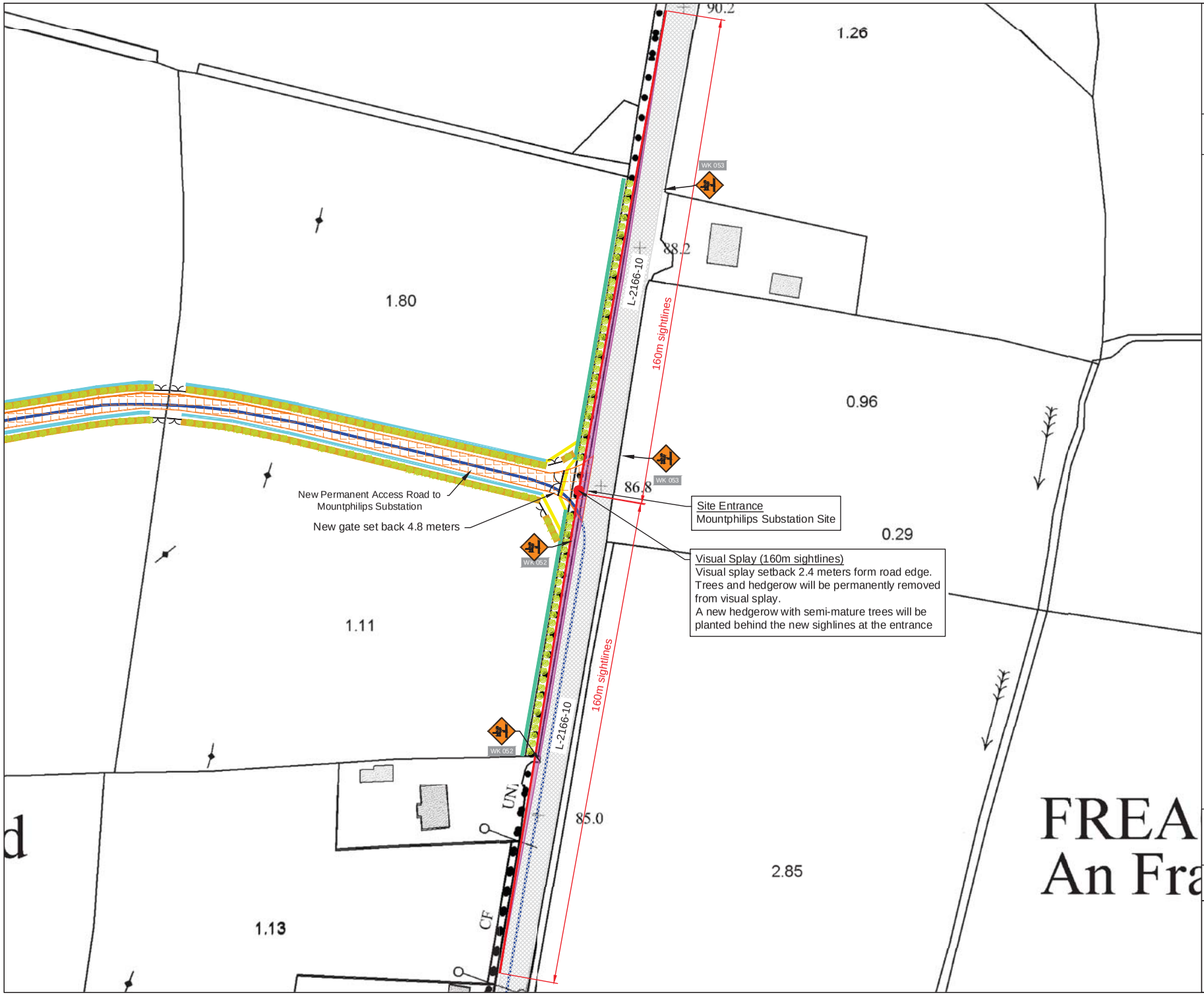

EMP: Traffic Management Plan

Figure TMP 6

Plan View of Site Entrance at Coole

(Mountphilips Substation Site Entrance)

Map Number:

N/A

Legend:

- UWF Grid Connection - 110kV UGC
- Hardcored site entrance and new permanent access road
- Public Roadway L-2166-10
- 160m Sightlines
- Visual Splay - Trees and hedgerow will be permanently removed from visual splay.
- New hedgerow with semi-mature trees will be planted behind the new sightlines at the Mountphilips Substation site entrance.
- New farm gate
- New permanent berms planted with new hedgerow
- New consealed drain at new entrance
- New field drains directed to existing field drainage
- Existing field drainage
- Traffic Management Signage (Construction Stage)

N

Project:

UWF Grid Connection (2019)

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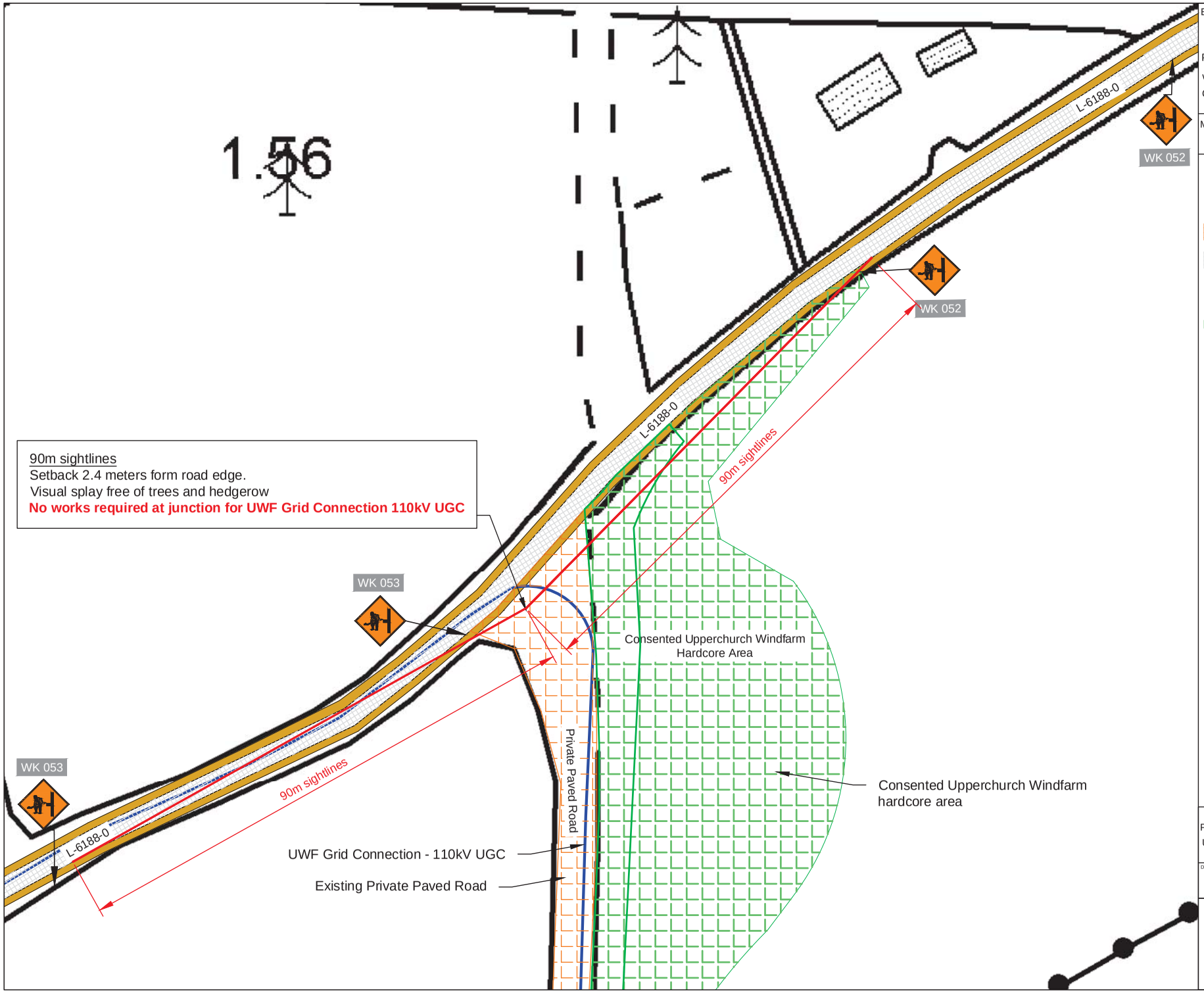

EMP: Traffic Management Plan

Figure TMP 7

Plan View of 110kV UGC at junction of L6188-0 with private paved road in Knockcurraghbola Commons

Map Number: N/A

Legend:

- UWF Grid Connection - 110kV UGC
- Existing Private Paved Road
- Public Roadway L-6188-0
- Roadside Verge
- Consented Upperchurch Windfarm Hardcore Area
- 90m Sightlines
- Traffic Management Signage (Construction Stage)

N

Project: UWF Grid Connection (2019)

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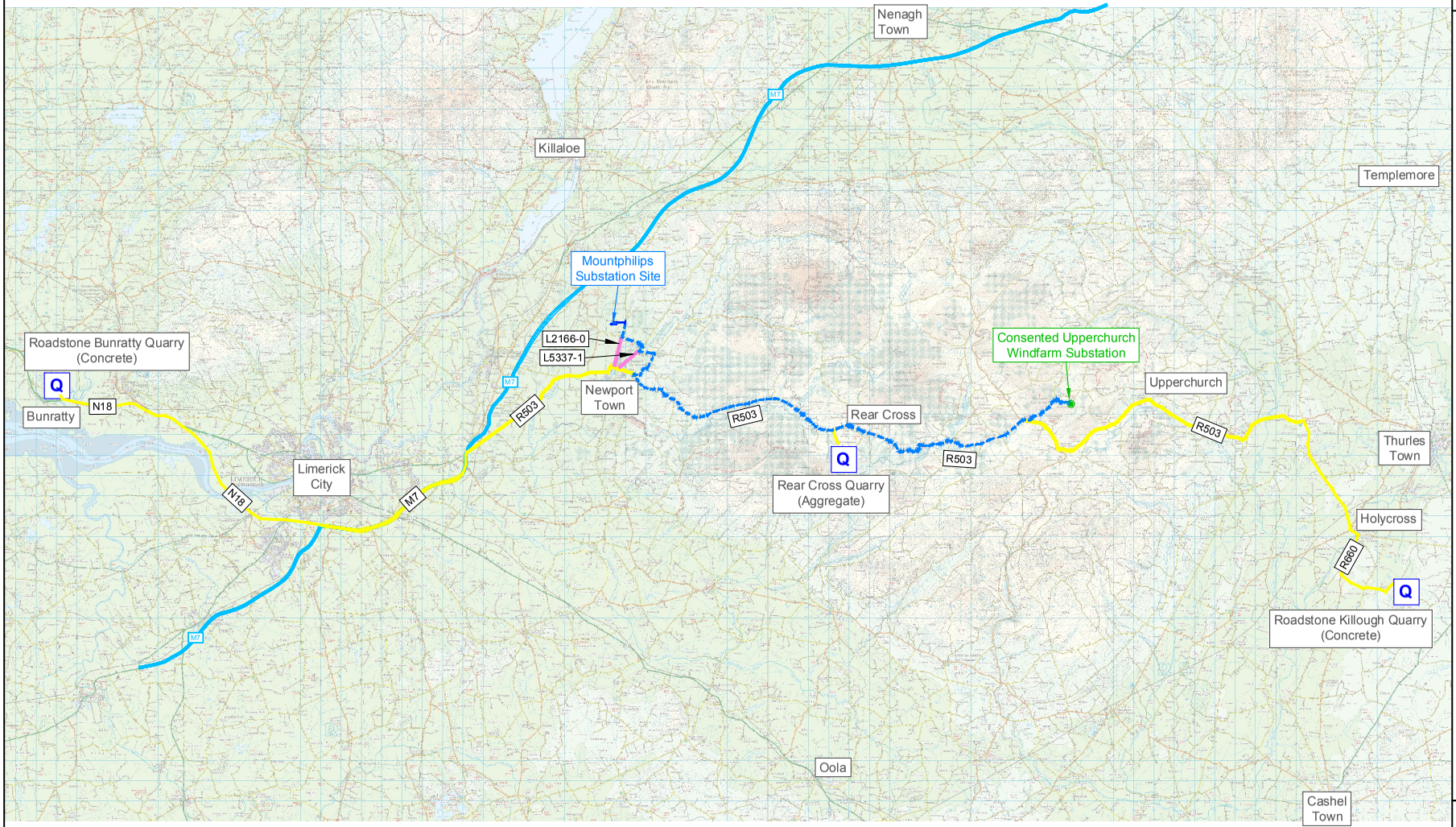
EMP: Traffic Management Plan

Figure TMP 8

Haul Routes for Stone and Concrete Deliveries

Map Number:

Map 1 of 1



Legend:

- Mountphilips Substation Site
- Consented Upperchurch Windfarm Substation
- Haul Route from Quarries
- Haul Route along Local Roads
- Haul Route along the 110kV UGC roads
- L2166-0 Local Road Numbers

N

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UWF Grid Connection (2019)

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UWF Grid Connection

Environmental Management Plan (2019)

Tab 3

Surface Water Management Plan

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OCTOBER 2019

UWF GRID CONNECTION

CONSTRUCTION PHASE SURFACE WATER MANAGEMENT PLAN

PREPARED FOR:

ECOPOWER DEVELOPMENTS LTD

PREPARED BY:

HYDRO-ENVIRONMENTAL SERVICES

DOCUMENT INFORMATION

DOCUMENT TITLE:	UWF Grid Connection – Construction Phase Surface Water Management Plan
ISSUE DATE:	**14TH JUNE 2019**
PROJECT NUMBER:	**P1299-2**
PROJECT REPORTING HISTORY:	**P1299-1** **P1299-0**
CURRENT REVISION NO:	**P1299-2 - REV 0 – FINAL REPORT**
AUTHOR(S):	**MICHAEL GILL** DAVID BRODERICK
SIGNED:	 _____ Michael Gill B.A., B.A.I., M.Sc., Dip. Geol., MIEI Managing Director – Hydro-Environmental Services

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FIGURES

FIGURES (IN TEXT)

TABLES

1. INTRODUCTION

1.1 Background

This document presents a Surface Water Management Plan and pollution prevention measures which will be implemented during the construction of the UWF Grid Connection, Co. Tipperary. The location of the UWF Grid Connection is shown on in black on **Figure A** (over).

This Surface Water Management Plan (SWMP) provides the water management framework for the appointed Contractors and Sub-contractors and it incorporates the mitigating principles described in the accompanying Environmental Impact Assessment Report (EIAR) submitted by Ecopower Developments Ltd (November 2019, refer to Chapter 11 – Water) to ensure that construction works are carried out with minimal impact on the surface water environment and in accordance with the mitigation measures and project design commitments made in the EIAR.

This report describes the existing geological and hydrological environment, and then sets out the water protection measures which will be implemented for surface water management during the construction of the UWF Grid Connection. The SWMP also outlines the surface water monitoring plan for the construction of the development.

The Surface Water Management Plan for the UWF Grid Connection was developed by Hydro-Environmental Services. This plan has been prepared in part through consultation with Inland Fisheries Ireland.

1.2 Description of the Development, Site and Topography

The UWF Grid Connection comprises the following main proposed elements:

- Mountphilips Substation near Newport, Co. Tipperary
- Mountphilips – Upperchurch 110kV Underground Cables (110kV UGC) – 30.5km
- Ancillary Works at the Mountphilips Substation site

The project comprises of a 110kV substation at Mountphilips near Newport, the Mountphilips – Upperchurch 110kV Underground Grid Connection (30.5km), 29km of which is along paved roads (mainly (22km) along the Regional Road R503) and Ancillary Works at the Mountphilips Substation site such as new permanent entrance, new permanent access road and associated drainage.

The Mountphilips Substation is proposed for a location 160m east of the existing Killonan - Nenagh 110kV line in agricultural grassland in Mountphilips townland, 2km north of Newport, Co. Tipperary. The Mountphilips Substation is located on a low-lying, north-south trending ridge with the slope of the site being to the west/southwest. The current land use is grassland. The elevation of the site is at approximately 70m OD. To facilitate construction and operational access to the Mountphilips Substation a new permanent access road will be constructed. This new access road will include new permanent crossings structures over field drains and a small headwater stream.

The 110kV UGC will connect the Mountphilips Substation to the Consented UWF Substation, through the installation of underground cables. The route of the underground cables, which is c.30.5km in length, will follow a generally west/east course along the local road network around Newport town, then along the R503, and then along the local road network, and then along a private paved road to the Consented UWF Substation location. The watercourses intersected range from drains / small headwater streams to larger rivers such as the Newport River, Clare River and Bilboa River.

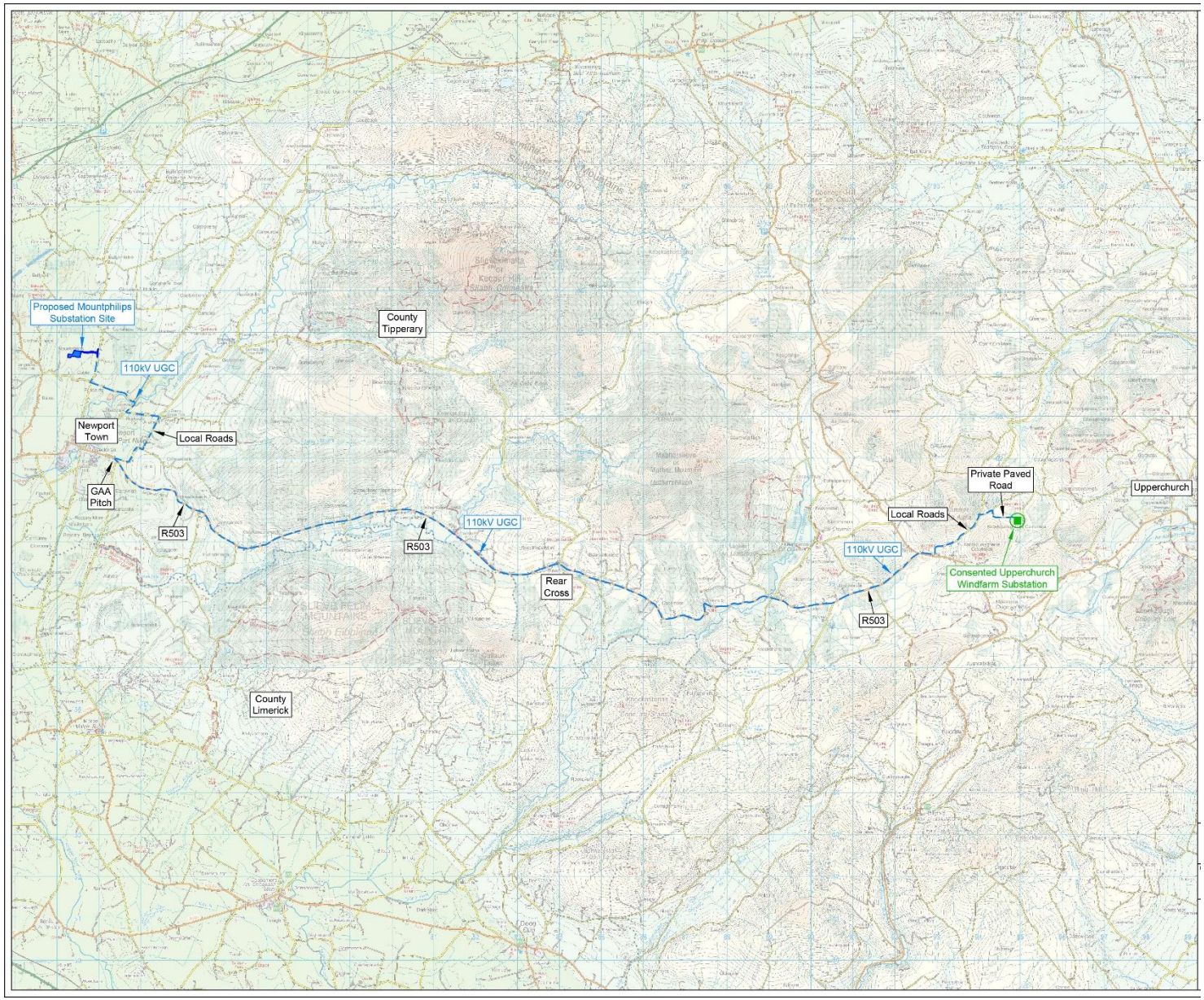


Figure A: Site Location Map

1.3 Description of Watercourses at Construction Works Areas

There is a total of 68 no. watercourses within the construction works areas associated with the UWF Grid Connection;

- 3 no. of these are at the Mountphilips Substation site (2 no. of these watercourses are new permanent crossings located along the new access road to Mountphilips Substation, the remaining 1 no. watercourse crossing is a temporary crossing between Mountphilips and the End Masts);
- 63 no. watercourse crossings are located along the route of the 110kV UGC on the public road network (road numbers: L2166-10, L6013-0, L2156-0, L2157-0, L6009-0, R503, L2264-50, L6188-0);
- the remaining 2 no. are existing culverts located along the paved private road between the local road network and the location of the Consented UWF Substation on the eastern extremity of the 110kV UGC.

The 65 no. existing watercourse crossings along the 110kV UGC where it occurs outside of the Mountphilips Substation site (i.e. between the Mountphilips Substation site entrance and the Consented UWF Substation location) are summarized in Table 1 below.

Table 1: Existing watercourse crossings along the route of the 110kV UGC outside the Mountphilips Substation site (*roads listed from west to east)*

Road No.	No. of culverts	No. of bridges	Potential culvert replacement
L-2166-10	1	0	0
L-6013-0	1	1	0
L2156-0	0	1	0
L2157-0	0	0	0
L6009-0	0	2	0
R-503	41	11	12
L-2264-50	3	0	1
L-6188-0	2	0	0
Private paved road	2	0	0

1.4 Outline of the Surface Water Management Plan

This document aims to set out the procedures and operations to be utilised on the UWF Grid Connection project to mitigate against any water related environmental impacts. The Project Design Environmental Protection Measures and best practice measures outlined herein will be employed on site during the construction phase of the project.

The main areas of water related concerns covered by this document are:

a) Measures for protection of surface water quality during watercourse crossing works, earthworks, and overburden storage
b) Measures for protection of surface water quality during fuel usage and storage, and during the use of cement based compounds;
c) Measures for protection of surface water quality when working at or near existing streams / watercourses;
d) Design of new permanent watercourse crossing structures to prevent flood risk; and,
e) Protection of local surface water supplies during construction works.

1.5 SWMP Report Status

The SWMP is considered a live document and will be modified over time as detailed contractor methods of work are developed. If the development is permitted an updated version of this document will be issued to all parties involved in the construction process as necessary.

1.6 Relevant Legislation & Guidance

All surface water control measures relating to the UWF Grid Connection will be constructed using best practice and in conformance with the requirements of the relevant regulatory authorities. The key legislation which will be adhered to are defined as follows:

- Water Framework Directive (2000/60/EC);
- Local Government (Water Pollution) Act, 1977–1990;
- Water Quality (Dangerous Substances) Regulations, 2000;
- Arterial Drainage Act, 1945;
- S.I. No. 41 of 1999 Protection of Groundwater Regulations, resulting from EU Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances (the Groundwater Directive);
- S.I. No. 249 of 1989 Quality of Surface Water Intended for Abstraction (Drinking Water), resulting from EU Directive 75/440/EEC concerning the quality required of surface water intended for the abstraction of drinking water in the Member States (repealed by 2000/60/EC in 2007);
- S.I. No. 439 of 2000 Quality of Water intended for Human Consumption Regulations and S.I. No. 122 of 2014 European Communities (Drinking Water) Regulations;
- S.I. No. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulations; and,
- S.I. No. 9 of 2010 European Communities Environmental Objectives (Groundwater) Regulations 2010.

1.7 Drainage and Surface water Quality Management Guidance Documentation

The key drainage and water quality guidance documentation relevant to this project are defined set out as follows:

Watercourse crossing works guidance

- Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters;
- NRA (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes;
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites. Eastern Regional Fisheries Board,
- OPW (2013) Construction, Replacement or Alteration of Bridges and Culverts.

Pollution Prevention Guidance Notes (PPGs):

- PPG01 General guide to the prevention of water pollution;
- PPG02 Above ground oil storage tanks;
- PPG05 Works in near or liable to affect watercourses;
- PPG06 Working at construction and demolition sites;
- PPG07 Refuelling Facilities;
- PPG11 Preventing pollution at industrial sites;
- PPG18 Control of spillages and fire fighting run-off;
- PPG20 Dewatering underground ducts and chambers;
- PPG21 Pollution Incident Response Planning;
- PPG23 Maintenance of Structures over Water; and,
- PPG26 Pollution Prevention Storage and Handling of Drums & Intermediate Bulk Containers.

Construction Industry Research and Information Association (CIRIA):

- CIRIA Report C502 Environmental Good Practice on Site;
- CIRIA Report C532 Control of Water Pollution from Construction Sites;
- CIRIA Report C648 Control of Pollution from Linear Construction Project; Technical Guidance;
- CIRIA Handbook C650 Environmental good practice on site;
- CIRIA Handbook C651 Environmental good practice on site checklist;
- CIRIA Report C609 - SuDS – hydraulic, structural & water quality advice; and,
- CIRIA Report C697 – The SuDS Manual.

2. EXISTING HYDROLOGICAL REGIME

2.1 Introduction

The existing geological and hydrological environment along the route is assessed in Chapter 10 (Soils) and Chapter 11 (Water) of the EIAR (Ecopower Developments Ltd, 2019) for the UWF Grid Connection. Only a brief summary of geological and hydrological data is provided below in order to put the SWMP into perspective.

2.1.1 Existing Geological Regime

The superficial geology (*i.e.* overburden) at the UWF Grid Connection locations comprises poorly draining mineral or peaty topsoil over glacial tills. Alluvium and fluvio-glacial sand and gravels are present along the larger watercourses such as the Newport River, Bilboa River and Clare River.

The underlying bedrock in the study area comprises a mixture of sandstone, limestone and volcanic meta-sediments, with the latter being most predominant.

2.2 Existing Hydrogeological Regime

The proposed development is located within 2 no. local groundwater bodies (GWBs) - the Slieve Phelim GWB and the Templemore A GWB. Both these GWBs have been classified as "Good Status" by the Water Framework Directive (WFD) characterisation process.

Within the Slieve Phelim GWB, the construction works areas are underlain by both Poor Bedrock Aquifers and Locally Important Aquifers with the former being more dominant. Within the Templemore A GWB, the construction works areas are completely underlain by Poor Bedrock Aquifers.

In general, the groundwater flow regime of both bedrock types is typically poorly productive. These bedrock aquifers generally have no inter-granular permeability. Groundwater flows within fractures and faults are more likely to occur within the Locally Important Aquifers rather than within the Poor Aquifers.

Local groundwater flow directions will mimic topography whereby flow paths will be from topographic high points to lower elevated discharge areas at local streams and rivers.

2.2.1 Existing Hydrological Regime

On a regional scale the UWF Grid Connection is located within the River Shannon and the River Suir surface water catchments. Approximately 29km of the 30.5km 110kV UGC route (including the Mountphilips Substation) is located in the River Shannon catchment while the remainder (1.5km) is located within the River Suir catchment.

Within the River Shannon catchment, the 110kV UGC route and the Mountphilips Substation site exist within the Lower Shannon & Mulkear hydrometric area. The sub-catchments within the Lower Shannon & Mulkear hydrometric area that the UWF Grid Connection passes through (list from west to east) include the Killeengarriff_SC_010, Newport (Tipperary)_SC_010, and Bilboa_SC_010. Within the River Suir catchment the route of the 110kV UGC (1.5km of the total 30.5km), exists within the Suir_SC_030 sub-catchment.

A Local hydrology map is attached in Section 5 of this SWMP as **Figure SWMP 1:** Local Hydrology Map.

The UWF Grid Connection crosses 68 no. watercourses, 3 no. of which are at the Mountphilips Substation site in the Ballyard_010 local surface water body of the Killeengarriff_SC_010 subcatchment. The remaining 65 no. watercourses are located along the route of the 110kV UGC on the road network outside the Mountphilips

Substation site. The spread of the 65 no. watercourse crossings within each sub-catchment, along with the extent of 110kV UGC works in each catchment is shown in Error! Reference source not found. below.

Table 2: Summary of Regional Hydrology, Local Hydrology and Proposed 110kV UGC Infrastructure

Regional Catchment	EPA Sub-Catchments[1]	EPA - Local Surface Water Bodies[2]	Length of 110kV UGC (km)	No. Water-course Crossings (all exist)	Potential Culvert Replace-ment Works	Works to road level/ parapet walls at bridges	No. Joint Bays
Shannon	Killeengarriff_SC_010	Ballyard_010	1.3	1	0	0	1
	Newport (Tipperary)_SC_010	Newport_040	3.5	5	0	1	6
	Killeengarriff_SC_010	Annagh(Tipperary)_030	4	7	0	0	5
		Annagh(Tipperary)_020	8.4	23	8	1	11
	Bilboa_SC_010	Bilboa_010	6.4	18	2	1	10
		Inch (Bilboa)_010	5.4	6	2	0	7
Suir	Suir_SC_030	Clodiagh (Tipperary)_010	1.5	5	1	0	2

1 Catchments are listed west to east along the 110kV route from the Mountphilips Substation site entrance to the Consented UWF Substation
2 Catchment areas as now defined in https://gis.epa.ie/EPAMaps/

2.2.2 Local Drainage Features

A detailed survey of all watercourse crossings along the UWF Grid Connection was completed as part of the EIAR assessment. The walkover surveys were completed in the winter and spring months of 2019 and therefore streams and rivers were seen in medium to high flow conditions.

Due to the upland nature of the majority of the UWF Grid Connection, many of the watercourses intercepted by the works area are small headwater streams or drains. A summary of the watercourse types intercepted by the UWF Grid Connection are shown in **Table 3** below. The locations of the Local Surface Water crossings are shown on **Figure SWMP 2:** Local Surface Water Crossing Locations, see section 5.

The main watercourse crossings along the UWF Grid Connection include the Newport River, Clare River and the Bilboa River. These 110kV UGC works across these watercourse crossings are located along the public road within the bridge structures. Works to the road level and parapet wall heights will be required at all three bridges. The Newport River will be crossed by installing cable in the Rockvale Bridge north of Newport town The Clare River will be crossed by installing cable in the Tooreenbrien Bridge on the R503. And the Bilboa River will be crossed by installing cable in the Anglesey Bridge on the R503.

While the Mountphilips Substation is located in a low lying location, most of the 110kV UGC is located across the lower slopes of an upland area, and consequently the watercourse crossings comprise mainly drains along with several headwater streams (1st – 2nd order).

Table 3: Watercourse Crossing Types along the 110kv UGC

Type	Watercourse Description	Total No.
1	EPA mapped blue line, major river or stream	13
2	Headwater Stream, equivalent to EPA blue line but not mapped	3
3	Ephemeral watercourse, heavily vegetated with low or no flow during dry periods	27
4	Manmade Drain	25
	Total	**68**

2.3 Flood Risk Assessment

The OPW Indicative Flood Maps have no records of recurring flood incidences along the UWF Grid Connection areas or immediately downstream of them (**Figure B** over, refers). The closest mapped recurring flooding event is mapped at Derryleigh, 350m south of the UWF Grid Connection route.

There are further afield recurring flood incidences mapped to the west of the Mountphilips Substation and west of the 110kV UGC in the town of Newport.

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 largely only available for watercourses downstream of the 110kV UGC route at Newport and therefore the PFRA mapping was consulted.

The PFRA mapping indicates that fluvial flooding along the 110kV UGC route is relatively localised to the larger stream and river crossing locations, namely; crossing locations W5, W7 (Newport River), W8, W9, W33, W36 (Clare River), W49 and W53 (Bilboa River) which are all mapped to be within the 100-year flood zone (Flood Zone A). All the above watercourse crossing within mapped 100-year flood zones are along the public road at existing bridges. These bridges will be crossed by installing a cable within the existing bridge structure, with the exception of W8 and W9, which will be directional drilled.

There are 42 no. joint bays (and their communication and link box chambers) located along the 110kV UGC and only 1 no. of the joint bay locations (J6) is located within a mapped fluvial flood zone. The Mountphilips Substation site and it's access roads are not located within a mapped fluvial flood zone.

There are no significant mapped pluvial flood zones along the UWF Grid Connection route. Due to the elevated and hilly nature of the topography in the area of the UWF Grid Connection development and the fact that the route is along public roads with drainage, no significant pluvial flooding is anticipated. None of the proposed joint bays are located within a mapped pluvial flood zone.

The proposed development largely involves the construction of the substation compound and the installation of underground cables and joint bays for the 110kV UGC. The 110kV UGC has no potential to increase flood risk due to its subsurface nature. The public road and agricultural land surrounding the permanent footprint of the Mountphilips Substation will be reinstated back to its original condition after the works are completed.

There are certain elements of the permanent infrastructure at the Mountphilips Substation site, such as new permanent watercourse crossing structures at watercourse crossings W2 and W3, and the new permanent access road which have *potential* to increase flood risk. Project design measure and best practice measures will be implemented during the construction of the UWF Grid connection to reduce flood risk – see Section 3.

[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.*

Figure B: OPW Flood Hazard Mapping (**www.floods.ie**)

2.4 Designated Sites

The UWF Grid Connection overlaps the boundary of the Lower River Shannon SAC and is located upstream of the Lower River Suir SAC and the Clare Glens SAC.

The Lower River Shannon SAC encompasses the Shannon, Feale, Mulkear and Fergus estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments, and the marine area between Loop Head and Kerry Head.

The Mountphilips Substation site and the majority of the 110kV UGC (29km of the total 30.5km) are located within the Mulkear River catchment of the Lower River Shannon SAC catchment area. The UWF Grid Connection (110kV UGC) is located within the boundary of the Lower River Shannon SAC at six locations, over a total distance of 1025m, as follows;

- 190m along a section of the local public road L6013-0 to the north of Newport;
- 230m along a section of local public roads L2156-0 and L2157-0 on either side of, and over Rockvale Bridge. Rockvale Bridge crosses the Newport River, to the north of Newport town, at Watercourse Crossing W6;
- 100m, 80m and 390m sections along the Regional Limerick to Thurles Road R503 to the east of Rear Cross; and
- 35m along a section of the Regional Road R503 at Anglesey Bridge, near Kilcommon. Anglesey Bridge crosses over the Bilboa River, to the south of Kilcommon village, at Watercourse Crossing W52.

All trenching works at the Rockvale Bridge and Anglesey Bridge will be carried out in the bridge structure. No instream works and no works on the lands below the bridges will be required. All works will be carried out from the bridge structures.

All construction works on the public road, including where works overlap the SAC boundary, will be carried out in the public road pavement and no instream works, and no works in the verges or adjacent lands will occur.

The Lower River Suir SAC consists of all of the freshwater stretches of the Suir immediately south of Thurles, and the tidal stretches as far as the confluence with the Barrow/Nore immediately east of Cheekpoint in Co. Waterford. Within the River Suir catchment, the last c.1.5km of the UWF Grid Connection 110kV UGC route is located in the Clodiagh River catchment. The UWF Grid Connection construction works are located c.12km upstream of the River Suir SAC.

Within the Suir_SC_030 sub-catchment of the River Suir, there are a total of 5 no. watercourses within the construction works area boundary associated with the UWF Grid Connection (W64 – W68). The 110kV UGC will cross all 5 watercourses at existing crossing points (culverts) along the public road network – 3 no. (W64, W65, W66) are located L2264-50 and L6188-0 public roads, while the remaining 2 no. (W67 and W68) are located along the private paved road to the Consented UWF Substation. Due to the primarily upland nature of the study area, all of the watercourses intercepted by the UWF Grid Connection within the River Suir catchment are either drains or minor headwater (1st - 2nd order) streams.

Clare Glen SAC is located in a wooded area on both banks of the Clare River approximately c.2.2km downstream of the UWF Grid Connection (110kV UGC) within the Clare River catchment. The qualifying interests, which includes Old Oak Woodlands and Killarney Fern, are terrestrial habitats, rather than water or watercourse based habitats. Regardless, with the implementation of the project design measures, any effects to water quality within the downstream SAC will be imperceptible of less.

Best practice surface water management mitigation measures which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses as described in Section 3 below.

3. SURFACE WATER MANAGEMENT & POLLUTION PREVENTION

3.1 Project Design Measures

3.1.1 Introduction

At the conception of the Project, 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 mitigation measures into the fundamental design of the development. Various measures, particularly options for mitigation by avoidance and mitigation by prevention are proposed.

3.1.2 Project Design Measures

The project design measures relating to the water environment are shown in Table 4 below.

Table 3: Water Related Environmental Protection Project Design Measures

Impact Source: Sediment / Suspended Solids	
PD No.	**Project Design Measure**
PD19	At Mountphilips Substation location, where dewatering of trenches or excavations is required, there will be no direct discharge of untreated 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 to the volume of water requiring treatment (if any) to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.
PD20	At Mountphilips Substation site, all excavated material will be removed for temporary or permanent storage at designated berms, which will be located more than 25m away from the watercourses on Mountphilips Substation site. All storage berms will be graded and sealed following emplacement. The berms will be covered if there is a risk of erosion. Temporary silt control methods such as silt fencing will be placed around all overburden storage areas. The existing vegetative buffer between the berms and the nearest watercourses will be maintained and no works will occur in the buffer zone.
PD21	At Mountphilips Substation site, the permanent storage berms will be along the new access road and around the substation compound will be planted with local provenance native fruiting hedge species, with grasses and native flower species common to the surrounding vegetation sown along the sides of the berms. Local provenance native wildflower seed of flowering plants like clovers, vetches and knapweed will be included. Revegetation works will take place at the soonest practicable opportunity after emplacement.
PD22	Outside of the Mountphilips Substation site, there will be no storage of overburden and all excavations from road trenches will be removed to licensed waste facilities in accordance with the UWF Grid Connection Waste Management Plan. Loads of excavated material will be covered during transportation to prevent spillages of excavated material.
PD23	All Joint Bays for the 110kV UGC will be located at least 50m from a Class 1 or Class 2 watercourse and at least 25m from Class 3 or Class 4 watercourses.
PD24	Outside of the Mountphilips Substation site, where dewatering of trenches or excavations is required for the 110kV UGC, there will be no direct discharge of treated water into any watercourse or drain. Rather all pumped water will be treated using a mobile water treatment train and then discharged via a silt bag to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.
PD25	Construction works along the 110kV UGC route will cease during heavy or prolonged rainfall events, and any open trenches or excavations will be covered. Use of weathering forecasting will be undertaken in advance of works.

PD26	A phased approach will be undertaken in relation to excavations, excavation dewatering and any culvert replacement works, where these works occur within 50m of a watercourse. The phased approach will only permit one of main potential sediment producing activities (i.e. excavations, excavation dewatering or culvert replacement works), to be carried out within 50m of a watercourse, at any one time.
PD27	At Mountphilips Substation site, works within 50m of watercourses, 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.
PD28	Along the 110kV UGC on the public road, where works will take place within 50m of a watercourse, additional mitigation measures will be implemented which include silt fencing and placement of sandbag arrangements along preferential surface water flowpaths on the road pavement. Following works on any particular section, any works debris will be removed from the road before the sandbags and silt fences are removed.
PD29	Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff. None of these 110kV UGC sections are within the Lower River Shannon SAC.
PD30	Lines of silt fencing and sandbags will be erected along the edge of the road so that surface water runoff from adjacent construction works areas is captured and directed to the excavated trench, where it can be pumped and treated before being released, as per PD24.
PD31	Works to bridge parapet walls at watercourse crossings W7, W36, W53 will be carried out during dry weather, and debris netting will be fixed to the outside of the walls in order to prevent any debris falling into the watercourse below.
PD32	At Mountphilips Substation site, instream construction works at the watercourse crossings W1, W2 and W3 will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). 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 margins to stabilise banks, add flood protection and provide riparian buffer; and the use of deflector plates during the restoration of flow. Instream works at W1, W2 and W3 at the Mountphilips Substation site will be undertaken during dry weather within the IFI instream works window (July – September inclusive). As per PD41, instream works at W1, W2 and W3 will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed.Although intended for the purpose of the WFD, this measure will also indirectly contribute to downstream water quality protection in the SAC.
PD37	In addition to PD22, there will be no storage of overburden within the Lower River Shannon SAC.
PD38	110kV UGC works outside of Mountphilips Substation site will be carried out entirely on paved roads and where the 110kV UGC crosses watercourses, the works will be carried out over the existing bridges and over/under existing culverts. No in-streams works are proposed at any watercourse crossing points (including the Newport River and Bilboa River crossings) within the boundary of the Lower River Shannon SAC and therefore there will be no placement of cement or other materials within the river channels or on the river banks within the SAC.
PD40	In addition to PD29, all 110kV UGC works within the boundary of the Lower River Shannon SAC will only be completed during dry weather in the dryer months of the year – i.e. February to September included.

PD45	The horizontal directional drilling works at W8 and W9 will be carried out by an experienced Drilling Contractor and supervised and managed by a competent and experienced Mud Engineer who understands the technicalities and challenges of drilling works. The Mud Engineer will advise the Construction Manager on the selection of competent drillers for the HDD works; monitor the watercourse bed during drilling works, and will supervise the drilling works including the drilling pressures and the implementation of any contingency measures. From a surface water quality protection perspective, the area around the launch/reception pit, bentonite batching, pumping and recycling plant will be bunded using appropriate terram geotextile and/or sandbags in order to contain any spillages. Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area. Spills of drilling fluid will be cleaned up immediately and stored in an adequately sized water tight skip before being taken off-site to a suitably licensed waste facility. In the event of a break-out occurring, the Environmental Emergency Response Procedure for Frac-Out will be implemented which includes the following contingency measures; In the event of break-out occurring in the river bed, the rig will immediately shut off the pumps and the drilling assembly will be pulled off to reduce annular pressures; In the event of break-out on the road an excavator will be available to dig a pit to contain fluid with vacuum trucks/pumps available to transfer drill fluid from the containment point back to the recycling point; and in either scenario, drilling fluid additives designed to plug the formation will be introduced to the circulation system and let set. Environmental Emergency Response Procedures are included in the UWF Grid Connection Environmental Management Plan (see Volume D).
PD49	In-stream works at Mountphilips Substation site and culvert replacement works at W14 along the R503 Regional Road will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
PD50	Culvert replacement works along the 110kV UGC will not be undertaken without isolation of flow within the watercourse. Isolation of flow will be achieved through the use of sandbags filled with clean, washed sand. Any fish within the isolated section will be removed prior to works commencing. This will require the engagement of licensed fisheries personnel to deplete the works area 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 using a flume (pipe), with deflector plates used on the downstream side of the flume to reduce the hydraulic power of the water. Construction works at the crossing will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilization measures, reinstatement of bank slope and character; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and the use of deflector plates during the restoration of flow. As per PD41, culvert replacement works will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed. These measures will ensure that the baseline character is maintained and will ensure that a deterioration in morphology is avoided, as required under the Water Framework Directive. This in turn will protect Aquatic Ecology.
PD51	The sections of the 110kV UGC trench within the R503, in the central part of the 110kV UGC where the adjacent lands comprise predominantly peaty soils, will be lined with a geotextile membrane which will provide support to the cables trench and the road structure.
Oils and Fuels	
PD16	No refuelling of plant or equipment will be permitted within 100m of identified water supply wells
PD39	In addition to PD42, there will be no refuelling of vehicles or plant, no storage of fuels and no overnight parking permitted within 100m of the boundary of the Lower River Shannon SAC.
PD42	There will be no refuelling of vehicles or plant permitted within 100m of a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment. The

	Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
PD43	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 at the Mountphilips Substation site. All fuel will be stored in bunded, locked storage containers. The designated storage location will be greater than 100m from a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored at the designated location in the temporary compound and all operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
PD44	Overnight parking of plant and machinery will only be permitted at the temporary compound at the Mountphilips Substation site and at a distance greater than 50m from watercourses.
PD45	The horizontal directional drilling works at W8 and W9 will be carried out by an experienced Drilling Contractor and supervised and managed by a competent and experienced Mud Engineer who understands the technicalities and challenges of drilling works. The Mud Engineer will advise the Construction Manager on the selection of competent drillers for the HDD works; monitor the watercourse bed during drilling works, and will supervise the drilling works including the drilling pressures and the implementation of any contingency measures. From a surface water quality protection perspective, the area around the launch/reception pit, bentonite batching, pumping and recycling plant will be bunded using appropriate terram geotextile and/or sandbags in order to contain any spillages. Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area. Spills of drilling fluid will be cleaned up immediately and stored in an adequately sized water tight skip before being taken off-site to a suitably licensed waste facility. In the event of a break-out occurring, the Environmental Emergency Response Procedure for Frac-Out will be implemented which includes the following contingency measures; In the event of break-out occurring in the river bed, the rig will immediately shut off the pumps and the drilling assembly will be pulled off to reduce annular pressures; In the event of break-out on the road an excavator will be available to dig a pit to contain fluid with vacuum trucks/pumps available to transfer drill fluid from the containment point back to the recycling point; and in either scenario, drilling fluid additives designed to plug the formation will be introduced to the circulation system and let set. Environmental Emergency Response Procedures are included in the UWF Grid Connection Environmental Management Plan (see Volume D).
Cement Based Compounds	
PD34	Only precast concrete culverts or structures will be used at the watercourse crossing locations at Mountphilips Substation site and for any culvert replacements along the 110kV UGC. Only precast concrete chambers will be used at Joint Bay locations. No batching of wet cement will take place on-site.
PD35	Concrete pours will be required for the 110kV UGC cables trench. Only chutes will be washed out at the works locations into the cable trench, with the washout of the tank taking place at the concrete supplier depot. Concrete chute washouts within the SAC boundary will take place into designated bins for removal to the designated concrete wash settlement pond at the Mountphilips Substation site.
PD36	The sections of 110kV UGC trenches that overlap the Lower River Shannon SAC will be lined with an impermeable geotextile material to prevent potential migration of cement from the trench base or sides into the SAC.
PD38	110kV UGC works outside of Mountphilips Substation site will be carried out entirely on paved roads and where the 110kV UGC crosses watercourses, the works will be carried out over the existing bridges and over/under existing culverts. No in-streams works are proposed at any watercourse crossing points (including the Newport River and Bilboa River crossings) within the boundary of the Lower River Shannon SAC and therefore there will be no placement of cement or other materials within the river channels or on the river banks within the SAC.

Flood Risk	
PD18	The new substation compound and the new permanent access road at the Mountphilips Substation site will have a permanent surface water drainage network in place which will include check dams. These check dams will allow the settlement of suspended solids in water runoff while also slowing down the rate of water run-off from these areas.
PD25	Construction works along the 110kV UGC route will cease during heavy or prolonged rainfall events, and any open trenches or excavations will be covered. Use of weathering forecasting will be undertaken in advance of works.
PD29	Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff. None of these 110kV UGC sections are within the Lower River Shannon SAC.
PD33	All new permanent watercourse culverts at the Mountphilips Substation site and any replacement culverts along the public road for the 110kV UGC will be sized to cope with a minimum 100-year flood event.
PD40	In addition to PD29, all 110kV UGC works within the boundary of the Lower River Shannon SAC will only be completed during dry weather in the dryer months of the year – i.e. February to September included.
PD48	The new permanent cross structures at the Mountphilips Substation site and the replacement culvert at W14 along the R503 will be bottomless or clear spanning.
PD49	In-stream works at Mountphilips Substation site and culvert replacement works at W14 along the R503 Regional Road will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
Scheduling and Phasing of Works	
PD25	Construction works along the 110kV UGC route will cease during heavy or prolonged rainfall events, and any open trenches or excavations will be covered. Use of weathering forecasting will be undertaken in advance of works.
PD26	A phased approach will be undertaken in relation to excavations, excavation dewatering and any culvert replacement works, where these works occur within 50m of a watercourse. The phased approach will only permit one of main potential sediment producing activities (i.e. excavations, excavation dewatering or culvert replacement works), to be carried out within 50m of a watercourse, at any one time.
PD29	Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff. None of these 110kV UGC sections are within the Lower River Shannon SAC.
PD31	Works to bridge parapet walls at watercourse crossings W7, W36, W53 will be carried out during dry weather, and debris netting will be fixed to the outside of the walls in order to prevent any debris falling into the watercourse below.
PD32	At Mountphilips Substation site, instream construction works at the watercourse crossings W1, W2 and W3 will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). 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 margins to stabilise banks, add flood protection and provide riparian buffer; and the use of deflector plates during the restoration of flow. Instream works at W1, W2 and W3 at the Mountphilips Substation site will be undertaken during dry weather within the IFI instream works window (July – September inclusive). As per PD41, instream works at W1, W2

	and W3 will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed. Although intended for the purpose of the WFD, this measure will also indirectly contribute to downstream water quality protection in the SAC.
PD49	In-stream works at Mountphilips Substation site and culvert replacement works at W14 along the R503 Regional Road will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).

3.1.3 Phasing of Works within 50m of a watercourse

In an effort to reduce the potential for localised in-combination effects on surface water quality from the main sediment sources during construction works (i.e. watercourse crossing Works, earthworks and excavation dewatering), it is built into the proposed works as a Project Design Measure (PD26) that a phased approach will be undertaken during the construction works, particularly where works within 50m of a watercourse are required.

It is proposed that within any local surface water catchment, the following works will be completed separately:

- Earthworks (trench and joint bay excavations along the 110kV UGC; excavations, access road construction and overburden storage at Mountphilips Substation site);
- Excavation dewatering (i.e. cable trench/joint bay/foundation dewatering where required); and,
- Watercourse crossing works (particularly at W1, W2 and W3 instream works at Mountphilips Substation, and where culvert replacement is required at up to 13 no. locations along the 110kV UGC route, and also to the 2 no. directional drilling locations at W8 and W9.

Not all the activities listed above will be required at all locations (e.g. excavation dewatering are likely to be required at a number of locations only). Earthworks and watercourse crossings will be the main activities required throughout the works area and importantly these activities will be completed at separate times. For example, after the completion of the earthworks (i.e. access road construction / trench excavation) up to a point where watercourse crossing works are required (e.g. new/replaced culvert), the permanent drainage and/or runoff control measures will have been put in place prior to the commencement of the watercourse crossing works. This will reduce the potential for localised in-combination effects on surface water quality. In other words, the watercourse crossing works such as open trenching / excavation pumping / installation or replacement of structures will not commence until the earthworks within 50m of the watercourse have been completed and the relevant surface water control measures have been put in place.

3.1.4 Protection measures to be implemented within 50m of a Watercourse

In addition to the Phasing of Works within 50m, the following Project Design Measures will also be implemented within 50m of watercourse:

- At the Mountphilips Substation site, where works within 50m of watercourses are taking place, the following additional mitigation measures will be put in place: 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.
- Along the 110kV UGC on the public road, where works will take place within 50m of a watercourse, the following additional mitigation measures will be put in place: placement of sandbag arrangements along preferential surface water flowpaths on the road pavement, regular road sweeping to remove debris from works areas on the road, and sweeping road before the sandbags are removed.
- Excavation work will not be undertaken during periods of high rainfall. This will minimise the risk of entrainment of suspended sediment in surface water runoff and transport via this pathway to surface watercourses;
- If high levels of silt or other contaminants are noted in any local watercourse, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied;
- At the Mountphilips Substation site, all disturbed ground will be re-seeded at the soonest, practicable opportunity to prevent erosion; all temporary surface water control / protection measures such as silt fencing and check dams will be kept in place until disturbed ground has vegetated and stabilized;
- There will be no refuelling of vehicles or plant permitted within 100m of a watercourse. All plant will be checked for purpose of use prior to mobilisation. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be trained in the use of this equipment

3.2 Best Practice Measures

Best Practice Measures (BPMs) have been prepared for each of the main construction activities that have the potential to impact on the surface water environment. The BPMs are listed in **Table 5** below, and included in full in Tab 7 of the UWF Grid Connection Environmental Management Plan.

Table 4: Water Related Environmental Protection Best Practice Measures

BPM No.	Best Practice Measure Title
GC-BPM-01	Measures for Protection of Surface Water Quality and Watercourse Morphology during instream works at Mountphilips Substation site
GC-BPM-02	Measures for Protection of Surface Water Quality and Watercourse Morphology during replacement of existing culverts along the 110kV UGC outside Mountphilips Substation site
GC-BPM-03	Design of New Permanent Watercourse Crossing Structures and Existing Culvert Replacements to Prevent Flood Risk
GC-BPM-04	Surface Water Quality Protection Measures for Site Runoff during the Mountphilips Substation Site Construction Works
GC-BPM-05	Protection of Surface Water and Groundwater Quality during use of Cement Based Compounds
GC-BPM-06	Protection of Surface Water and Groundwater Quality During Storage and Handling of Fuels, Oils and Chemicals
GC-BPM-07	Surface Water Quality Protection Measures During Storage of Overburden at the Mountphilips Substation Site

3.3 Emergency Response Measures

Three Emergency Response Procedures have been developed, and will be implemented immediately in the unlikely event of a significant pollution occurrence in local surface waters relating to the works. These Emergency Response Procedures are listed in Table 6 below, and included in full in Tab 6 of the UWF Grid Connection Environmental Management plan.

Table 5: List of Emergency Response Procedures

ERP No.	Environmental Emergency Response Procedures
GC-ERP-01	Oil/Fuel Spillage
GC-ERP-02	Significant Pollution Occurrence in Local Surface Waters
GC-ERP-03	Frac-Out during Drilling Works at W8 or W9

4. WATER QUALITY MONITORING PLAN

4.1 Drainage Inspection & Maintenance at Mountphilips Substation site

Drainage control and maintenance will form part of the civil works contract requirements. During the construction phase the effectiveness of drainage measures designed to minimise runoff entering works areas and the capture and treatment of potentially silt-laden water from the works areas will be monitored periodically (daily, weekly, and event based monitoring, *i.e.* after heavy rainfall events) by the Environmental Clerk of Works and their team of environmental specialists, which will include a Project Hydrologist and a Project Aquatic Ecologist.

The Construction Manager will respond to changing weather and drainage conditions on the ground as the project proceeds, to ensure the effectiveness of the drainage design is maintained. Regular inspections of all existing and installed drainage systems will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water along the works area. Any excess build-up of silt levels at check dams, the settlement ponds, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed.

The following periodic inspection regime at Mountphilips Substation site will be implemented, and inspections recorded:

- Daily general visual inspections by Environmental Clerk of Works;
- Weekly (existing & new drains) inspections by site Construction Manager;
- All inspection to include all elements of drainage systems;
- Inspections required to ensure that drainage systems are operating correctly and to identify any maintenance that is required;
- Any changes, such as discolouration, odour, oily sheen or litter should be noted and corrective action should be implemented immediately.
- High risk locations such as settlement ponds will be inspected on a daily basis by the Construction Manager;
- Daily inspections checks will be completed on plant and equipment, and whether materials such as straw bales or oil absorbent materials need replacement;
- Event based inspections by the Environmental Clerk of Works as follows:
    - >10 mm/hr (*i.e.* high intensity localised rainfall event);
    - >25 mm in a 24 hour period (heavy frontal rainfall lasting most of the day); or,
    - Rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week).
- Weekly, Fortnightly and Monthly (depending on weather conditions and the nature of on-going construction works) site inspections by the Project Hydrologist during construction phase.

4.2 Water Quality Monitoring at Mountphilips Substation site and along the 110kV UGC

4.2.1 Field Monitoring

Daily field monitoring of water quality parameters and collection of samples will be undertaken by the Environmental Clerk of Works. He/she will be appropriately trained on the required monitoring methods and the use, calibration and maintenance of all monitoring equipment used.

Regular (i.e. weekly or fortnightly depending on weather conditions) field monitoring will be carried out by the Project Hydrologist.

4.2.2 Sampling Locations

Surface water quality will be monitored during the construction phase and this monitoring will also extend into the post construction phase. Proposed monitoring locations downstream of the works areas (9 no. in total, DSW01 – DSW09) and upstream of the works area (4 no.in total, DSW10 – DSW13) within the EPA sub-catchments are shown on **Figure SWMP 3:** Surface Water Quality Monitoring Locations, see section 5**.**

The locations of the surface water monitoring points will be agreed with Inland Fisheries Ireland and Tipperary County Council in advance of the construction phase.

Coordination of the flow monitoring and continuous monitoring (maintenance and downloading and data management) will be undertaken by the Environmental Clerk of Works, Project Hydrologist and Project Aquatic Ecologist.

4.2.3 Laboratory Analysis

Laboratory analysis of water samples will also be undertaken as part of the monitoring programme by an independent and appropriately certified laboratory.

Coordination of the laboratory sampling and analytical programme will be undertaken by the Environmental Clerk of Works. Samples will be dispatched for analysis under chain of custody procedures.

Laboratory analytical results will be sent to the Environmental Clerk of Works who will relay the data onto the Project Hydrologist and Project Aquatic Ecologist for their independent review.

Proposed parameter suite for hydrochemistry analysis at the monitoring locations is shown in **Table 7** below.

Table 6: Parameter Suite for Surface Water Monitoring

pH (field measured)	Soluble Iron
Electrical Conductivity (field measured)	Ammonia N
Nitrate	Total Petroleum Hydrocarbons
Ortho-Phosphate	Total Suspended Solids
Phosphorus	Turbidity
Biological Oxygen Demand	Total Dissolved Solids
Temperature (field measured)	
Chloride	

4.2.4 Frequency of Water Quality Monitoring

Monitoring frequency will be specified and finalised following consultation with Inland Fisheries Ireland and Tipperary County Council prior to commencement of construction.

As a minimum, the monitoring programme will include:

- Daily visual checks at watercourse crossing locations where works are taking place;
- Weekly sampling for suspended solids and turbidity in catchments where earthworks or watercourse crossing work is on-going;
- Fortnightly sampling for the full suite of parameters (Table 7) in catchments where works are on-going;
- Event based sampling, e.g. after heavy rainfall;
- Additional sampling in the event of trigger level exceedance, after heavy rainfall, etc; and,
- Post construction sampling programme (monthly sampling) for a period of six months.

4.2.5 Surface Water Monitoring Reporting

Results of surface water quality monitoring shall assist in determining requirements for improvements in drainage and pollution prevention measures implemented on site. All results will need to comply with the criteria included in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) to ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.

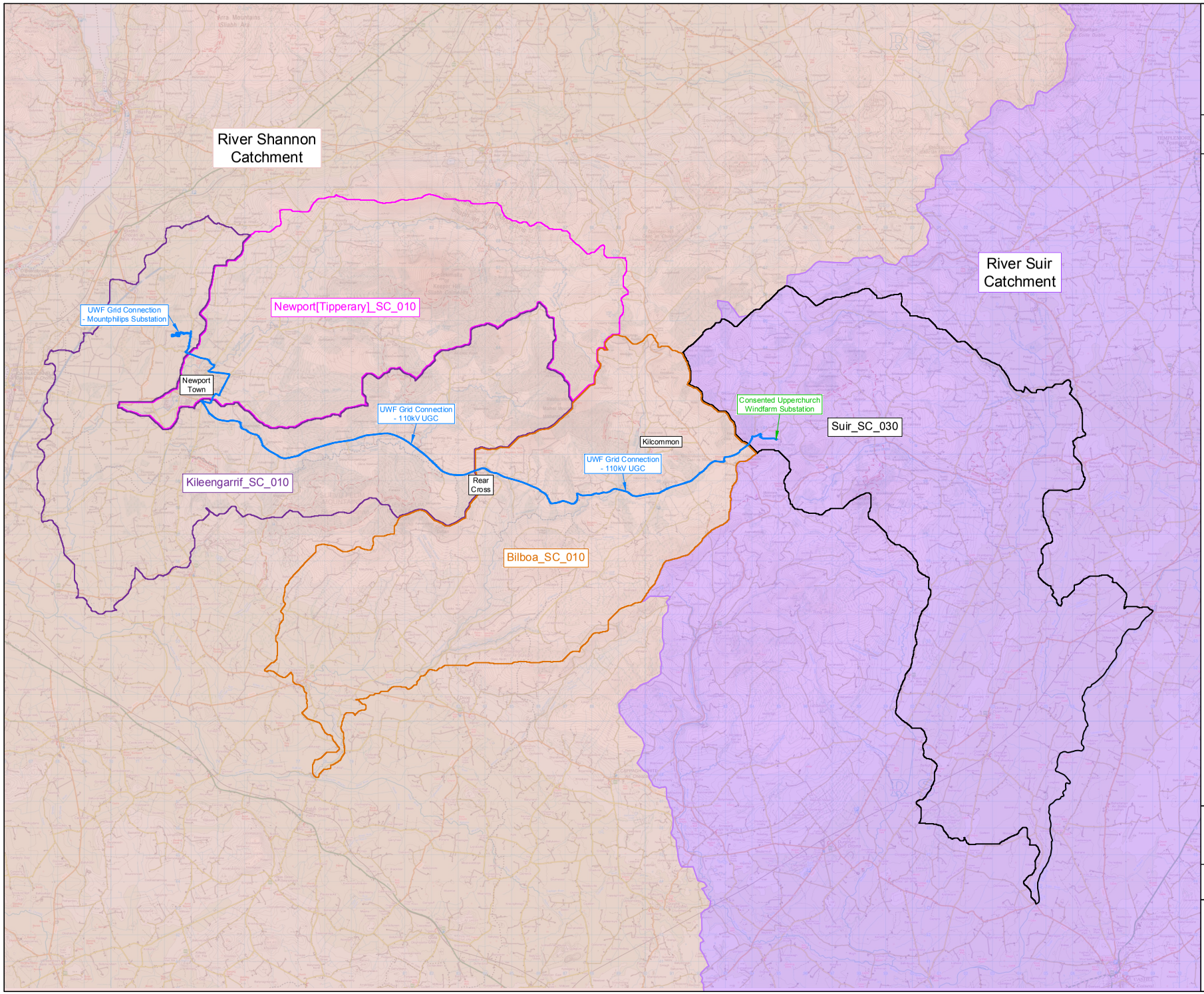
Interpretation and reporting of both the field and laboratory data will be the responsibility of the Project Hydrologist and Project Aquatic Ecologist, who will report the results including any recommendations to the Environmental Clerk of Works.

It will be the responsibility of the Environmental Clerk of Works to present the ongoing results of water quality and weather monitoring to the Project Team at regular site meetings. There will also be regular meetings between the Environmental Clerk of Works and the Construction Manager which will include a look ahead for upcoming works and any environmental management required to facilitate ongoing construction works.

Reports on water quality will consider all field monitoring and results of laboratory analysis completed that period. Reports will describe how the results compare with baseline data as well as previous reports on water quality. The reports will also describe whether any deterioration or improvement in water quality has been observed, whether any effects are attributable to construction activities and what remedial measures or corrective actions have been implemented or are required going forward. The reports will be made available to Tipperary County Council and Inland Fisheries Ireland on request.

* *

5. FIGURES



EMP: Surface Water Management Plan

Figure GC SWMP 1

Local Hydrology Map

Map Number:
Map 1 of 1

Legend:

Subject Development:

- UWF Grid Connection Construction Works Area

Survey Results:

- River Shannon Catchment
- River Suir Catchment
- Kileengarrif_SC_010
- Newport[Tipperary]_SC_010
- Bilboa_SC_010
- Suir_SC_030

N

Project:

UWF Grid Connection (2019)

Drawn by:	Checked by:	Date:	Sheet Size:
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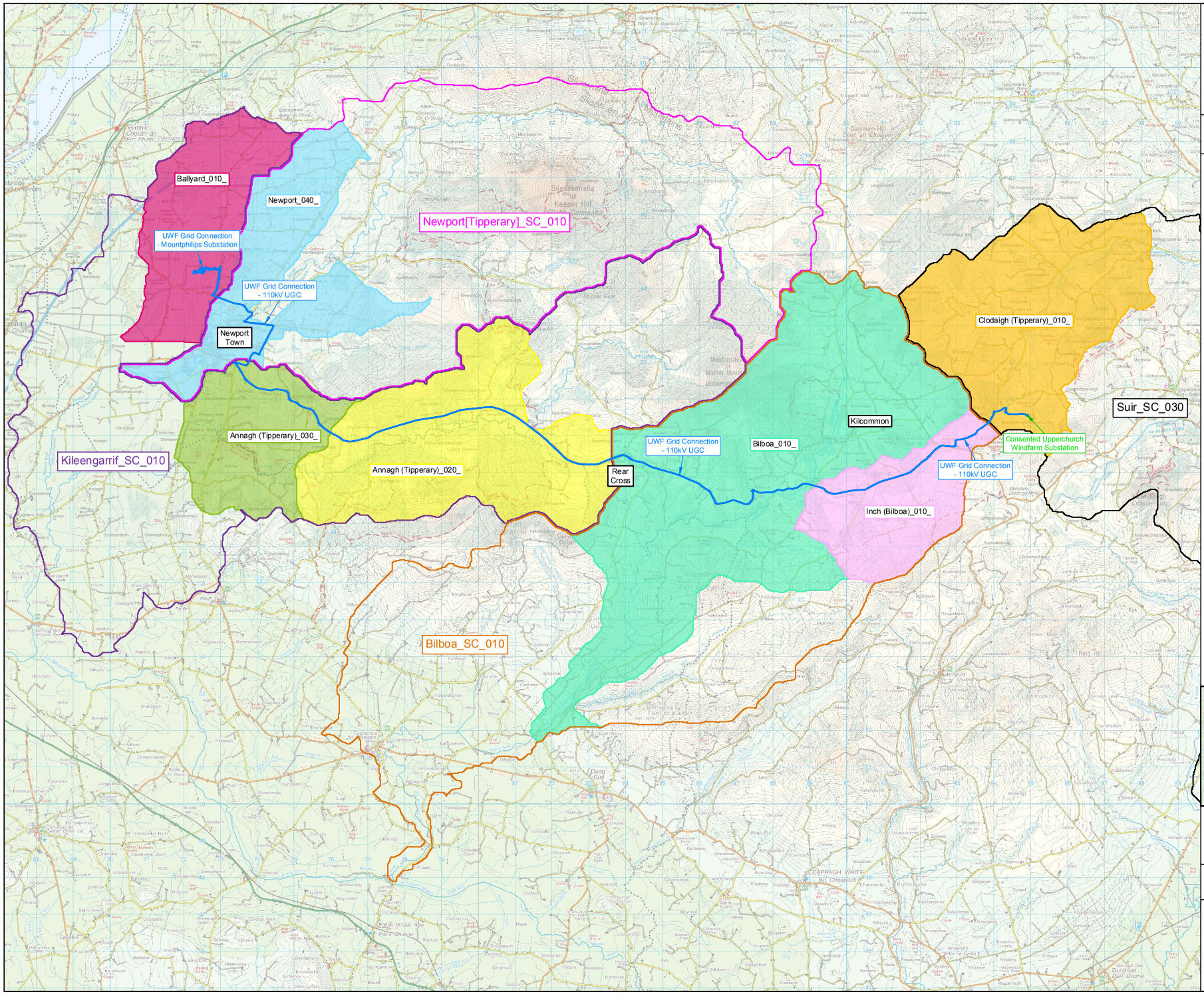


EMP: Surface Water Management Plan

Figure GC SWMP 2

Local Surface Water Crossing Locations

Map Number:

Overview Map

Legend:

Subject Development:

- UWF Grid Connection Construction Works Area

Survey Results:

EPA Sub-Catchment:

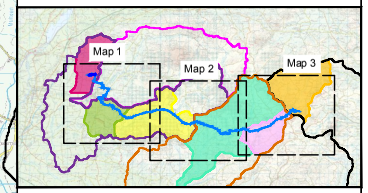
- Kileengarrif_SC_010
- Newport[Tipperary]_SC_010
- Bilboa_SC_010
- Suir_SC_030

EPA Local Surface Water Bodies:

- Ballyard_010
- Newport_040
- Annagh (Tipperary)_030
- Annagh (Tipperary)_020
- Bilboa_010
- Inch (Bilboa)_010
- Clodaigh (Tipperary)_010

N

Keyplan:



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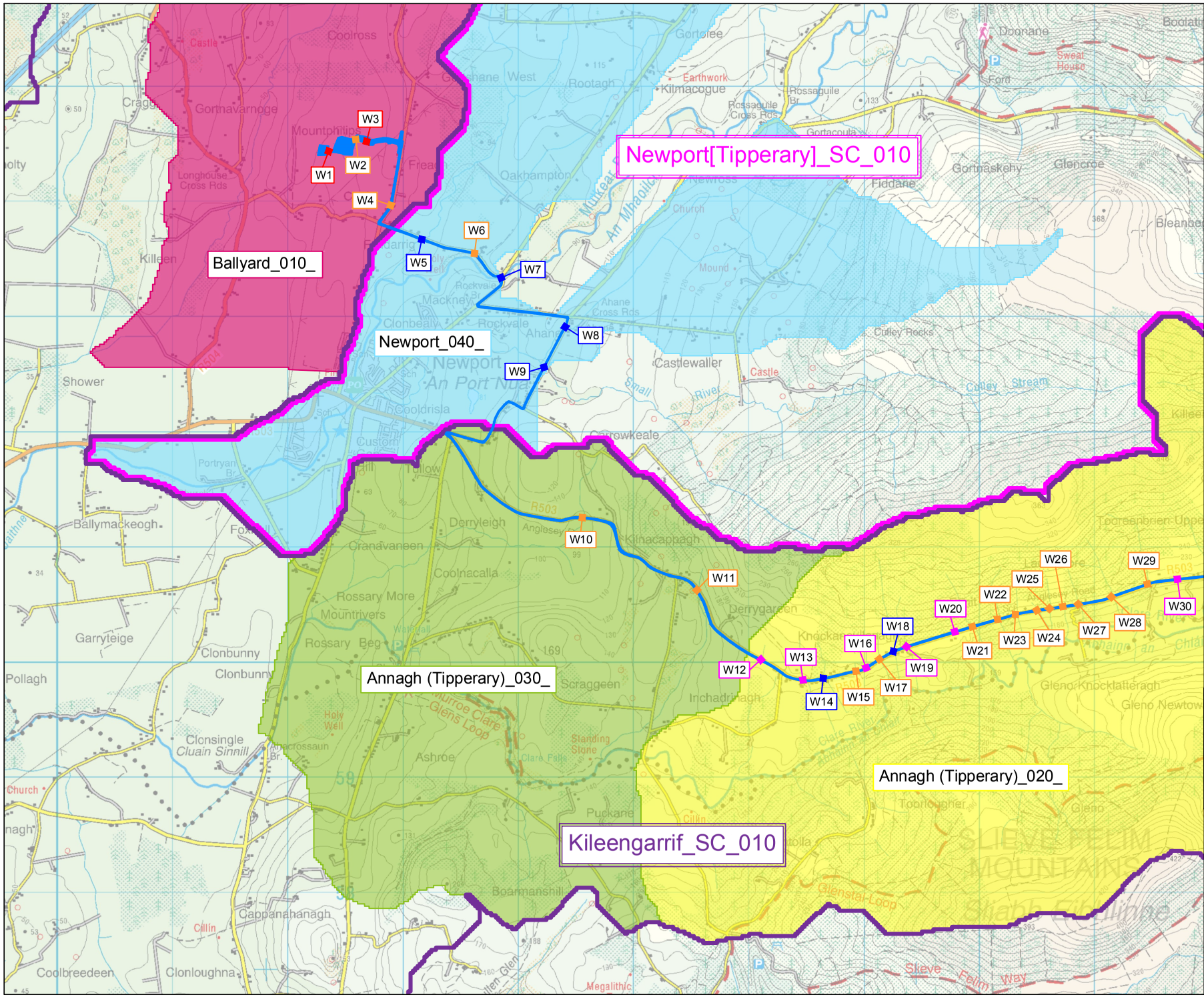


EMP: Surface Water Management Plan

Figure GC SWMP 2

Local Surface Water Crossing Locations

Map Number:
Map 1 of 3

Legend:

Subject Development:

- UWF Grid Connection Construction Works Area

Survey Results:

EPA Sub-Catchment:

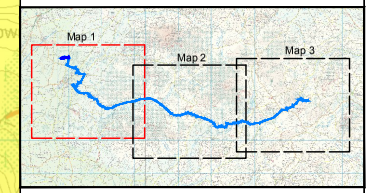
- Kileengarrif_SC_010
- Newport[Tipperary]_SC_010

EPA Local Surface Water Bodies:

- Ballyard_010
- Newport_040
- Annagh (Tipperary)_030
- Annagh (Tipperary)_020
- W7 Class 1 Watercourse Crossing
- W1 Class 2 Watercourse Crossing
- W4 Class 3 Watercourse Crossing
- W12 Class 4 Watercourse Crossing

N

Keyplan:



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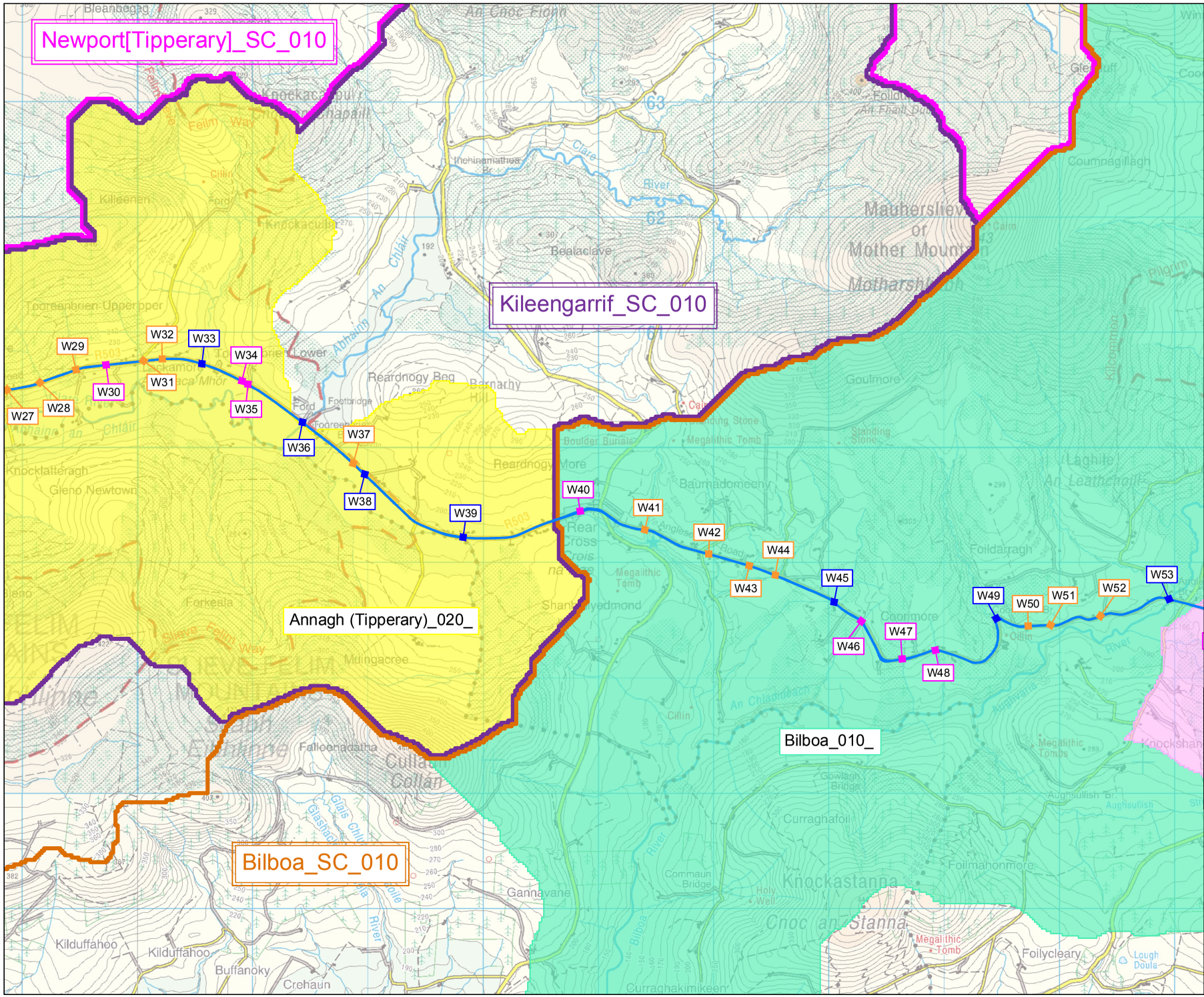

EMP: Surface Water Management Plan

Figure GC SWMP 2

Local Surface Water Crossing Locations

Map Number:
Map 2 of 3

Legend:

Subject Development:

- UWF Grid Connection Construction Works Area

Survey Results:

EPA Sub-Catchment:

- Kileengarrif_SC_010
- Newport[Tipperary]_SC_010
- Bilboa_SC_010

EPA Local Surface Water Bodies:

- Annagh (Tipperary)_020
- Bilboa_010
- Inch (Bilboa)_010
- W7 Class 1 Watercourse Crossing
- W4 Class 3 Watercourse Crossing
- W12 Class 4 Watercourse Crossing

N

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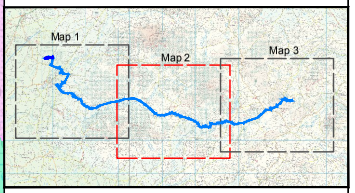

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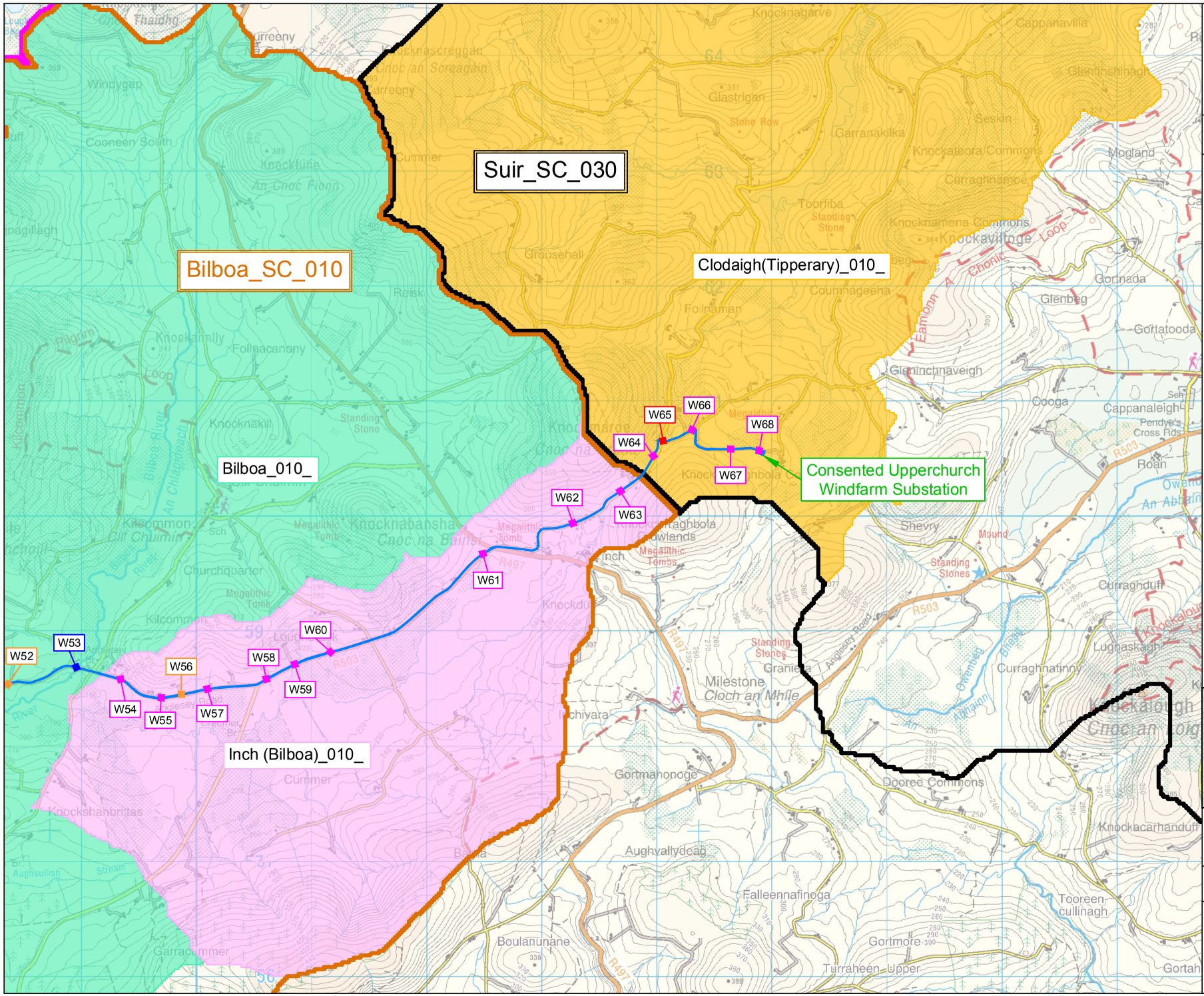

EMP: Surface Water Management Plan

Figure GC SWMP 2

Local Surface Water Crossing Locations

Map Number:
Map 3 of 3

Legend:

Subject Development:

- UWF Grid Connection Construction Works Area

Survey Results:

EPA Sub-Catchment:

- Newport[Tipperary]_SC_010
- Bilboa_SC_010
- Suir_SC_030

EPA Local Surface Water Bodies:

- Bilboa_010
- Inch (Bilboa)_010
- Clodaigh (Tipperary)_010
- W7 Class 1 Watercourse Crossing
- W65 Class 2 Watercourse Crossing
- W4 Class 3 Watercourse Crossing
- W12 Class 4 Watercourse Crossing

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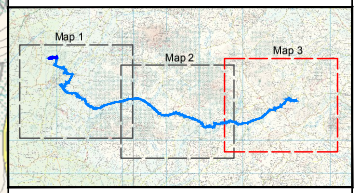

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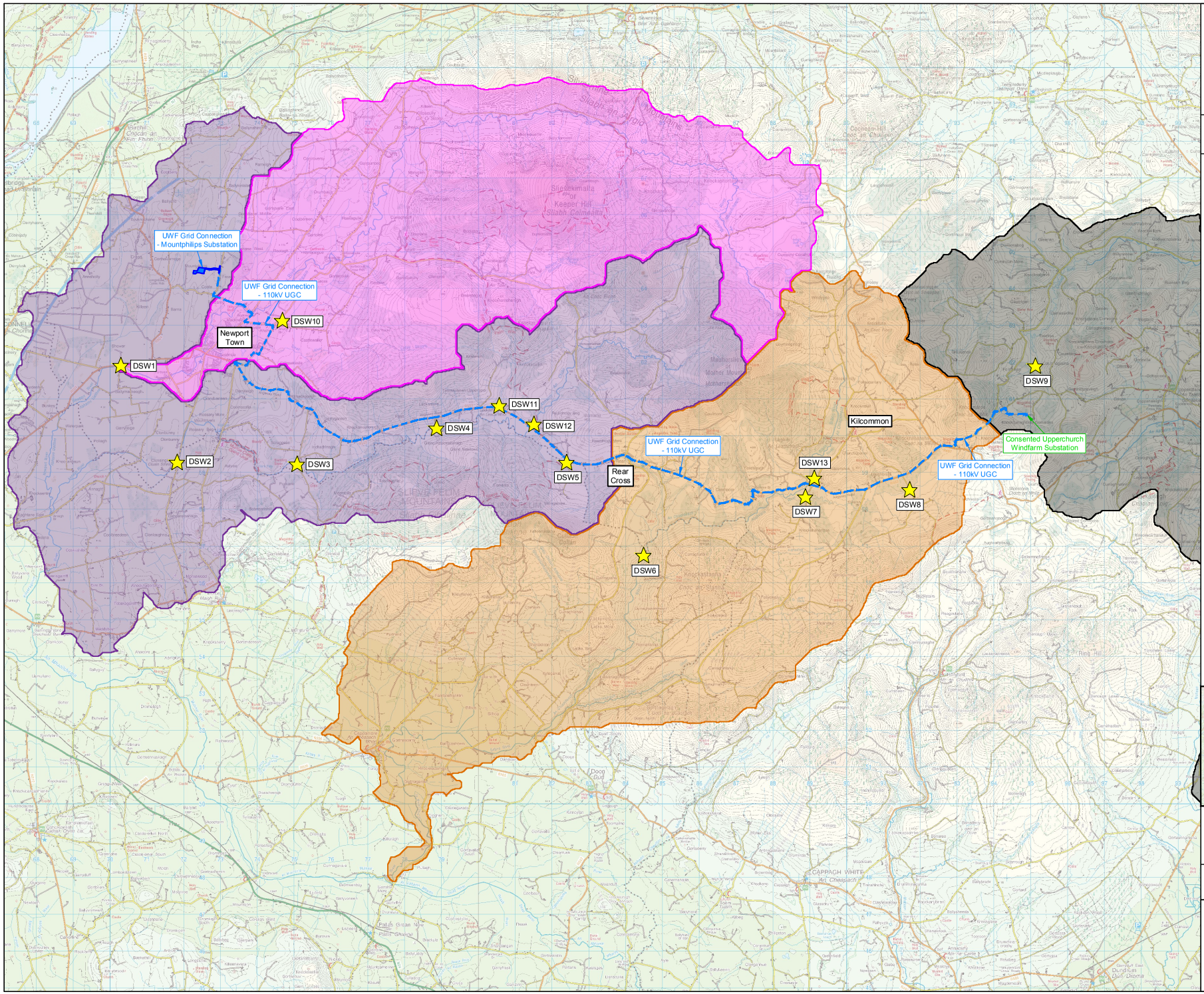


EMP: Surface Water Management Plan

Figure GC SWMP 3

Surface Water Quality Monitoring Locations

Map Number:

Overview Map

Legend:

Subject Development:

- UWF Grid Connection - 110kV UGC
- UWF Grid Connection - Mountphilips Substation

Survey Results:

EPA Sub-Catchment:

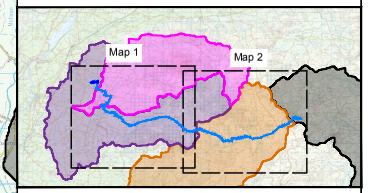
- Kileengarrif_SC_010
- Newport[Tipperary]_SC_010
- Bilboa_SC_010
- Suir_SC_030

Map Information:

- Recommended Downstream Sampling Points
- DSW6 Recommended Downstream Sampling Points Identification Numbers

N

Keyplan:



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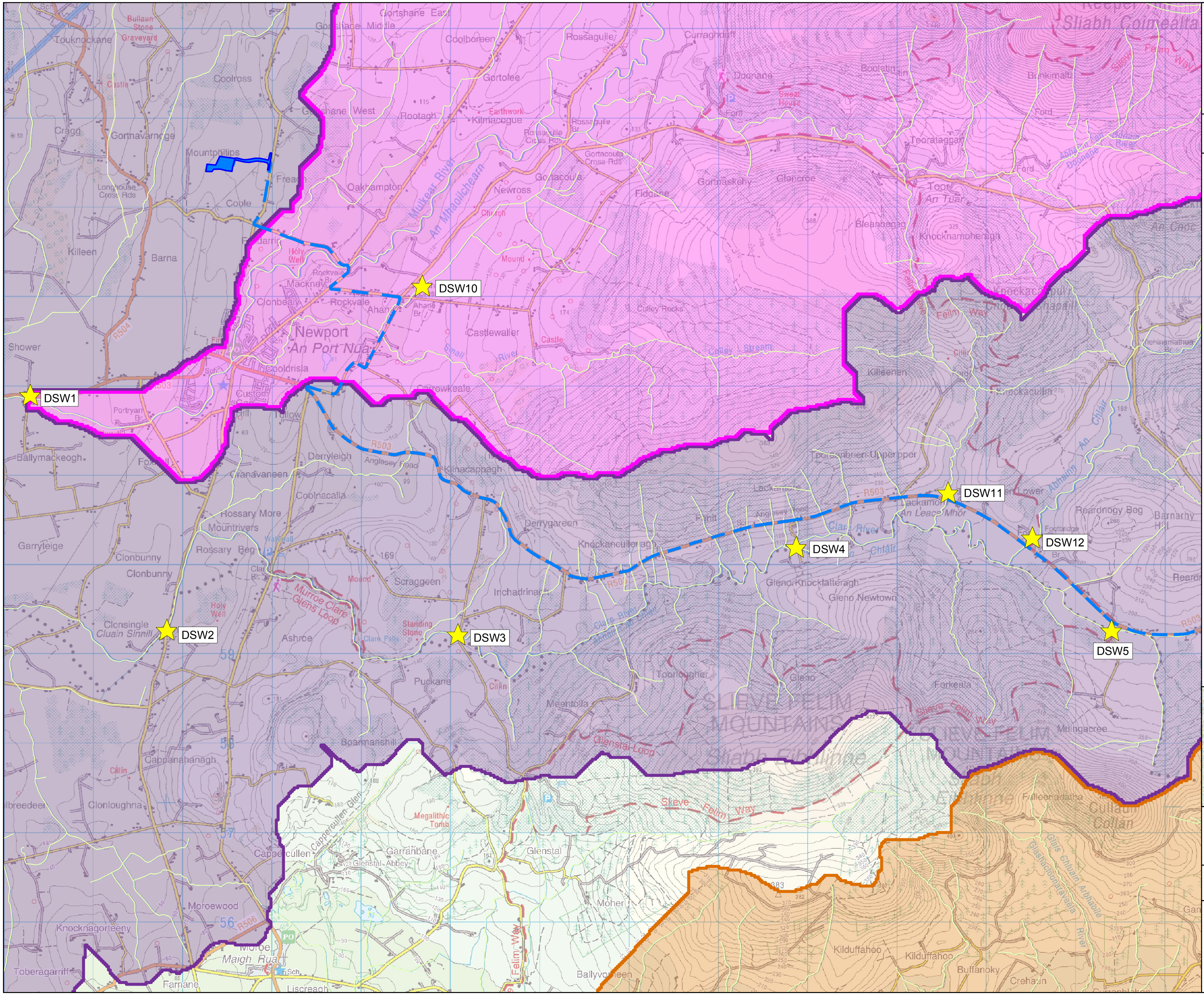

EMP: Surface Water Management Plan

Figure GC SWMP 3

Surface Water Quality Monitoring Locations

Map Number:
Map 1 of 2

Legend:

Subject Development:
- UWF Grid Connection - 110kV UGC
- UWF Grid Connection - Mountphilips Substation

Survey Results:

EPA Sub-Catchment:
- Kileengarrif_SC_010
- Newport[Tipperary]_SC_010
- Bilboa_SC_010

Map Information:
- Recommended Downstream Sampling Points
- DSW6 Recommended Downstream Sampling Points Identification Numbers
- Watercourse

N

Keyplan:

Keyplan
Map 1
Map 2

Project:
UWF Grid Connection (2019)

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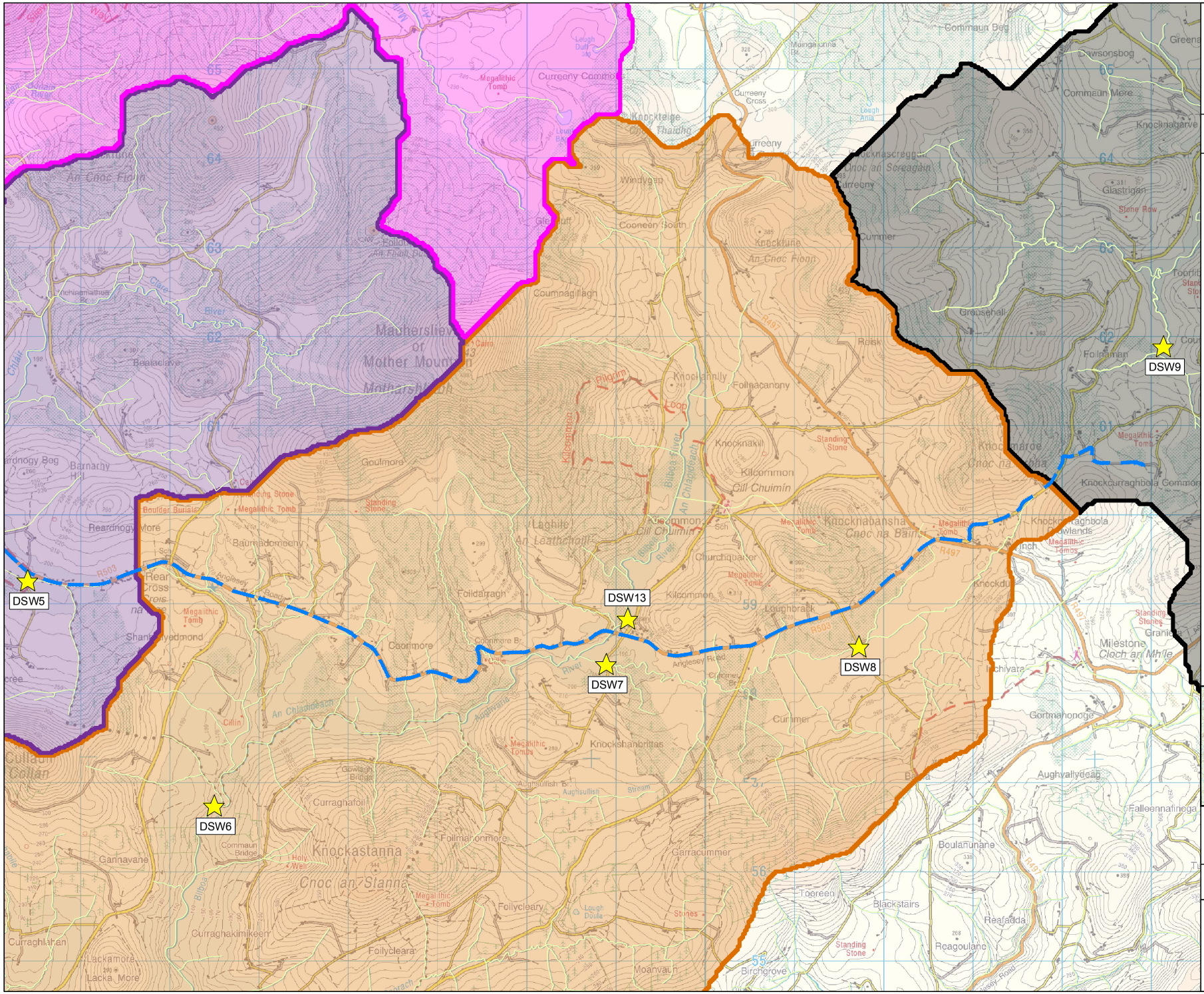

EMP: Surface Water Management Plan

Figure GC SWMP 3

Surface Water Quality Monitoring Locations

Map Number:
Map 2 of 2

Legend:

Subject Development:

- UWF Grid Connection - 110kV UGC

Survey Results:

EPA Sub-Catchment:

- Kileengarrif_SC_010
- Newport[Tipperary]_SC_010
- Bilboa_SC_010
- Suir_SC_030

Map Information:

- Recommended Downstream Sampling Points
- DSW6 Recommended Downstream Sampling Points Identification Numbers
- Watercourse

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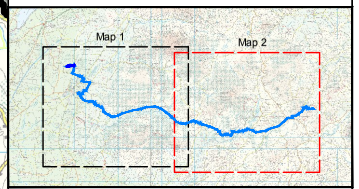
Keyplan:



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UWF Grid Connection

Environmental Management Plan (2019)

Tab 4

Invasive Species Management Plan

INIS Environmental Consultants Ltd.

Suite 11,
Shannon Commercial Properties,
Information Age Park,
Ennis,
County Clare
Ireland.

October 2019

Quality Assurance

The findings outlined within this report and the data we have provided are to our knowledge true, and express our bona fide professional opinions. This report has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Code of Professional Conduct. Where pertinent CIEEM Guidelines used in the preparation of this report include the *Guidelines for Ecological Report Writing* (CIEEM, 2017), *Guidelines for Preliminary Ecological Appraisals* (CIEEM, 2015) and *Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine*, (CIEEM, 2018). CIEEM Guidelines include model formats for Preliminary Ecological Appraisal and Ecological Impact Assessment. Also, where pertinent, evaluations presented herein take cognisance of recommended Guidance from the EPA such as *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2017), and in respect of European Sites, *Managing Natura 2000 sites. The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC* (European Commission, 2018).

Due cognisance has been given at all times to the provisions of the *Wildlife Act, 1976,* the *Wildlife (Amendment) Act, 2000*, the *European Union (Natural Habitats) Regulations. SI 378/2005*, the *European Communities (Birds and Natural Habitats) Regulations 2011,* EU Regulation on Invasive Alien Species under *EU Regulation 1143/2014*, the EU Birds *Directive 2009/147/EC* and *Habitats Directive 92/43/EEC*.

No method of assessment can completely remove the possibility of obtaining partially imprecise or incomplete information. Any limitation to the methods applied or constraints however are clearly identified within the main body of this document.

Version	**Date**		**Name**
1	13/09/2019	**Report prepared by:**	Donncha Ó Catháin MSc GradCIEEM
1	31/10/2019	**Report checked by:**	Chris Cullen DFE, HND Eng. ACIEEM
1	31/10/2019	**Report signed off by:**	Howard Williams CEnv, MCIEEM CBiol MRSB MIFM
Title		Invasive Species Management Plan, UWF Grid Connection project, County Tipperary	
Promoter		Ecopower Developments Ltd	

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Contents

Executive Summary

This report documents site assessments of 45 no. locations where Japanese knotweed, Himalayan knotweed, Rhododendron, and Giant hogweed infestations were recorded by Inis field ecologists during habitat assessments as part of their work on the UWF Grid Connection project. Construction works or activities for UWF Grid Connection are proposed near 24 invasive plant infestation locations.

This report presents the results of the individual site assessments undertaken to estimate the severity of each infestation. The best practices methods and processes which will be implemented during construction works are detailed, which will make safe any infestation proximal to works. A list of general measures to be applied in respect of the protection of the Aquatic Environment and in relation to invasive animal species is also provided.

It is important to note that no biosecurity 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. To ensure the effective implementation of the biosecurity measures, an invasive species specialist will monitor each infestation location during all critical stages of construction works.

1. Introduction

In this Plan, Invasive Species relates to any animal or plant introduced (deliberately or accidently) by human activity to an area in which they do not naturally occur. Invasive Species, which are also referred to as 'invasive non-native species', or '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.

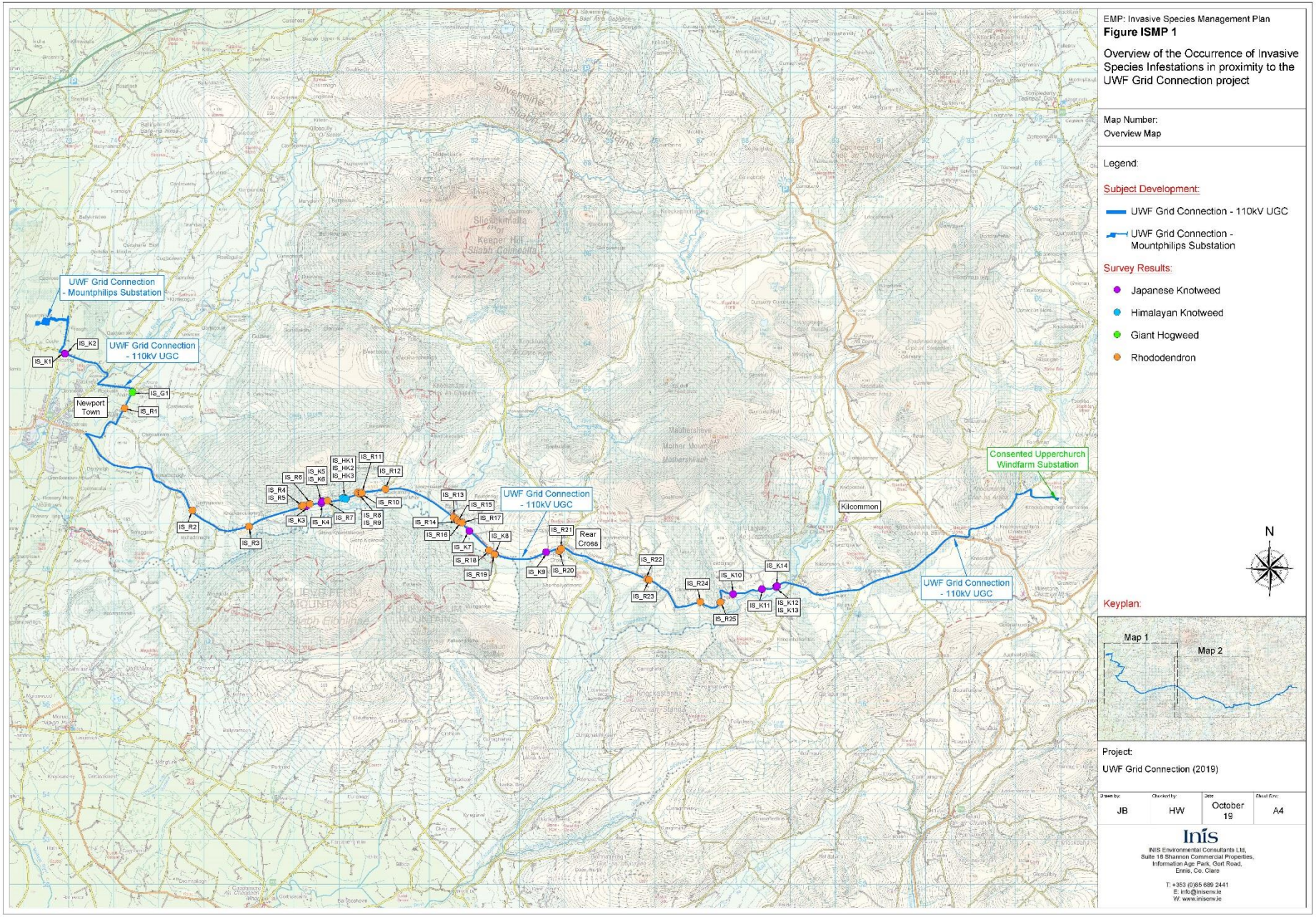
During fieldwork for the UWF Grid Connection project, Inis field ecologists identified a total of 43 invasive plant infestations – see **Figure ISMP 1**. It is important to note that only 24 No. of these will need direct management during the construction process – the other 19 No. infestations are at sufficient distance from the work area boundary not to pose a risk.

All 43 infestations are located on the route of the 110kV UGC. No infestations were recorded at the Mountphilips Substation site. Of the 43 locations along the route of the 110kV UGC, the site assessments by INIS ecologists confirmed the presence of Japanese knotweed (*Fallopia japonica*) at fourteen locations, Himalayan knotweed (*Persicaria wallichii*) at three locations, Rhododendron (*Rhododendron ponticum*) at twenty-five locations, and Giant Hogweed *(Heracleum mantegazzianum)* at one location. The results of the site assessments, which include descriptions of any notable infestation features, are presented in **Section 2: Results of Invasive Species Surveys**.

In relation to the Other Elements of the Whole UWF Project, there are 2 infestation of Japanese Knotweed in close proximity – one close to UWF Other Activities (Haul Route Activities) and one close to UWF Related Works (Internal Windfarm Cabling). These infestations, including their management, are described in **Section 3: Invasive Species Infestations at Other Elements of the Whole UWF Project**.

Invasive Species, such as Japanese knotweed, Himalayan knotweed, Rhododendron, and Giant Hogweed are regulated for control under legislation including under the requirements of the *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.

A description of the biosecurity measures for Invasive Species which will be implemented during construction works are presented in **Section 4: Biosecurity Measures for the Containment and Management of Invasive Species** of this Plan. These measures are taken from the most relevant and current guidance in relation to the containment and management of non-native invasive plant species in construction projects. In addition to the above a list of general measures to be applied in respect of the prevention of spread of invasive species in the aquatic environment and the spread of invasive animal species in the terrestrial environment is provided.


EMP: Invasive Species Management Plan
Figure ISMP 1
Overview of the Occurrence of Invasive Species Infestations in proximity to the UWF Grid Connection project
Map Number:
Overview Map
Legend:
Subject Development:
UWF Grid Connection - 110kV UGC
UWF Grid Connection - Mountphilips Substation
Survey Results:
Japanese Knotweed
Himalayan Knotweed
Giant Hogweed
Rhododendron
UWF Grid Connection - Mountphilips Substation
UWF Grid Connection - 110kV UGC
Newport Town
Rear Cross
Kilcommon
Consented Upperchurch Windfarm Substation
N
Keyplan:
Map 1
Map 2
Project:
UWF Grid Connection (2019)
Drawn by: JB
Checked by: HW
Date: October 19
Sheet Size: A4
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2. Results of Invasive Species Surveys

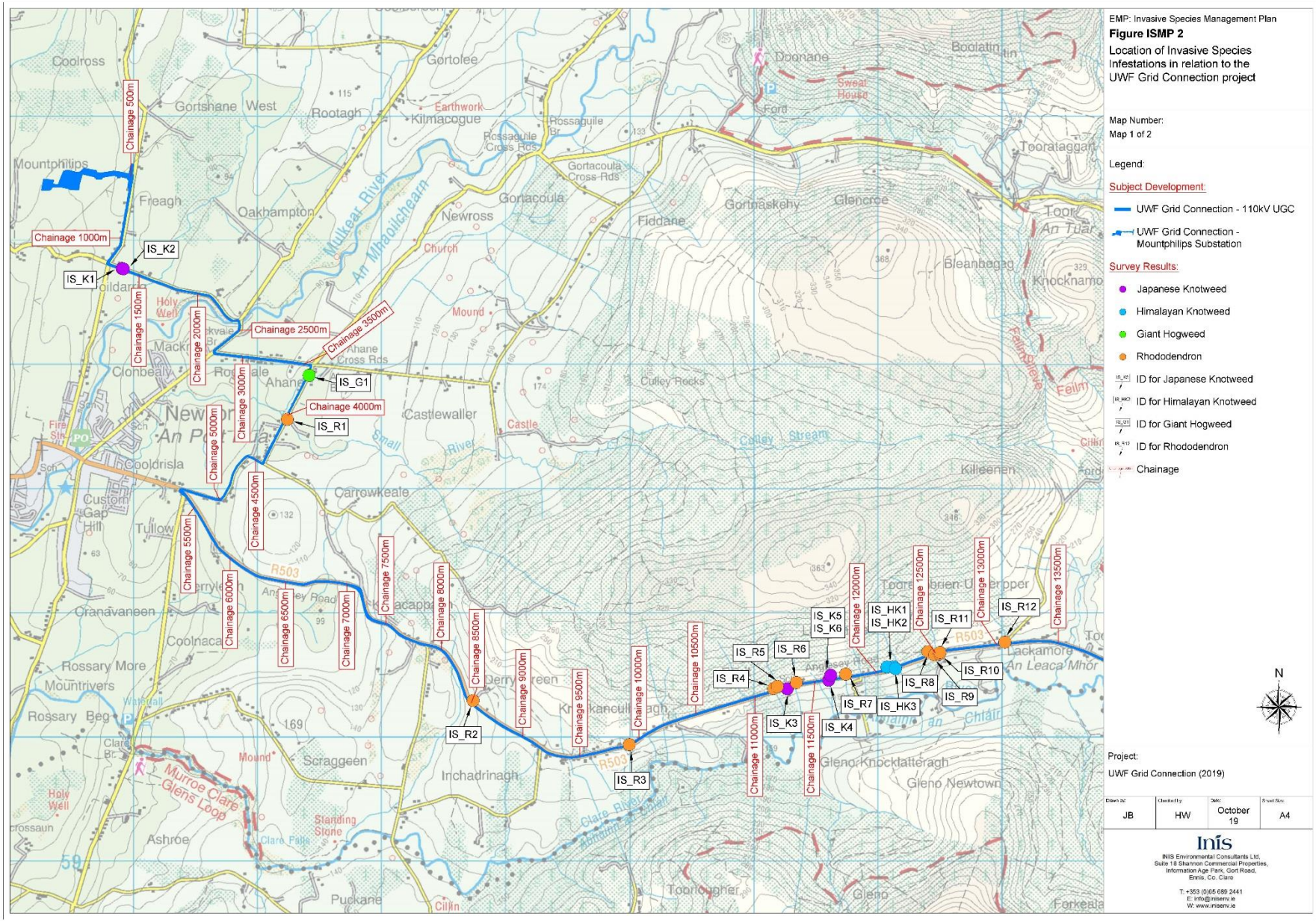
2.1 Presentation of Survey Results

Each Invasive Species infestation is identified with an ID code, and its location is identified on Figures ISMP 2 and Figure ISMP 3.

At each Infestation location the following data were gathered to assess the extent and severity of the 43 No. infestations:

- Species name;
- Grid reference of central point of infestation;
- Extent of infestation;
  Square meterage of each infestation.

A comprehensive list of biosecurity measures can be found in Section 4.1 – '*Biosecurity Measures for works proximate to Invasive Plant Species Infestations'.*


EMP: Invasive Species Management Plan
Figure ISMP 2
Location of Invasive Species Infestations in relation to the UWF Grid Connection project
Map Number:
Map 1 of 2
Legend:
Subject Development:
UWF Grid Connection - 110kV UGC
UWF Grid Connection - Mountphilips Substation
Survey Results:
Japanese Knotweed
Himalayan Knotweed
Giant Hogweed
Rhododendron
ID for Japanese Knotweed
ID for Himalayan Knotweed
ID for Giant Hogweed
ID for Rhododendron
Chainage
Project:
UWF Grid Connection (2019)
JB
HW
October 19
A4
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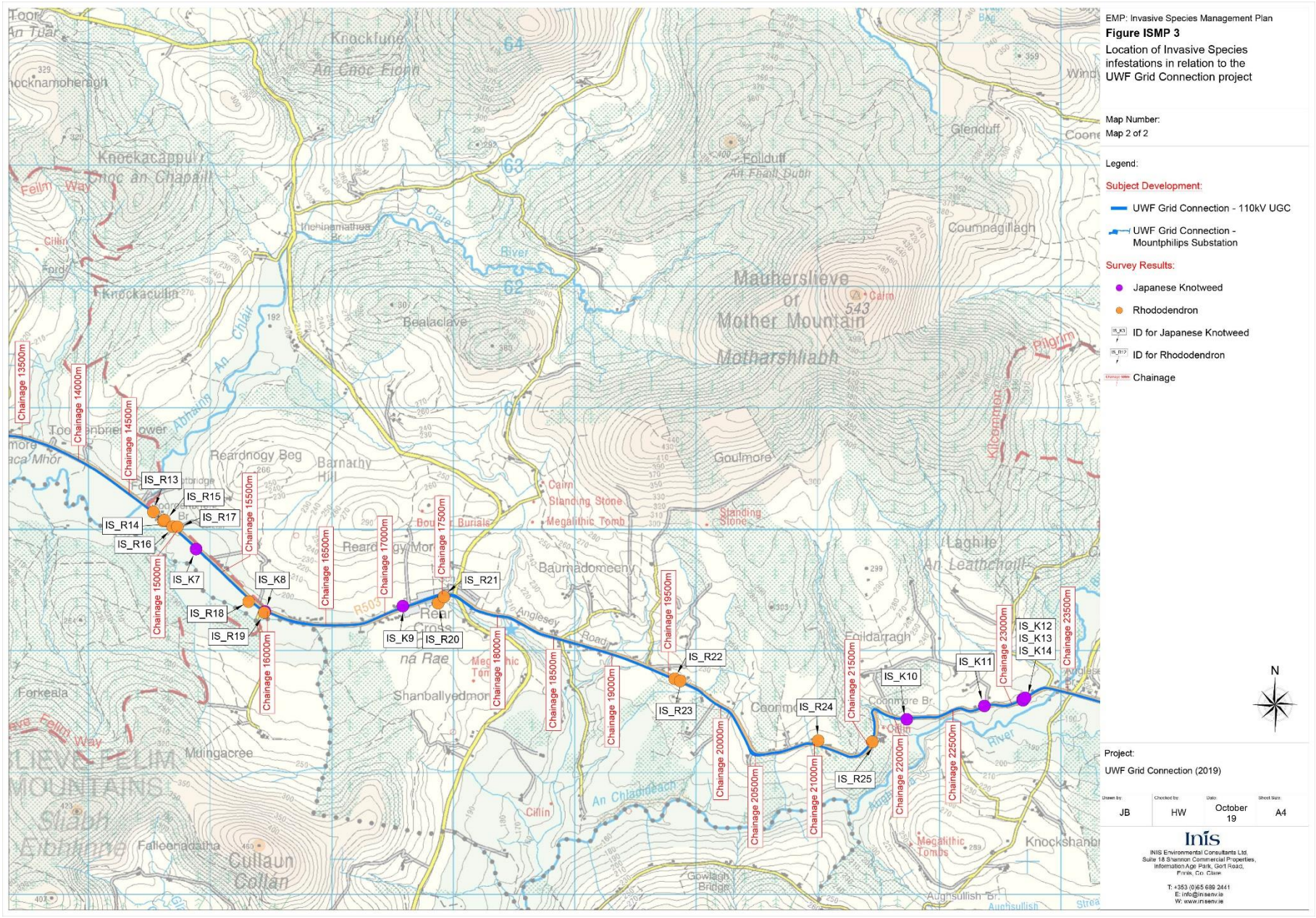
N
IS_K1
IS_K2
IS_G1
IS_R1
IS_R2
IS_R3
IS_R4
IS_R5
IS_R6
IS_K5
IS_K6
IS_K3
IS_K4
IS_HK1
IS_HK2
IS_R7
IS_HK3
IS_R8
IS_R9
IS_R10
IS_R11
IS_R12
Chainage 500m
Chainage 1000m
Chainage 1500m
Chainage 2000m
Chainage 2500m
Chainage 3000m
Chainage 3500m
Chainage 4000m
Chainage 4500m
Chainage 5000m
Chainage 5500m
Chainage 6000m
Chainage 6500m
Chainage 7000m
Chainage 7500m
Chainage 8000m
Chainage 8500m
Chainage 9000m
Chainage 9500m
Chainage 10000m
Chainage 10500m
Chainage 11000m
Chainage 11500m
Chainage 12000m
Chainage 12500m
Chainage 13000m
Chainage 13500m
Mountphilips
Coolross
Gortshane West
Rootagh
Kilmacogue
Gortolee
Doonane
Oakhampton
Freagh
Newross
Gortacoula
Fiddane
Gortnaskehy
Glencree
Bleanbeagag
Knocknamo
Clonbeally
Ahane
Castlewaller
Culley Rocks
Killeenen
Cooldrisla
Carrowkeale
Custom Gap Hill
Tullow
Cranavaneen
Coolnacahera
Rossary More
Mountrivers
Rossary Beg
Scraggeen
Inchadrinagh
Ashroe
Puckane
Glenco Knocktatteragh
Glenco Newtown
Toorloughter
Glenco
Lackamore
An Leaca Mhór
Mulkear River
An Mhaoilchearn
Culley Stream
Clare River
Murroe Clare Glens Loop
Standing Stone
Clare Falls
Holy Well
Mound
Earthwork
Church
Castle
Fire Stn
Post Office
R503


EMP: Invasive Species Management Plan
Figure ISMP 3
Location of Invasive Species infestations in relation to the UWF Grid Connection project
Map Number:
Map 2 of 2
Legend:
Subject Development:
UWF Grid Connection - 110kV UGC
UWF Grid Connection - Mountphilips Substation
Survey Results:
Japanese Knotweed
Rhododendron
ID for Japanese Knotweed
ID for Rhododendron
Chainage
Project:
UWF Grid Connection (2019)
Drawn by: JB
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Date: October 19
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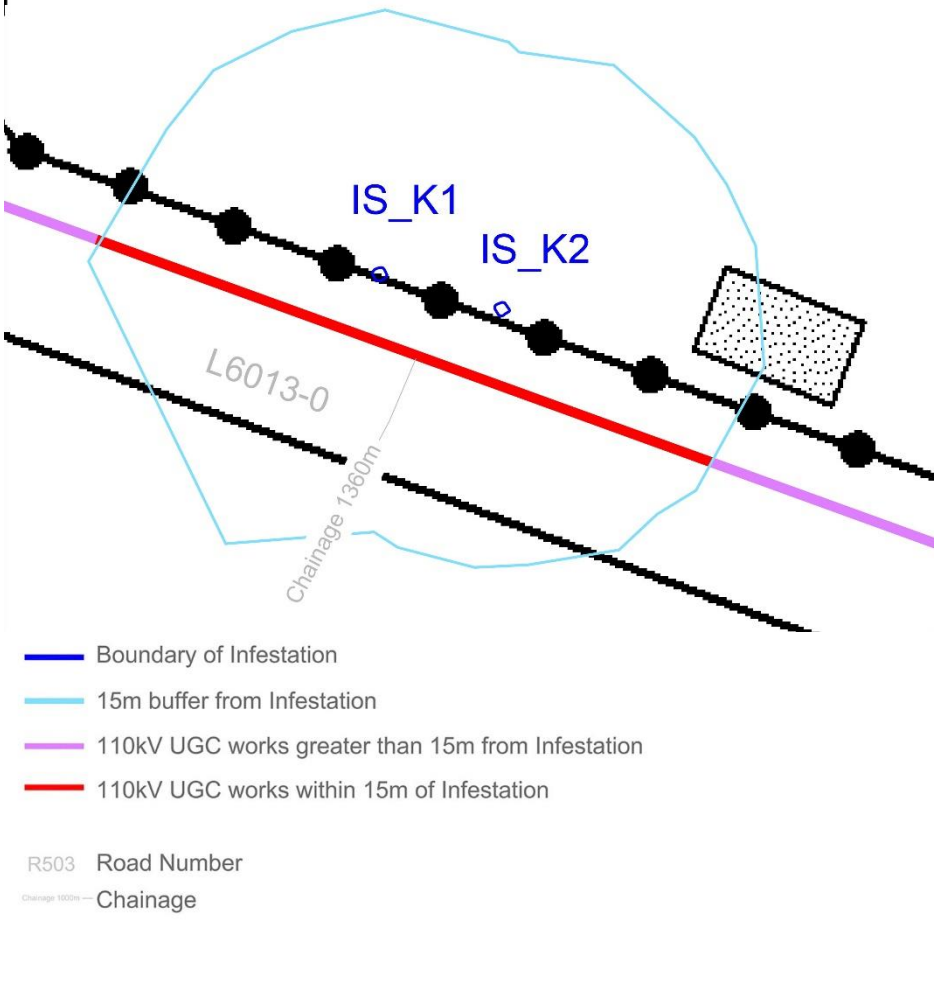
IS_R16
IS_K7
IS_K8
IS_R18
IS_R19
IS_K9
IS_R20
IS_R21
IS_R22
IS_R23
IS_R24
IS_R25
IS_K10
IS_K11
IS_K12
IS_K13
IS_K14
Chainage 13500m
Chainage 14000m
Chainage 14500m
Chainage 15000m
Chainage 15500m
Chainage 16000m
Chainage 16500m
Chainage 17000m
Chainage 17500m
Chainage 18000m
Chainage 18500m
Chainage 19000m
Chainage 19500m
Chainage 20000m
Chainage 20500m
Chainage 21000m
Chainage 21500m
Chainage 22000m
Chainage 22500m
Chainage 23000m
Chainage 23500m

2.2 Japanese Knotweed Infestations



Invasive Species Survey:

Infestation ID: IS_K1

ITM: 572876,663814

Infestation Type:
Knotweed Spp

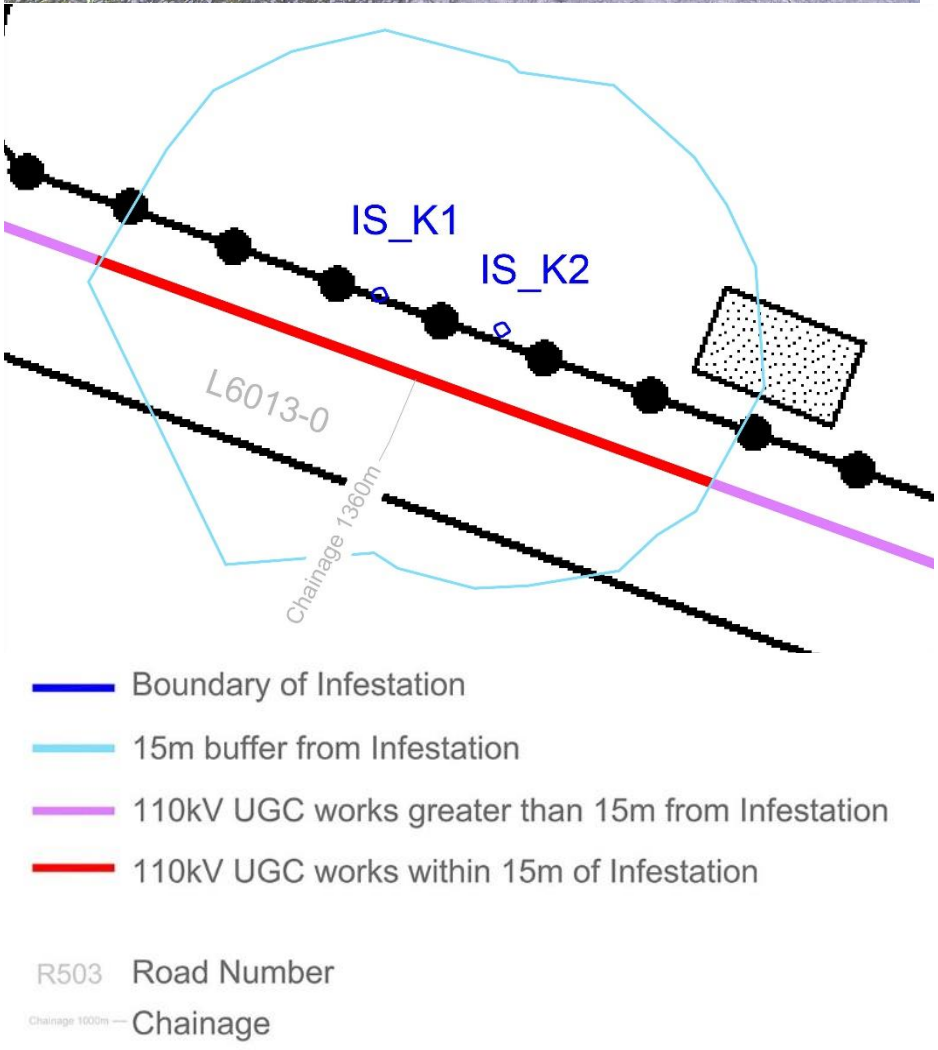
Dimensions of Infestation:
1m x 1m

Separation Distance: 0m - At Edge of roadway

Infestation Specific Biosecurity Measures
(to be implemented under supervision of an invasive species specialist

High density polyethylene grass carpet terram covering the infestation during the preconstruction phase and maintained throughout the duration of works. The polyethylene grass carpet terram covering will only be placed on and removed from the infestation under direct supervision from an invasive species specialist

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Invasive Species Survey:

Infestation ID: IS_K2

ITM: 572883,663812

Infestation Type:
Japanese Knotweed

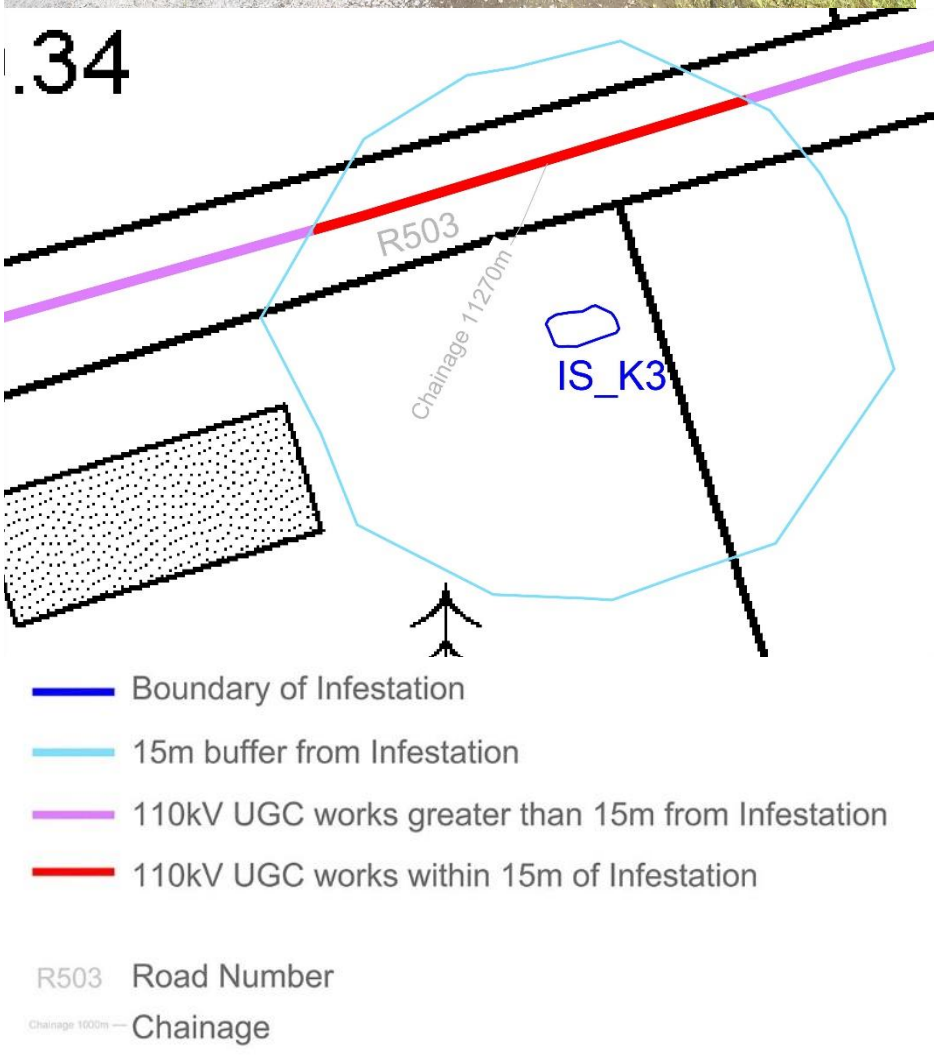
Dimensions of Infestation:
1m x 1m

Separation Distance: 0m - At Edge of roadway

Infestation Specific Biosecurity Measures
(to be implemented under supervision of an invasive species specialist)

High density polyethylene grass carpet terram covering the infestation during the preconstruction phase and maintained throughout the duration of works.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Invasive Species Survey:

Infestation ID: IS_K3

ITM: 578237,660431

Infestation Type:
Japanese Knotweed

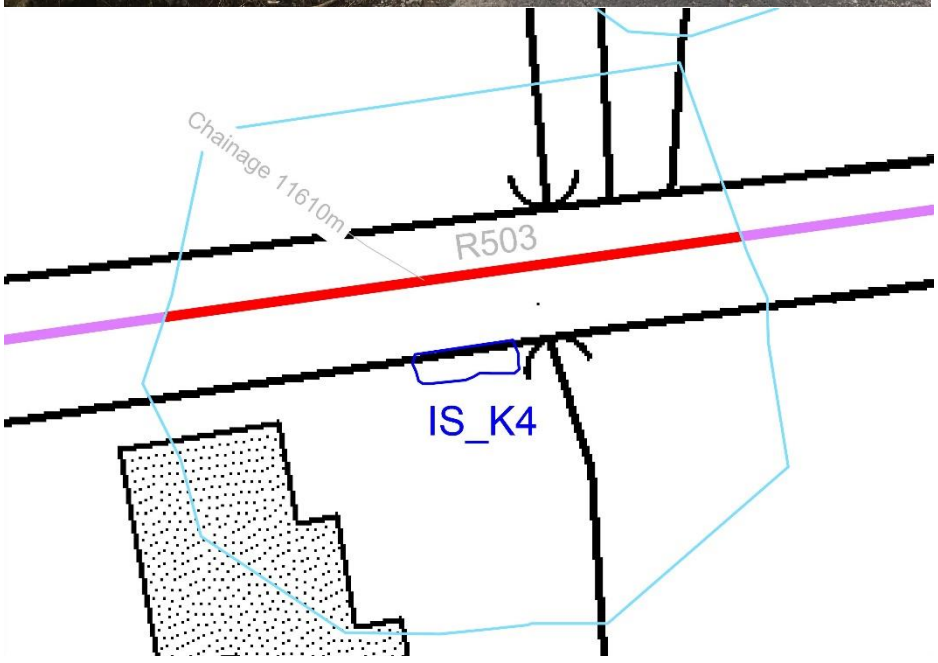
Dimensions of Infestation:
4m x 2m

Separation Distance**:** 6m ***(****from construction works****)***:

Infestation Specific Biosecurity Measures
(to be implemented under supervision of an invasive species specialist)

High density polyethylene grass carpet terram covering the infestation during the preconstruction phase and maintained throughout the duration of works.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Boundary of Infestation
15m buffer from Infestation
110kV UGC works greater than 15m from Infestation
110kV UGC works within 15m of Infestation

R503 Road Number
Chainage

Invasive Species Survey:

Infestation ID: IS_K4

ITM: 578572,660499

Infestation Type:
Japanese Knotweed

Dimensions of Infestation:
6m X 2m

Separation Distance**:** 0m - At Edge of roadway

Infestation Specific Biosecurity Measures
(to be implemented under supervision of an invasive species specialist)

High density polyethylene grass carpet terram covering the infestation during the preconstruction phase and maintained throughout the duration of works.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility..

Invasive Species Survey:

Infestation ID: IS_K5

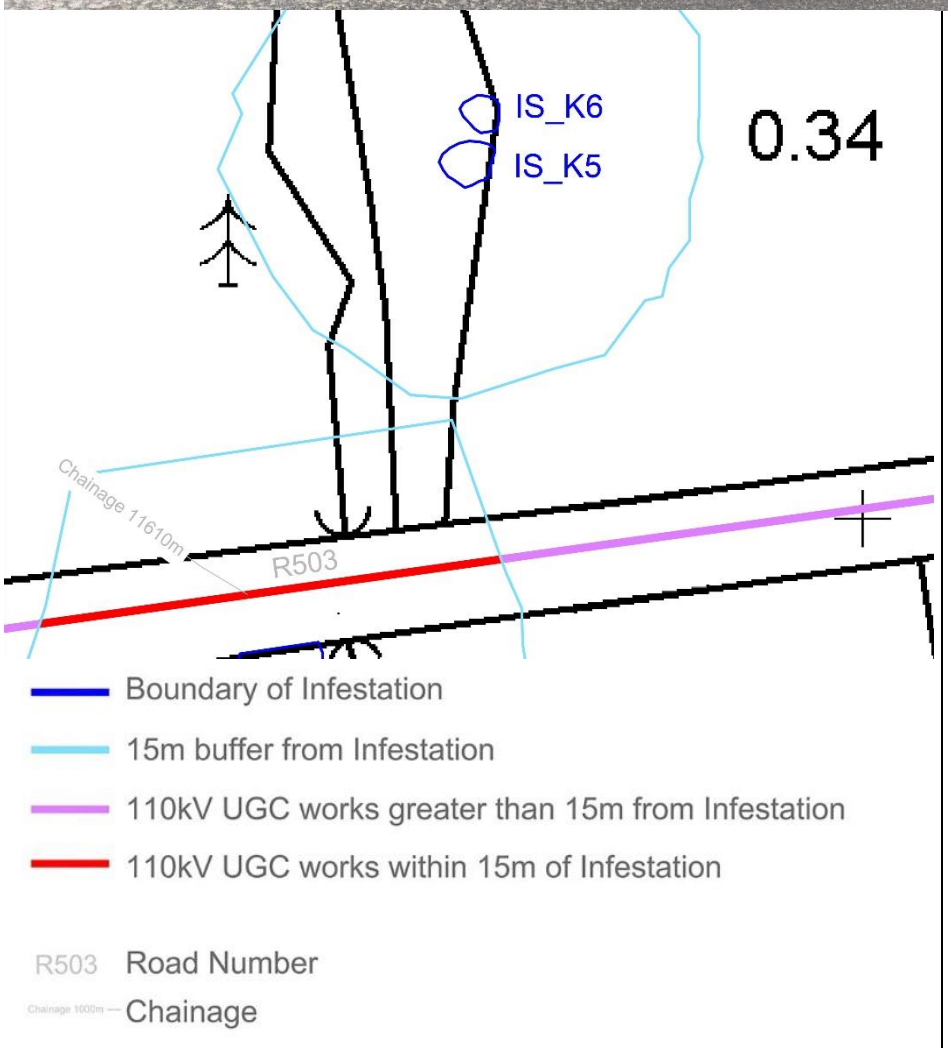
ITM: 578586,660536

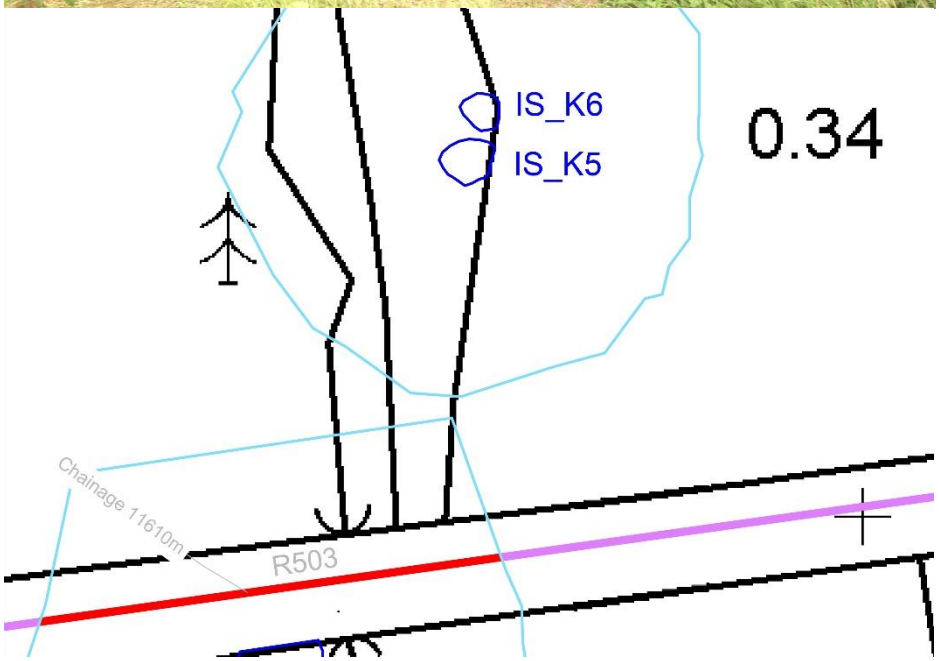
Infestation Type:
Japanese Knotweed

Dimensions of Infestation:
4m x 3m

Separation Distance: 26m

Infestation Specific Biosecurity Measures
No measures required due to distance from works





Boundary of Infestation

15m buffer from Infestation

110kV UGC works greater than 15m from Infestation

110kV UGC works within 15m of Infestation

R503 Road Number

Chainage 1000m — Chainage

Invasive Species Survey:

Infestation ID: IS_K6

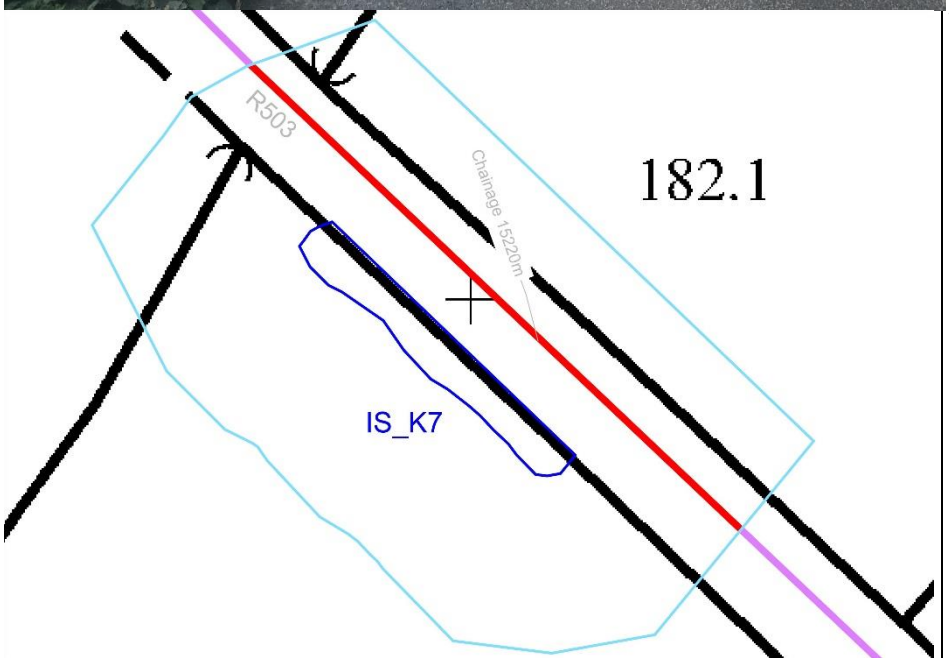
ITM: 578587,660540

Infestation Type:
Japanese Knotweed

Dimensions of Infestation:
3m x 3m

Separation Distance: 30m
(*from construction works****)***:

Infestation Specific Biosecurity Measures
No measures required due to distance from works



Boundary of Infestation

15m buffer from Infestation

110kV UGC works greater than 15m from Infestation

110kV UGC works within 15m of Infestation

R503 Road Number

Chainage 1000m — Chainage

Invasive Species Survey:

Infestation ID: IS_K7

ITM: 581851,659882

Infestation Type:
Japanese Knotweed

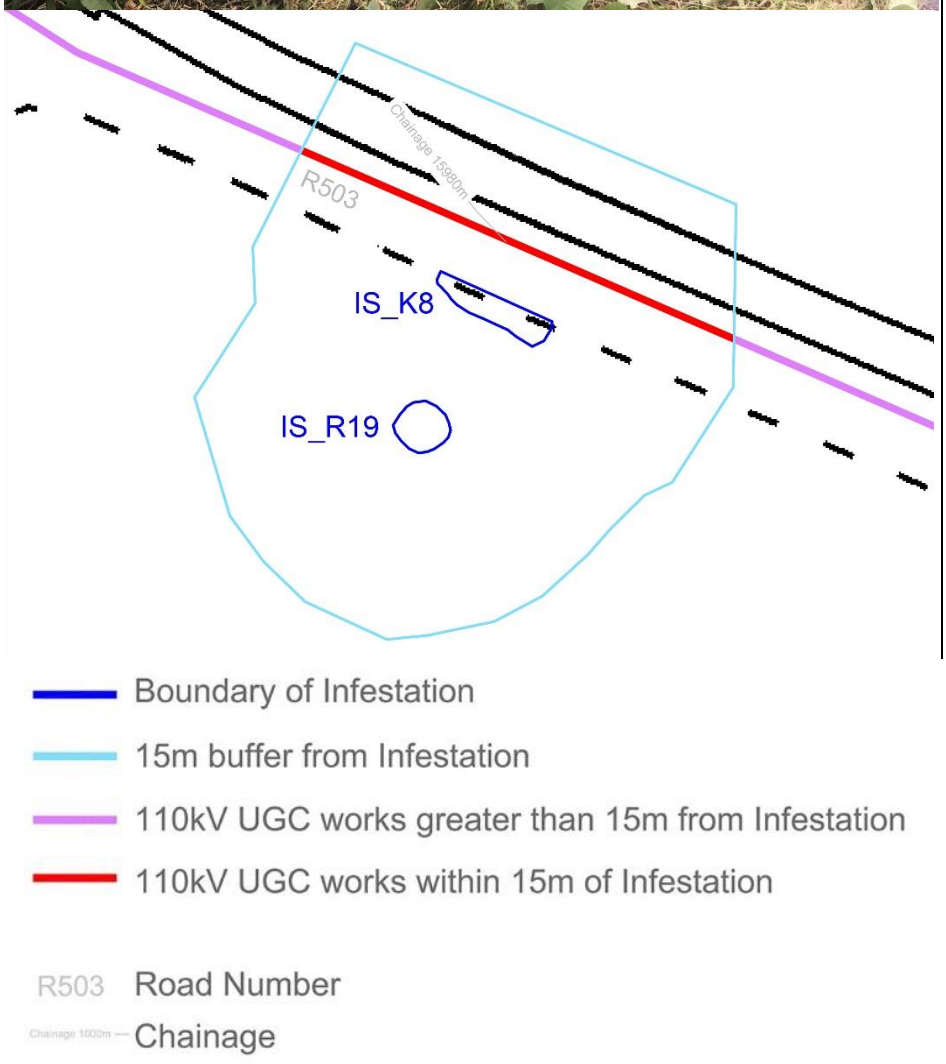
Dimensions of Infestation:
30m x 4m

Separation Distance: 0m - At Edge of roadway

Infestation Specific Biosecurity Measures
(to be implemented under supervision of an invasive species specialist)

High density polyethylene grass carpet terram covering the infestation during the preconstruction phase and maintained throughout the duration of works.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Invasive Species Survey:

Infestation ID: IS_K8

ITM: 582418,659369

Infestation Type:
Japanese Knotweed

Dimensions of Infestation:
10m x 2m

Separation Distance: 0m - At Edge of roadway

Infestation Specific Biosecurity Measures
(to be implemented under supervision of an invasive species specialist)

High density polyethylene grass carpet terram covering the infestation during the preconstruction phase and maintained throughout the duration of works.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.

Boundary of Infestation

15m buffer from Infestation

110kV UGC works greater than 15m from Infestation

110kV UGC works within 15m of Infestation

R503 Road Number

Chainage 1000m — Chainage

Invasive Species Survey:

Infestation ID: IS_K9

ITM: 583553,659413

Infestation Type:
Japanese Knotweed

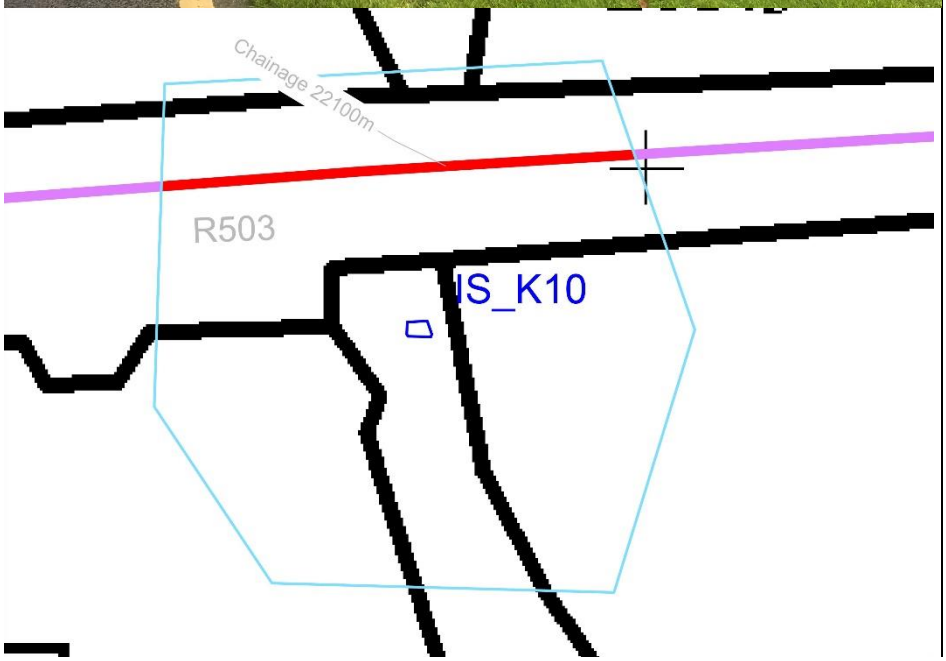
Dimensions of Infestation:
20m x 15m

Separation Distance: 0m - At Edge of roadway

Infestation Specific Biosecurity Measures
(to be implemented under supervision of an invasive species specialist)

High density polyethylene grass carpet terram covering the infestation during the preconstruction phase and maintained throughout the duration of works.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Boundary of Infestation

15m buffer from Infestation

110kV UGC works greater than 15m from Infestation

110kV UGC works within 15m of Infestation

R503 Road Number

Chainage 1000m — Chainage

Invasive Species Survey:

Infestation ID: IS_K10

ITM: 587701,658482

Infestation Type:
Japanese Knotweed

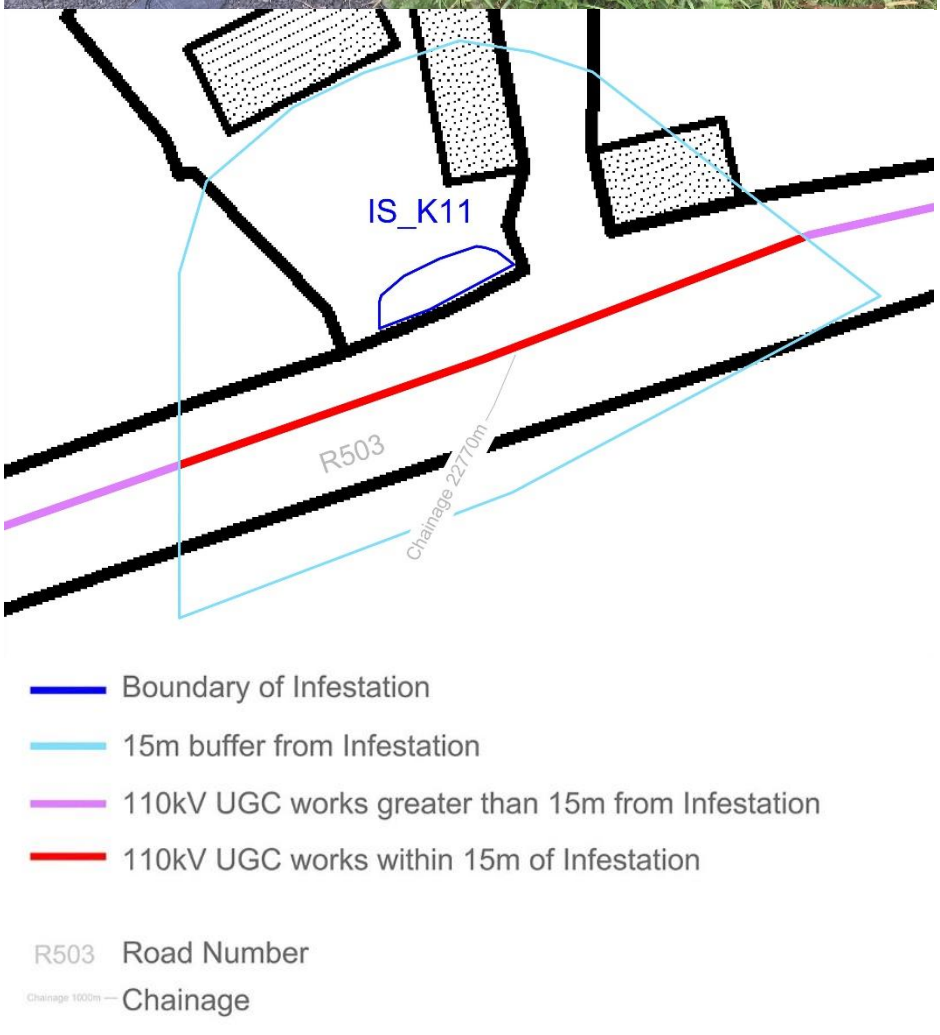
Dimensions of Infestation:
1m x 1m

Separation Distance: 4m
(from construction works)

Infestation Specific Biosecurity Measures
(to be implemented under supervision of an invasive species specialist)

High density polyethylene grass carpet terram covering the infestation during the preconstruction phase and maintained throughout the duration of works.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Invasive Species Survey:

Infestation ID: IS_K11

ITM: 588340,658592

Infestation Type:
Japanese Knotweed

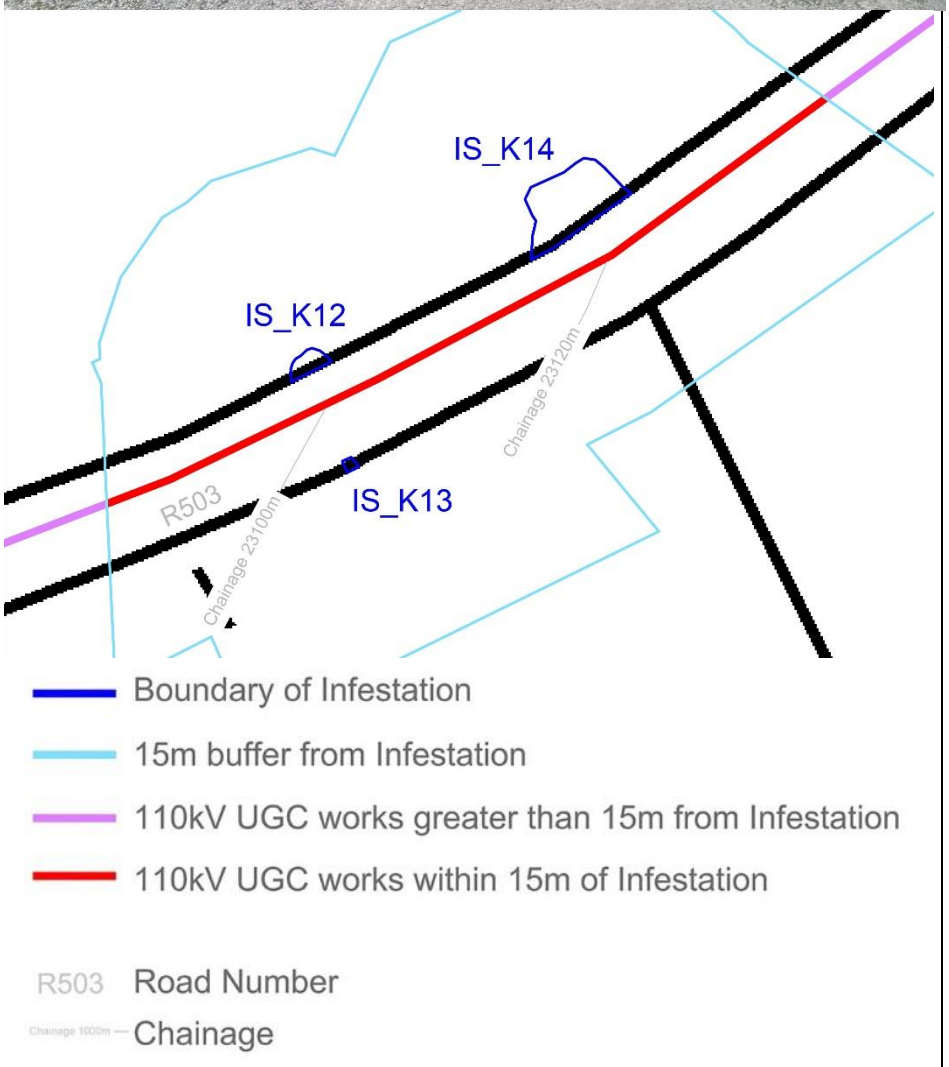
Dimensions of Infestation:
11m x 3m

Separation Distance: 1m – Edge of road verge

Infestation Specific Biosecurity Measures
(to be implemented under supervision of an invasive species specialist)

High density polyethylene grass carpet terram covering the infestation during the preconstruction phase and maintained throughout the duration of works.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Invasive Species Survey:

Infestation ID: IS_K12

ITM: 588654,658645

Infestation Type:
Japanese Knotweed

Dimensions of Infestation:
3m x 2m

Separation Distance: 0m - At Edge of roadway

Infestation Specific Biosecurity Measures *(to be implemented under supervision of an invasive species specialist)*

High density polyethylene grass carpet terram covering the infestation during the preconstruction phase and maintained throughout the duration of works.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.

Invasive Species Survey::

Infestation ID: IS_K13

ITM: 588657,658637

Infestation Type:
Japanese Knotweed

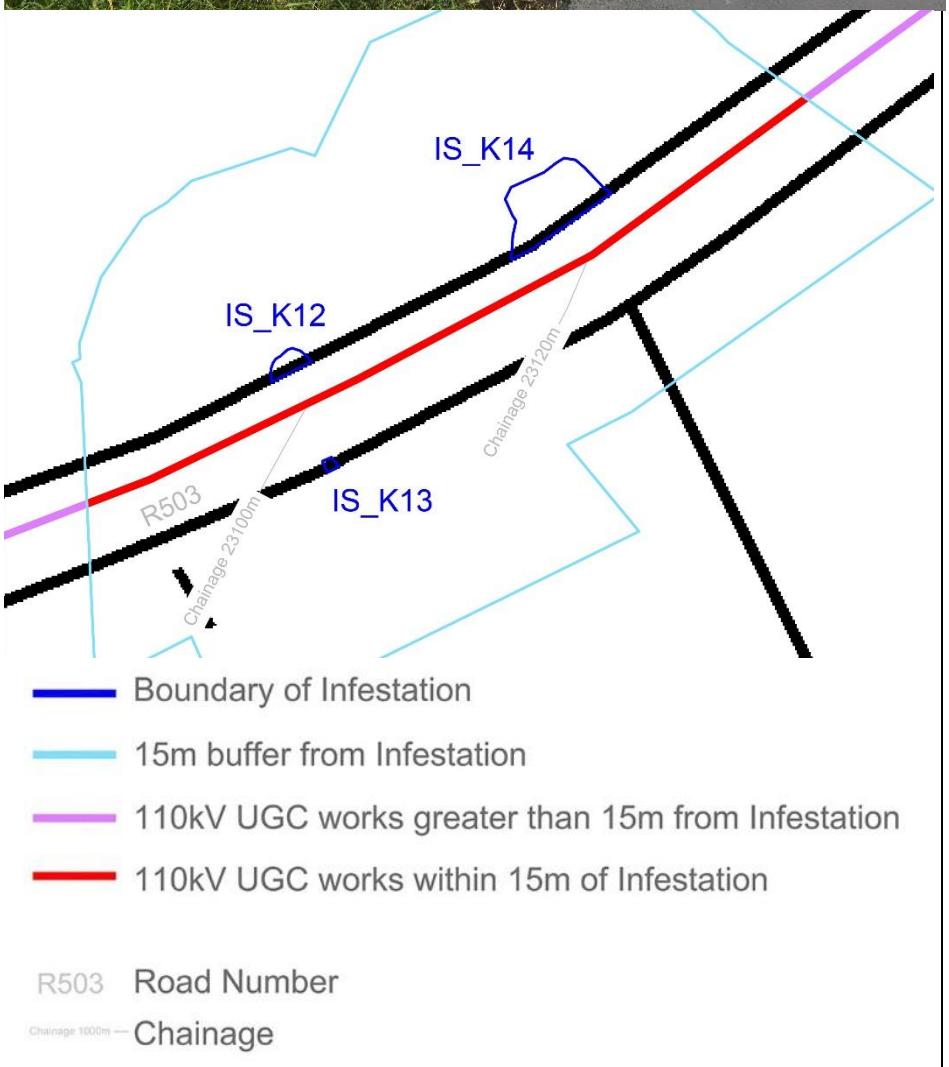
Dimensions of Infestation:
1m x 1m

Separation Distance: 0m - At Edge of roadway

Infestation Specific Biosecurity Measures
(to be implemented under supervision of an invasive species specialist)

High density polyethylene grass carpet terram covering the infestation during the preconstruction phase and maintained throughout the duration of works.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Invasive Species Survey:

Infestation ID: IS_K14

ITM: 588675,658659

Infestation Type:
Japanese Knotweed

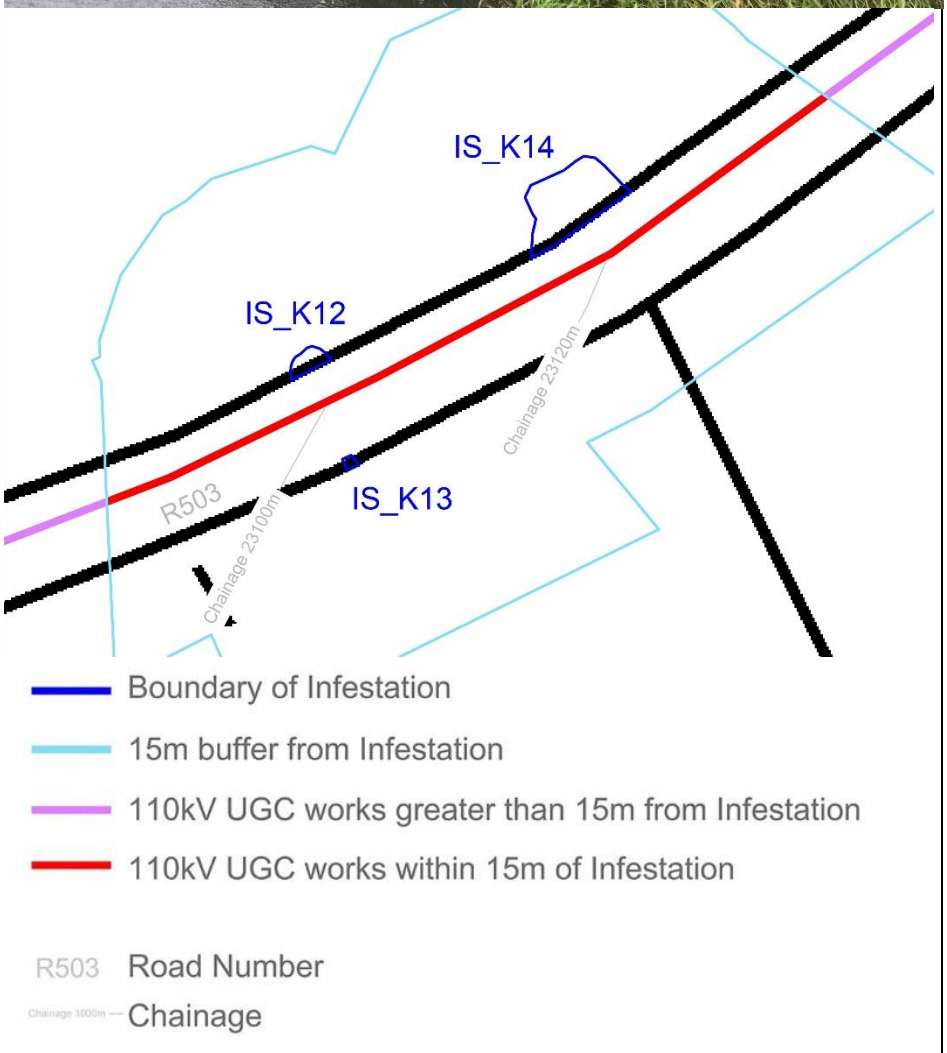
Dimensions of Infestation:
8m x 5m

Separation Distance: 0m - At Edge of roadway

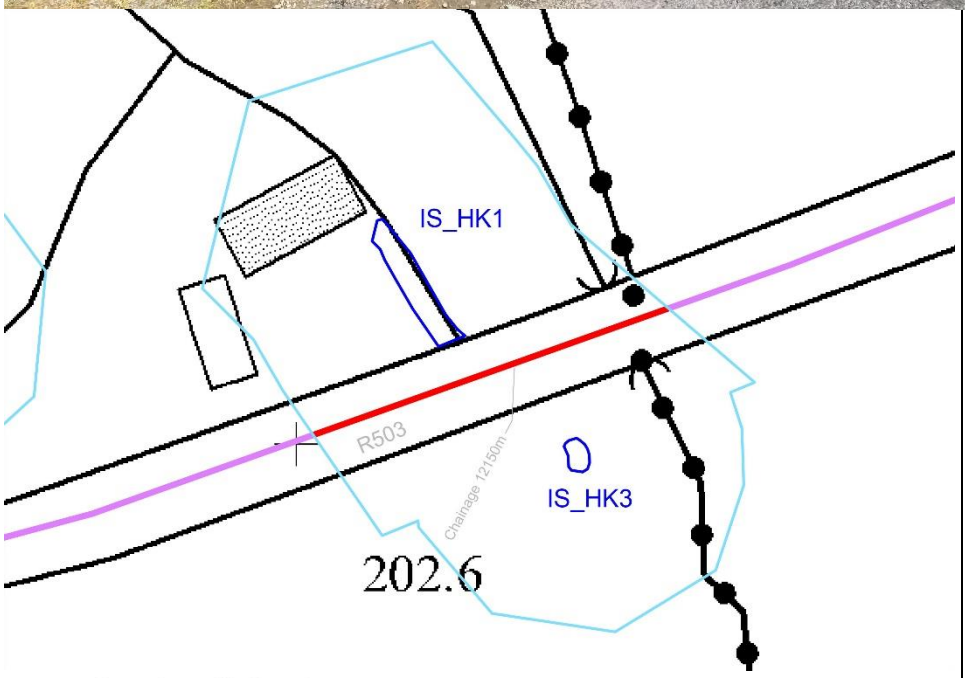
Infestation Specific Biosecurity Measures
(to be implemented under supervision of an invasive species specialist)

High density polyethylene grass carpet terram covering the infestation during the preconstruction phase and maintained throughout the duration of works.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



2.3 Himalayan Knotweed infestations



Invasive Species Survey:

Infestation ID: IS_HK1

ITM: 579096,660608

Infestation Type: Himalayan Knotweed

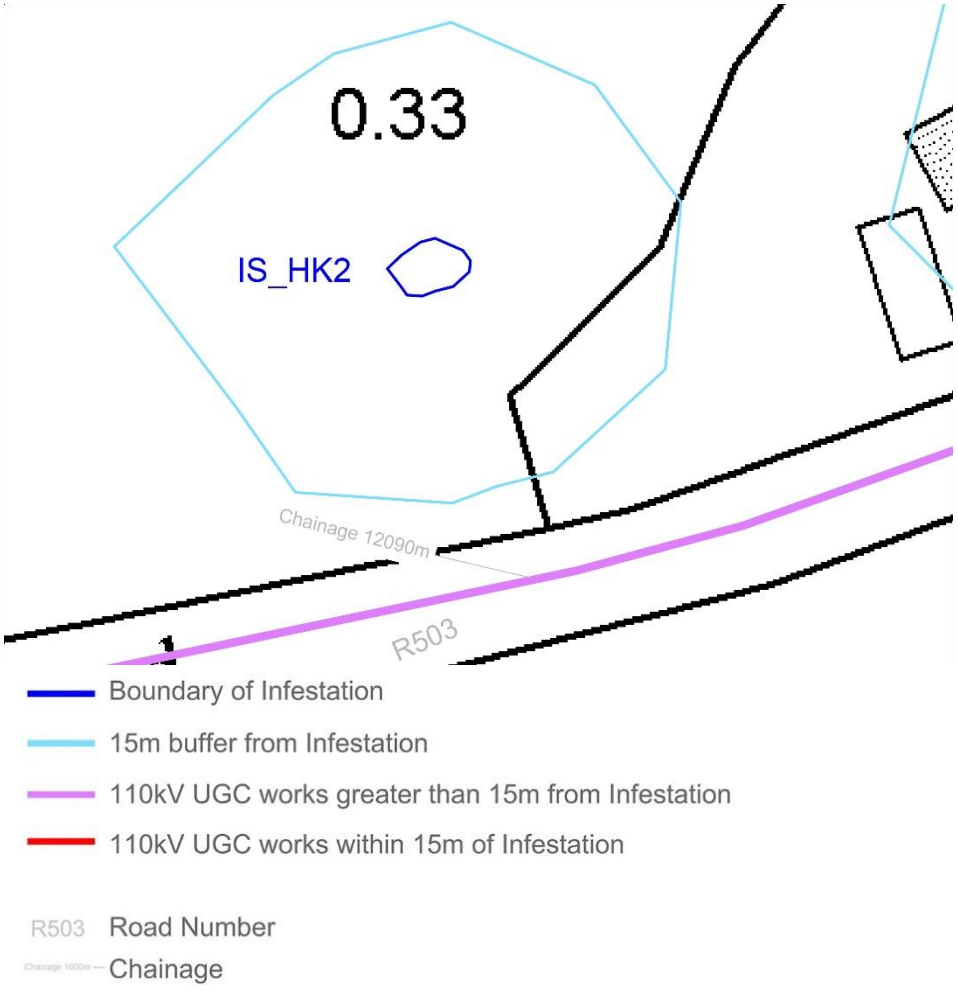
Dimensions of Infestation: 3m x 10m

Separation Distance: 0m - At Edge of roadway

Infestation Specific Biosecurity Measures *(to be implemented under supervision of an invasive species specialist)*

High density polyethylene grass carpet terram covering the infestation during the preconstruction phase and maintained throughout the duration of works.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Invasive Species Survey:

Infestation ID: IS_HK2

ITM: 579041,660606

Infestation Type:
Himalayan Knotweed

Dimensions of Infestation:
3m x 2m

Separation Distance: 18m
(from construction works)

Infestation Specific Biosecurity Measures
No measures required due to distance from works

Invasive Species Survey:

Infestation ID: IS_HK3

ITM: 579110,660593

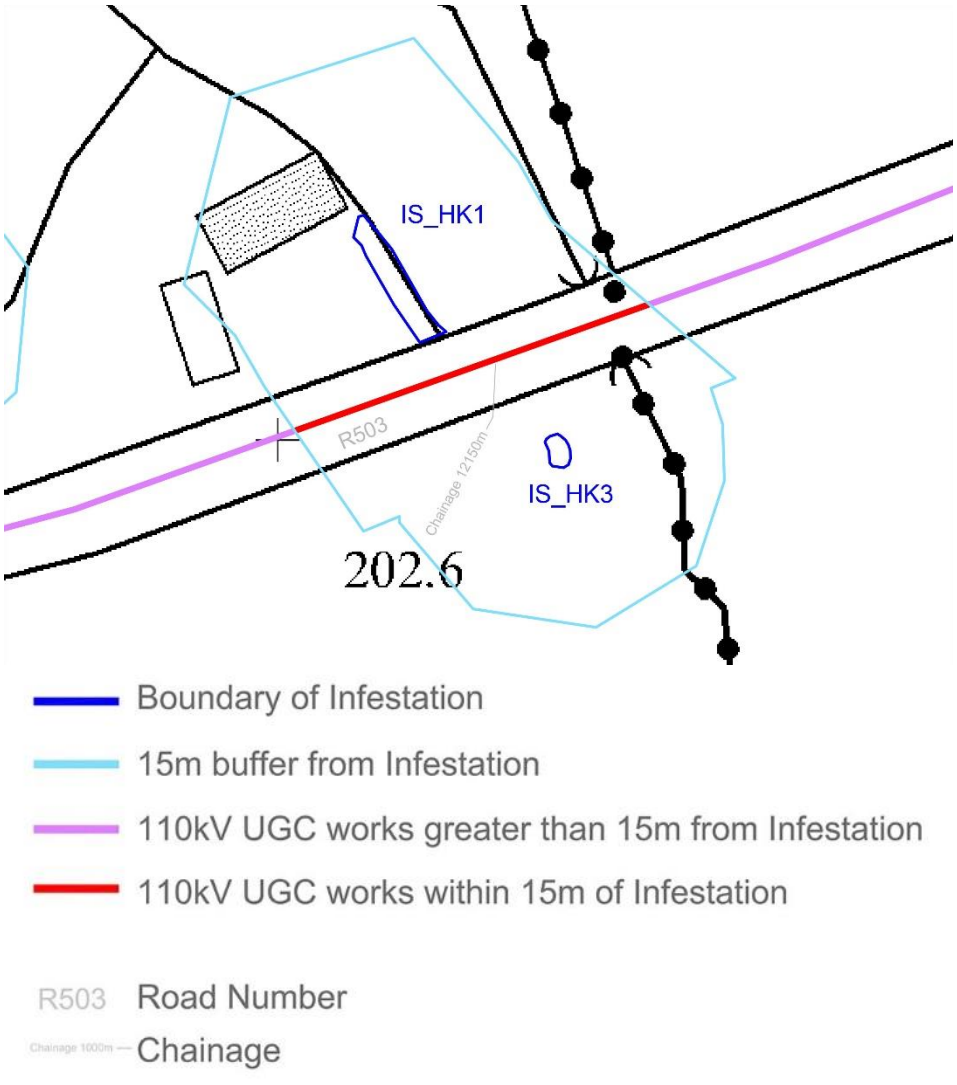
Infestation Type:
Himalayan Knotweed

Dimensions of Infestation:
2m x 3m

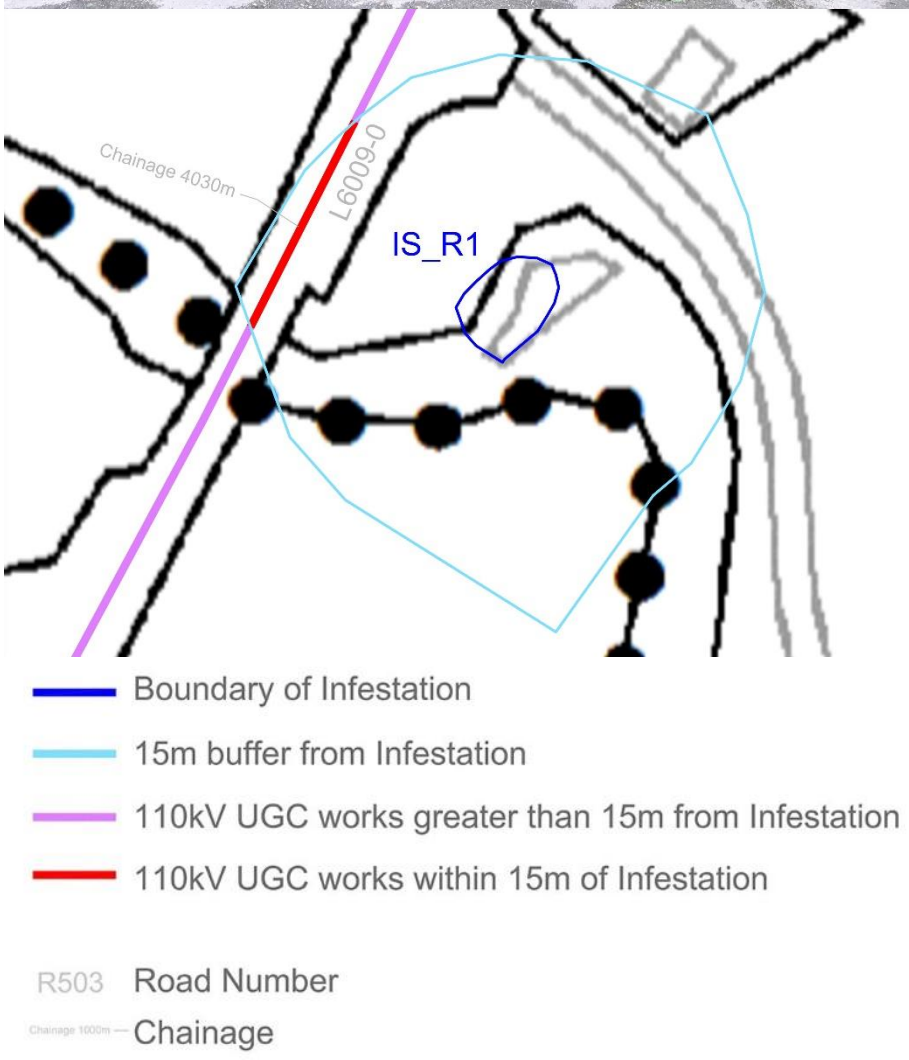
Separation Distance: 4m
(from construction works)

Infestation Specific Biosecurity Measures
(to be implemented under supervision of an invasive species specialist)

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



2.4 Rhododendron Infestations



Invasive Species Survey:

Infestation ID: IS_R1

ITM: 574208,662599

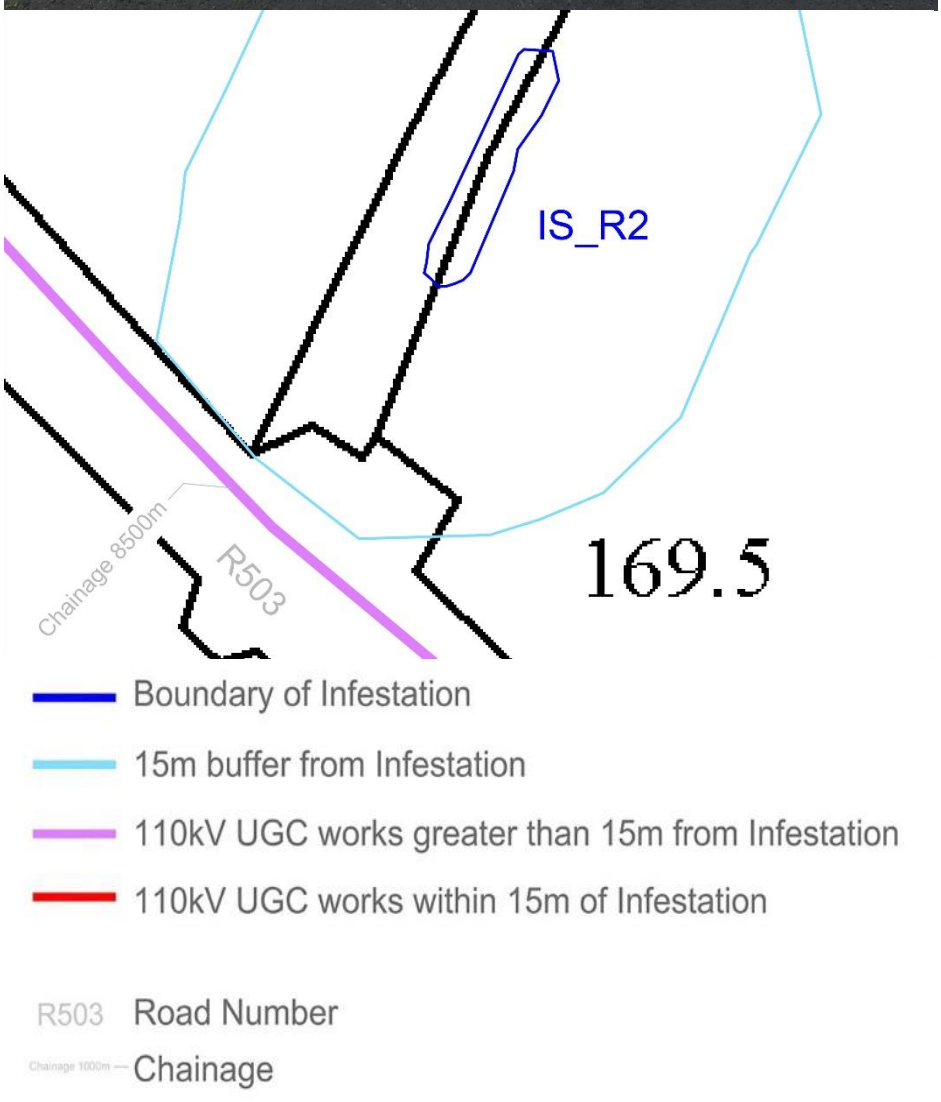
Infestation Type: Rhododendron

Dimensions of Infestation: 8m x 6m

Separation Distance: 10m *(from construction works)*

Infestation Specific Biosecurity Measures

No measures required due to distance from works



Invasive Species Survey:

Infestation ID: IS_R2

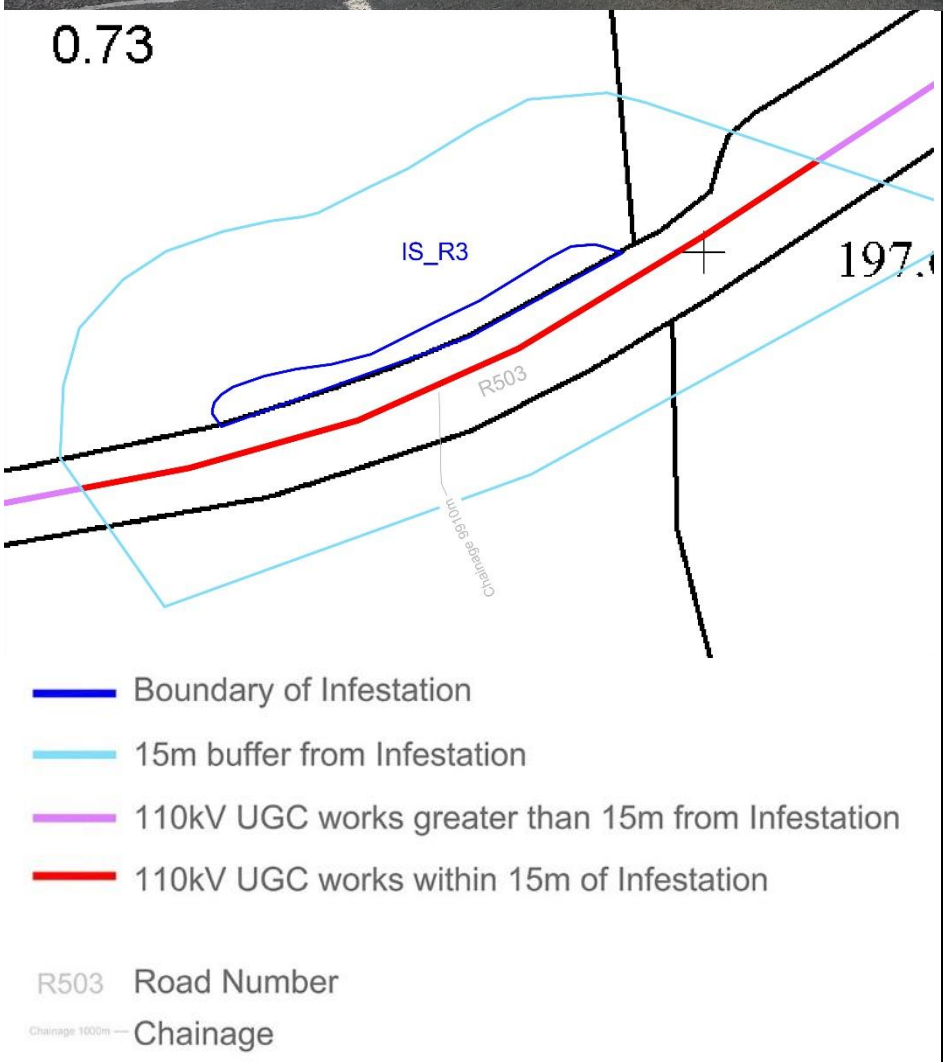
ITM: 575705,660336

Infestation Type:
Rhododendron

Dimensions of Infestation:
3m x 15m

Separation Distance: 15m

Infestation Specific Biosecurity Measures
No measures required due to distance from works



Invasive Species Survey:

Infestation ID: IS_R3

ITM: 576964,659981

Infestation Type: Rhododendron

Dimensions of Infestation: 40m X 3m

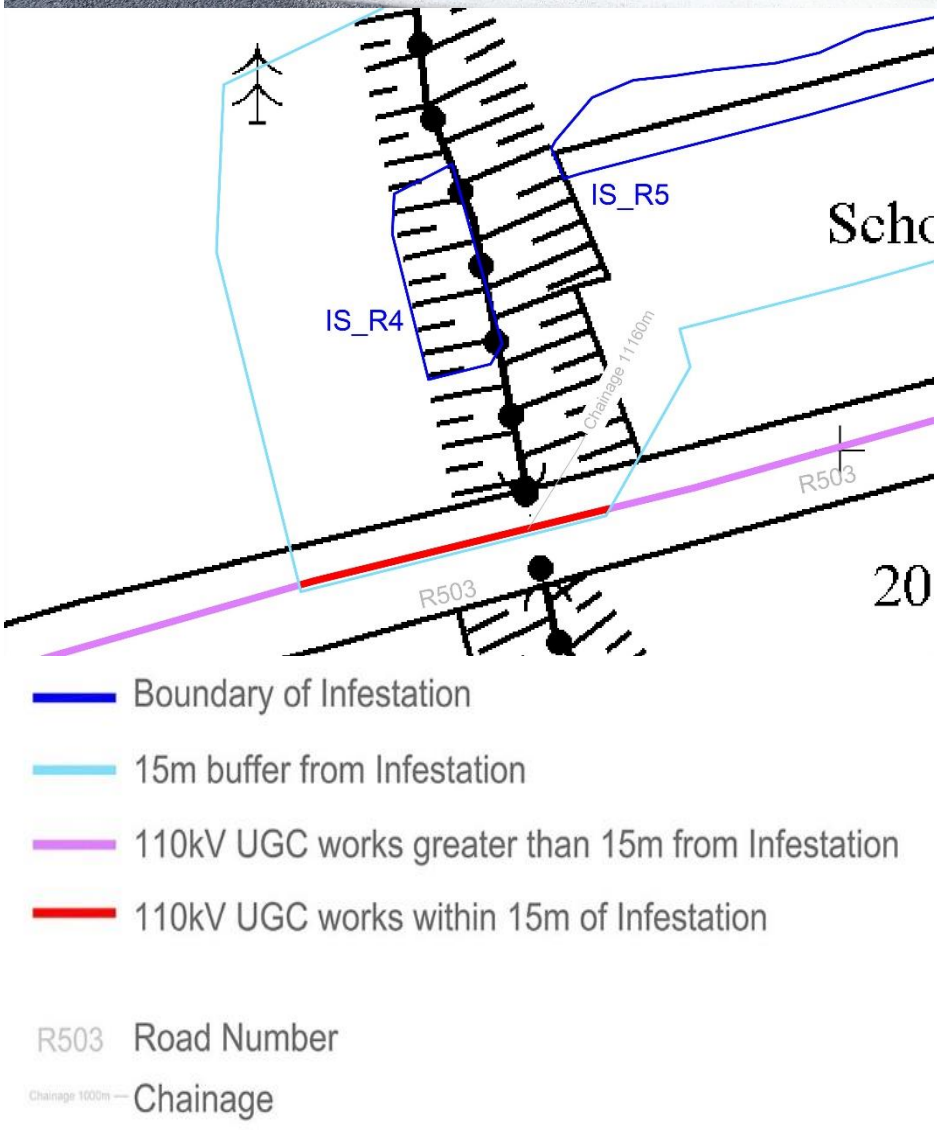
Separation Distance: 0m - At Edge of roadway

Infestation Specific Biosecurity Measures:

Construction machinery will not come into contact with any of the adjacent vegetation during excavation of the ducting channel.

Construction works adjacent to the infestation will be carried out under supervision of the invasive species specialist.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Invasive Species Survey:

Infestation ID: IS_R4

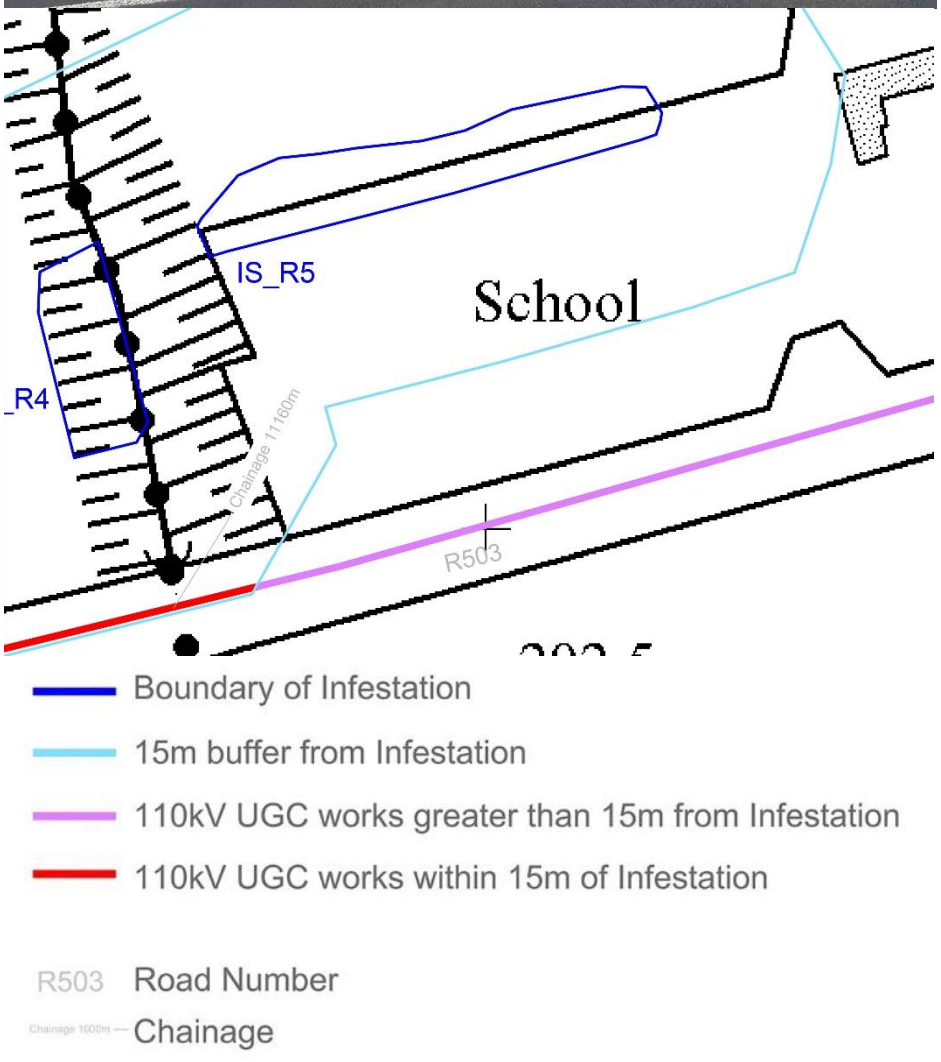
ITM: 578127,660433

Infestation Type:
Rhododendron

Dimensions of Infestation:
7m x 16m

Separation Distance: 10m
(from construction works)

Infestation Specific Biosecurity Measures
No measures required due to distance from works



Invasive Species Survey:

Infestation ID: IS_R5

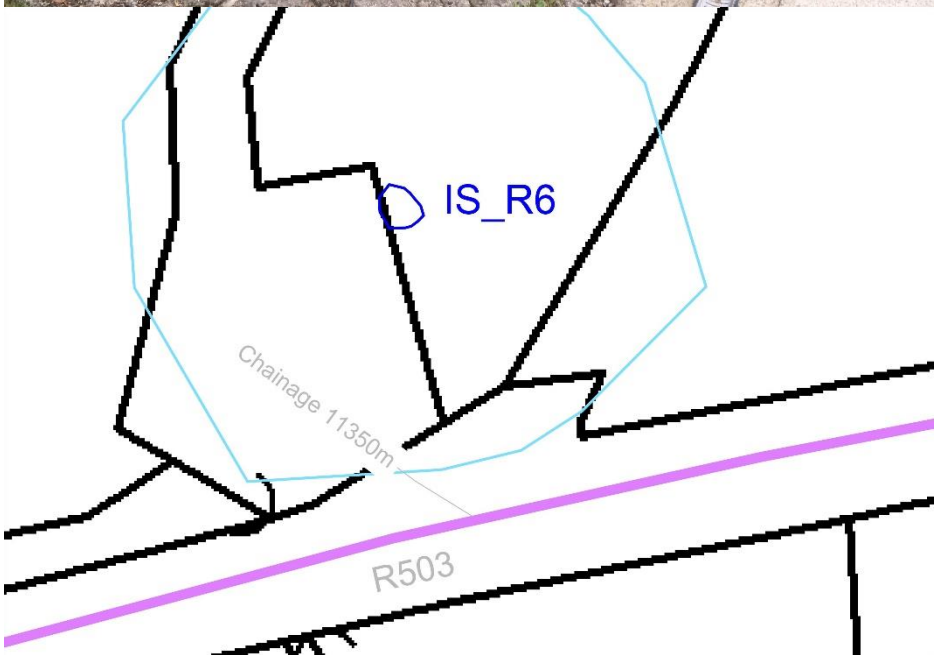
ITM: 578157,660450

Infestation Type:
Rhododendron

Dimensions of Infestation:
40m x 5m

Separation Distance: 25m
(from construction works)

Infestation Specific Biosecurity Measures
No measures required due to distance from works



Boundary of Infestation

15m buffer from Infestation

110kV UGC works greater than 15m from Infestation

110kV UGC works within 15m of Infestation

R503 Road Number

Chainage 1000m — Chainage

Invasive Species Survey:

Infestation ID: IS_R6

ITM: 578311,660481

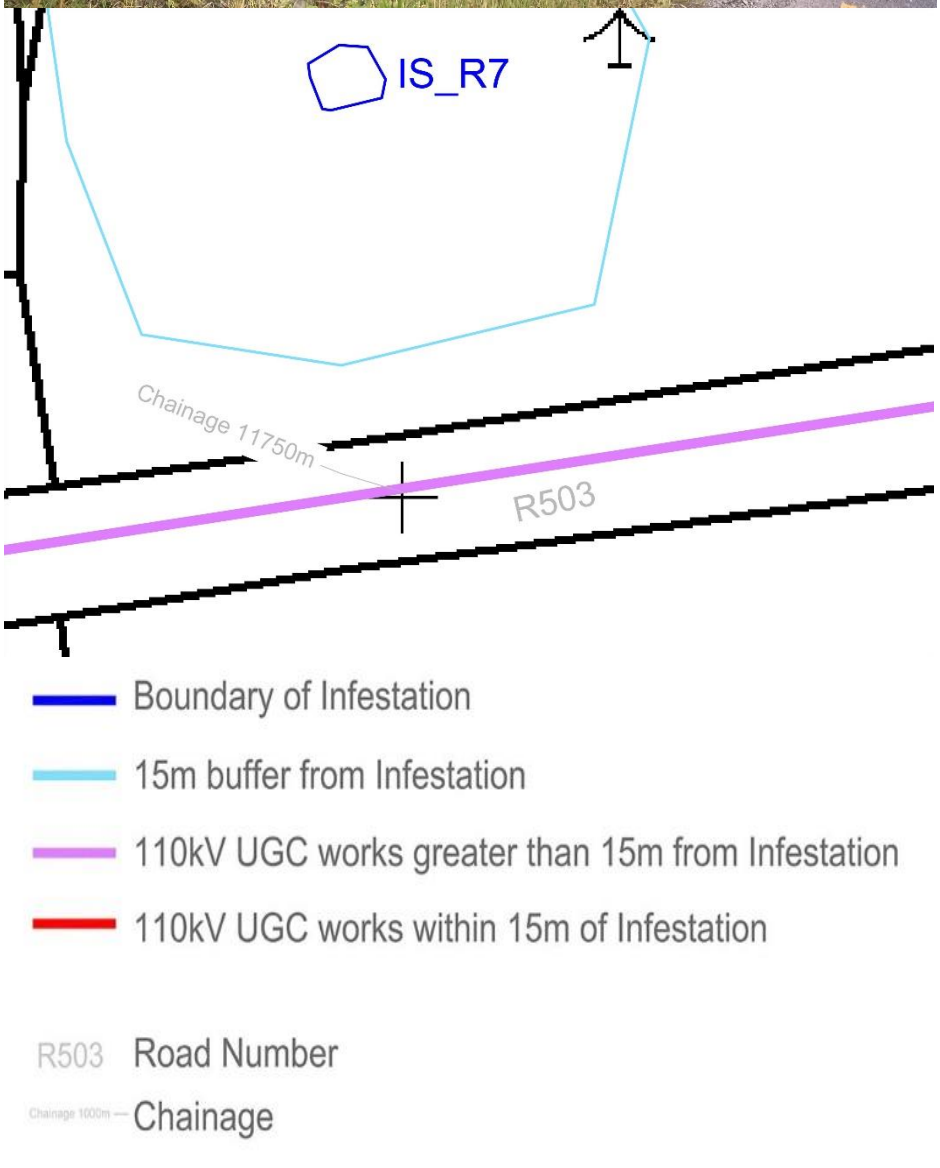
Infestation Type: Rhododendron

Dimensions of Infestation: 2m x 2m

Separation Distance: 15m *(from construction works)*

Infestation Specific Biosecurity Measures

No measures required due to distance from works



Invasive Species Survey:

Infestation ID: IS_R7

ITM: 578708,660549

Infestation Type: Rhododendron

Dimensions of Infestation: 4m x 3m

Separation Distance: 20m *(from construction works)*

Infestation Specific Biosecurity Measures
No measures required due to distance from works

Invasive Species Survey:

Infestation ID: IS_R8

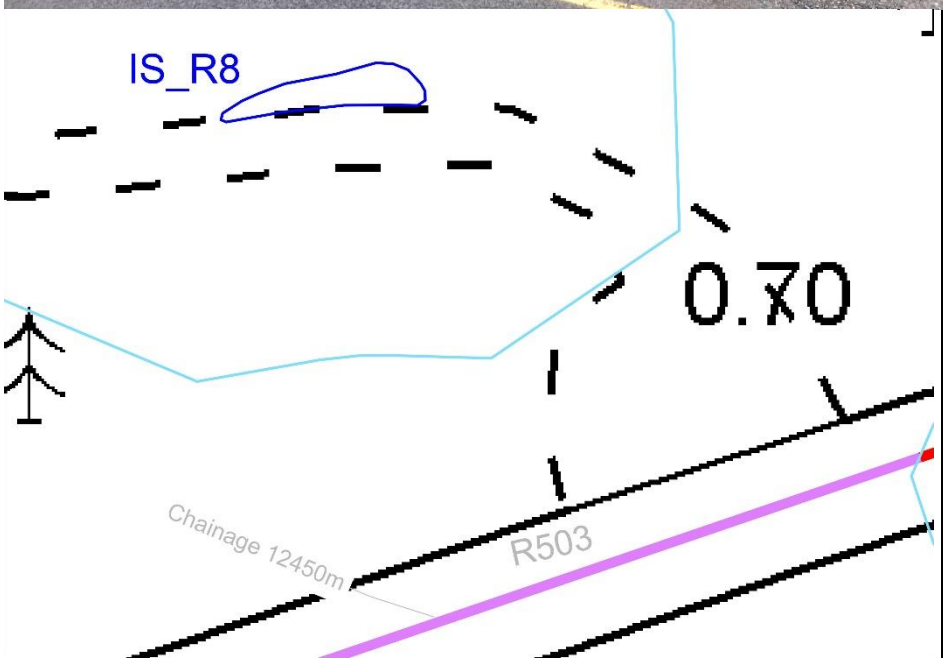
ITM: 579371,660730

Infestation Type: Rhododendron

Dimensions of Infestation: 3m x 12m

Separation Distance: 28m *(from construction works)*

Infestation Specific Biosecurity Measures
No measures required due to distance from works



Boundary of Infestation

15m buffer from Infestation

110kV UGC works greater than 15m from Infestation

110kV UGC works within 15m of Infestation

R503 Road Number

Chainage 1000m — Chainage

Boundary of Infestation

15m buffer from Infestation

110kV UGC works greater than 15m from Infestation

110kV UGC works within 15m of Infestation

R503 Road Number

Chainage

Invasive Species Survey:

Infestation ID: IS_R9

ITM: 579425,660705

Infestation Type: Rhododendron

Dimensions of Infestation: 4m x 5m

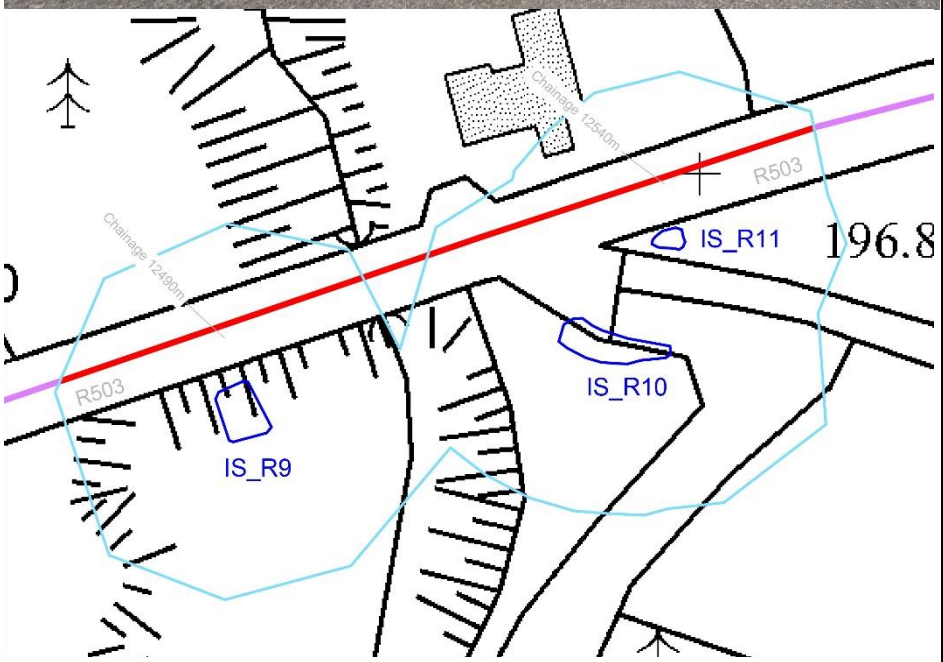
Separation Distance: 2m *(from construction works)*

Infestation Specific Biosecurity Measures:

Construction machinery will not come into contact with any of the adjacent vegetation during excavation of the ducting channel.

Construction works adjacent to the infestation will be carried out under supervision of the invasive species specialist.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Boundary of Infestation

15m buffer from Infestation

110kV UGC works greater than 15m from Infestation

110kV UGC works within 15m of Infestation

R503 Road Number

Chainage 1000m — Chainage

Invasive Species Survey:

Infestation ID: IS_R10

ITM: 579462,660712

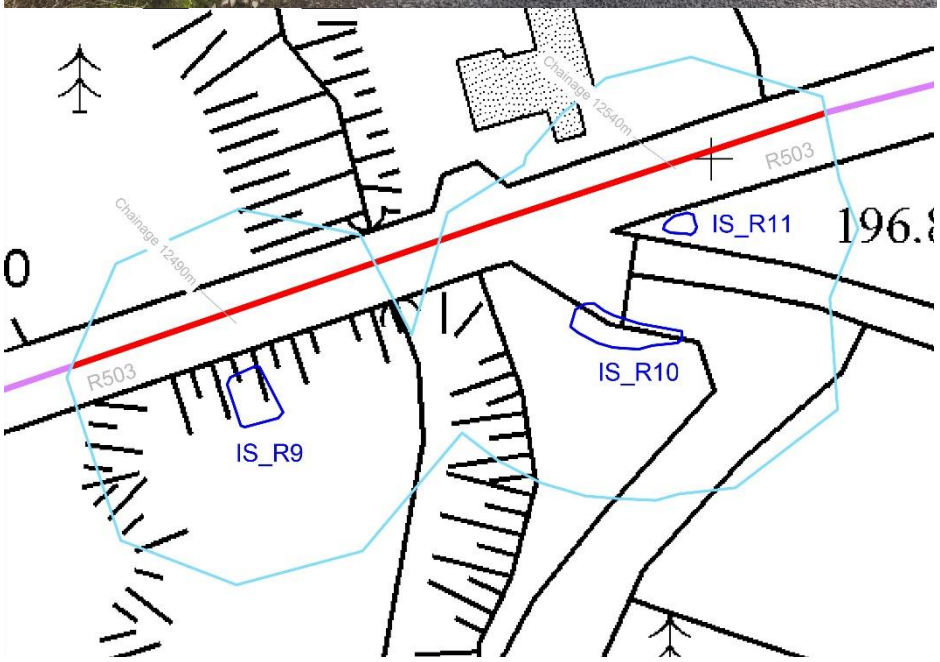
Infestation Type: Rhododendron

Dimensions of Infestation: 10m x 3m

Separation Distance: 7m *(from construction works)*

Infestation Specific Biosecurity Measures

No measures required due to distance from works



Boundary of Infestation

15m buffer from Infestation

110kV UGC works greater than 15m from Infestation

110kV UGC works within 15m of Infestation

R503 Road Number

Chainage 1000m — Chainage

Invasive Species Survey:

Infestation ID: IS_R11

ITM: 579468,660723

Infestation Type: Rhododendron

Dimensions of Infestation: 2m x 2m

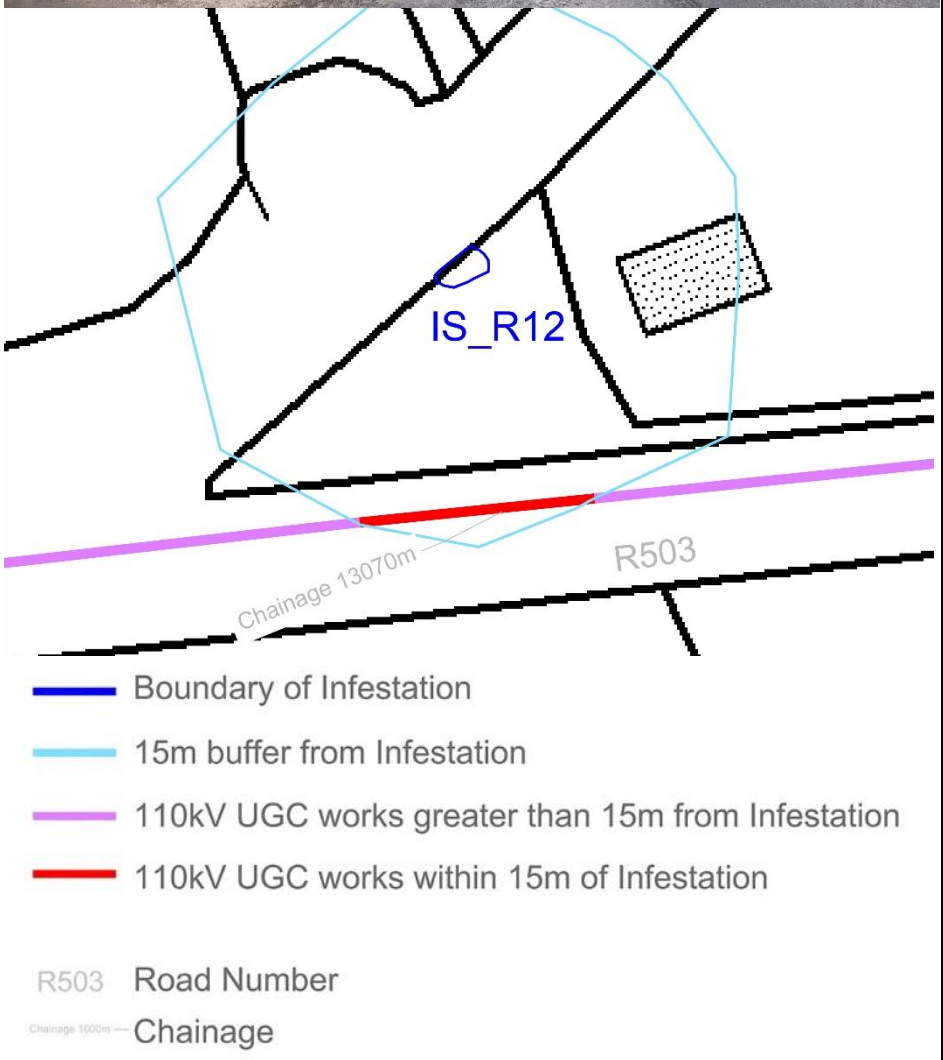
Separation Distance: 1m *(from construction works)*

Infestation Specific Biosecurity Measures:

Construction machinery will not come into contact with any of the adjacent vegetation during excavation of the ducting channel.

Construction works adjacent to the infestation will be carried out under supervision of the invasive species specialist.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Invasive Species Survey:

Infestation ID: IS_R12

ITM: 579991,660807

Infestation Type: Rhododendron

Dimensions of Infestation: 2m x 3m

Separation Distance: 11m

Infestation Specific Biosecurity Measures

No measures required due to distance from works

Invasive Species Survey:

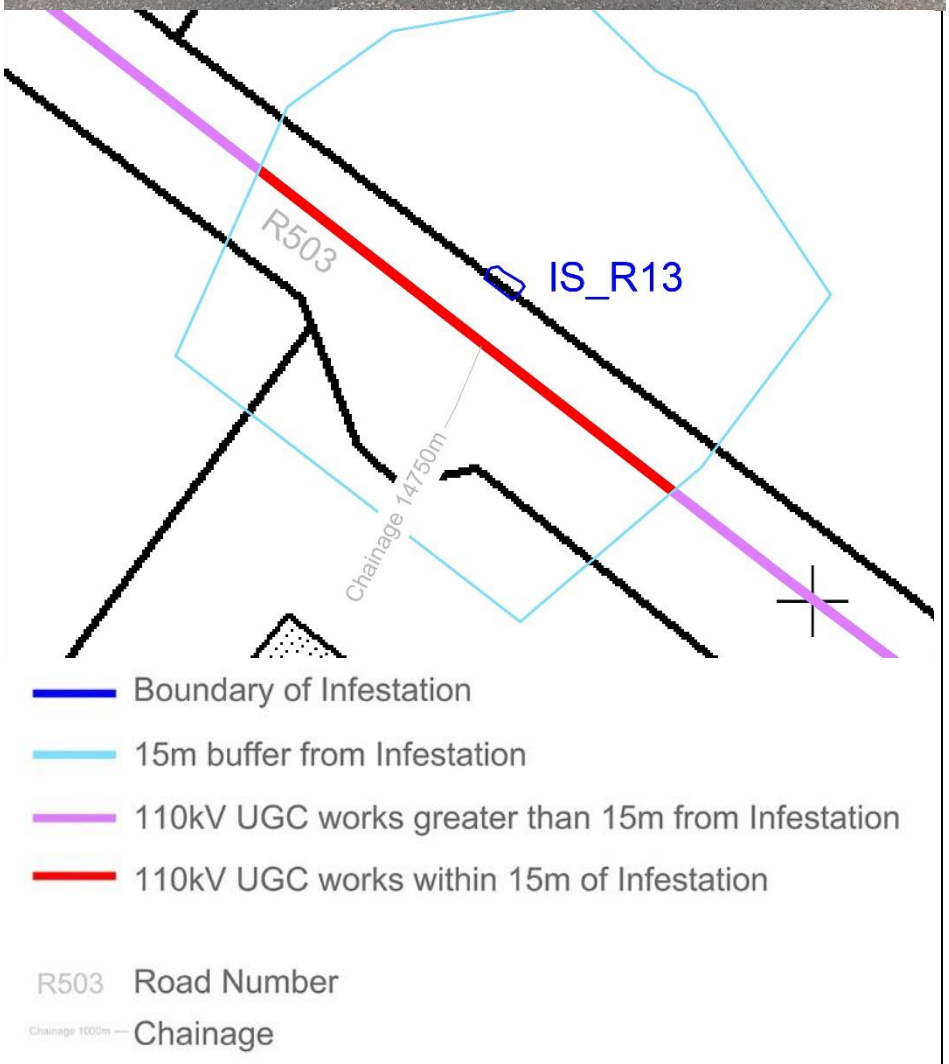
Infestation ID: IS_R13

ITM: 581500,660187

Infestation Type: Rhododendron

Dimensions of Infestation: 2m x 1m

Separation Distance: 0m - At Edge of roadway

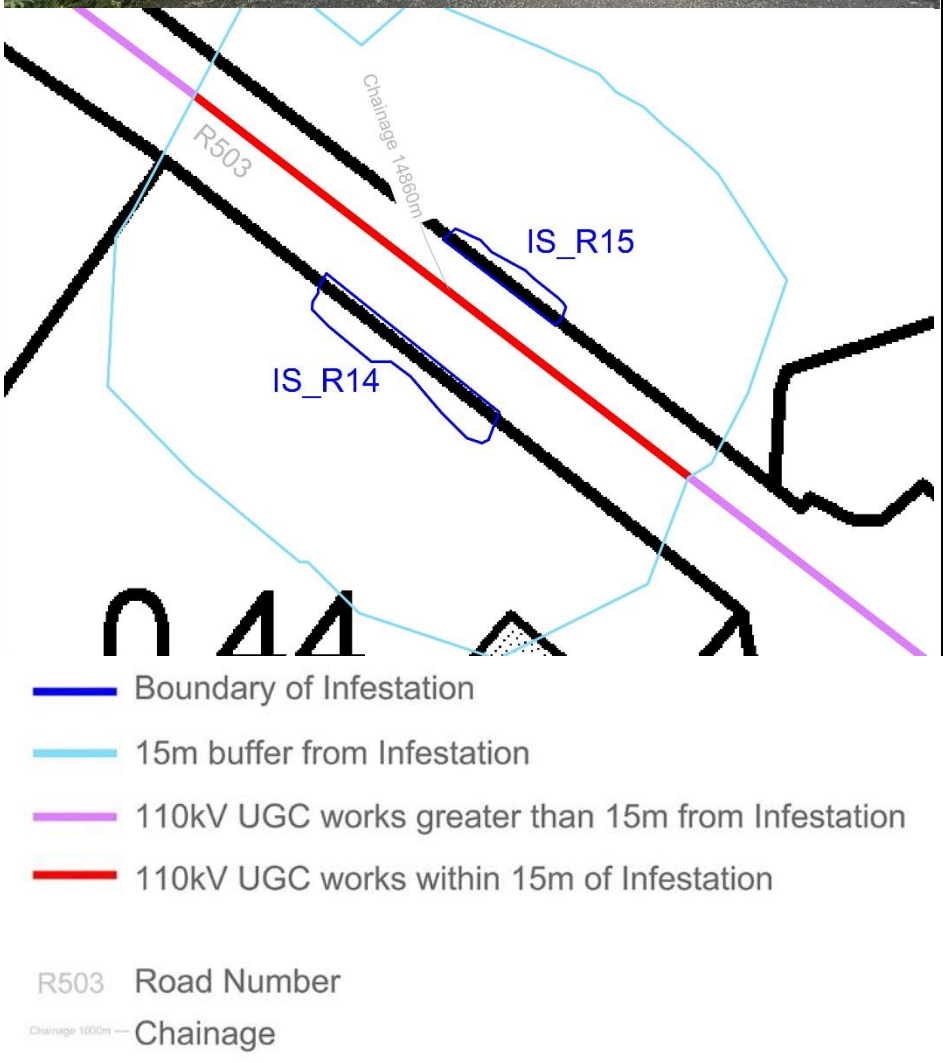


Infestation Specific Biosecurity Measures:

Construction machinery will not come into contact with any of the adjacent vegetation during excavation of the ducting channel.

Construction works adjacent to the infestation will be carried out under supervision of the invasive species specialist.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Invasive Species Survey:

Infestation ID: IS_R14

ITM: 581582,660113

Infestation Type: Rhododendron

Dimensions of Infestation: 16m x 2m

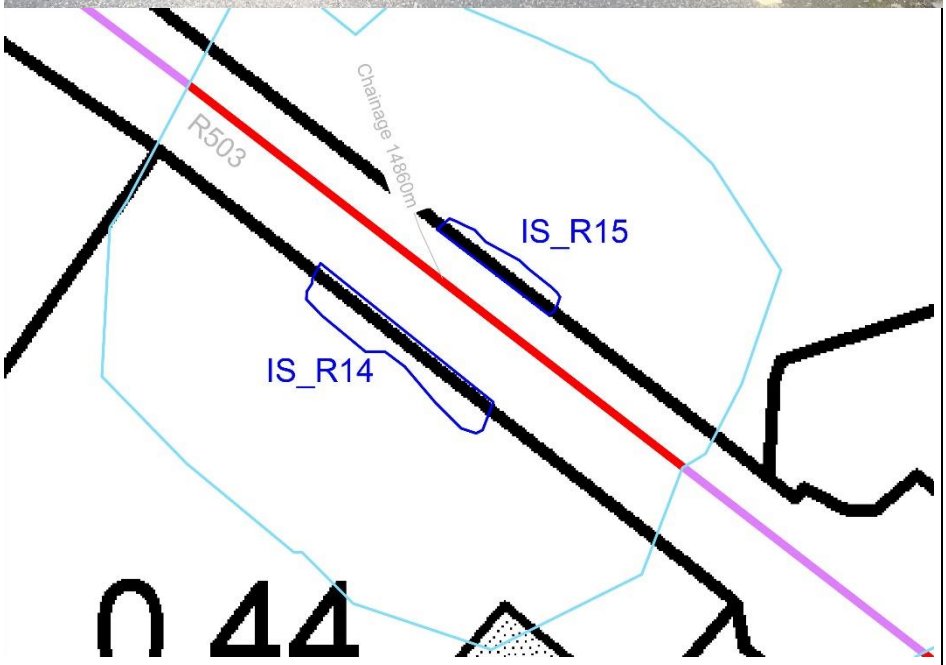
Separation Distance: 0m - At Edge of roadway

Infestation Specific Biosecurity Measures:

Construction machinery will not come into contact with any of the adjacent vegetation during excavation of the ducting channel.

Construction works adjacent to the infestation will be carried out under supervision of the invasive species specialist.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Invasive Species Survey:

Infestation ID: IS_R15

ITM: 581590,660120

Infestation Type: Rhododendron

Dimensions of Infestation: 10m x 2m

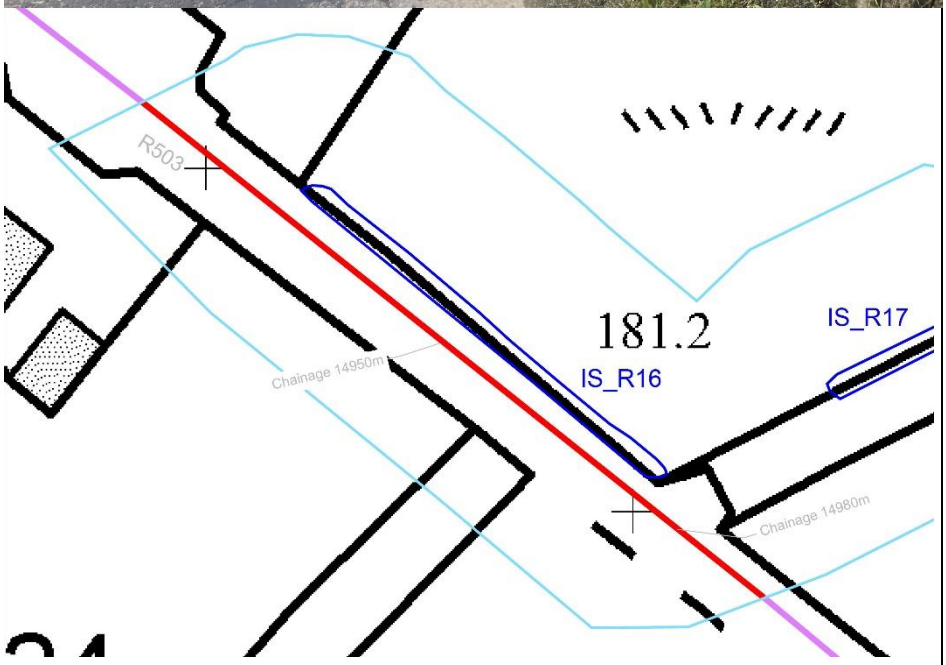
Separation Distance: 0m - At Edge of roadway

Infestation Specific Biosecurity Measures:

Construction machinery will not come into contact with any of the adjacent vegetation during excavation of the ducting channel.

Construction works adjacent to the infestation will be carried out under supervision of the invasive species specialist.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Boundary of Infestation

15m buffer from Infestation

110kV UGC works greater than 15m from Infestation

110kV UGC works within 15m of Infestation

R503 Road Number

Chainage 1000m — Chainage

Invasive Species Survey:

Infestation ID: IS_R16

ITM: 581658,660067

Infestation Type: Rhododendron

Dimensions of Infestation: 45m x 2m

Separation Distance: 0m - At Edge of roadway

Infestation Specific Biosecurity Measures:

Construction machinery will not come into contact with any of the adjacent vegetation during excavation of the ducting channel.

Construction works adjacent to the infestation will be carried out under supervision of the invasive species specialist.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.

Invasive Species Survey:

Infestation ID: IS_R17

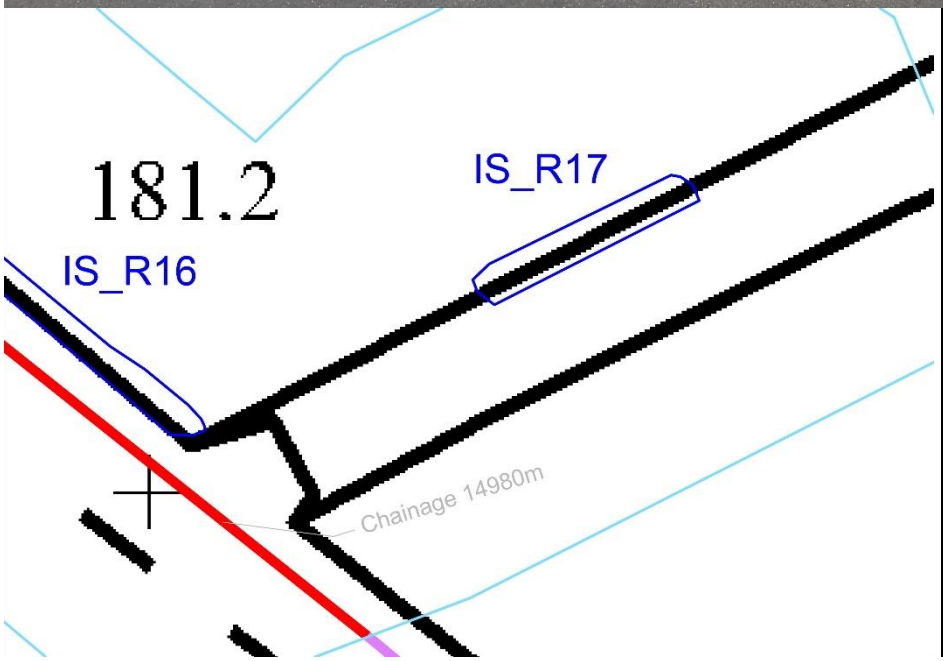
ITM: 581697,660065

Infestation Type:
Rhododendron

Dimensions of Infestation:
2m x 15m

Separation Distance: 20m
(from construction works)

Infestation Specific Biosecurity Measures
No measures required due to distance from works



Boundary of Infestation

15m buffer from Infestation

110kV UGC works greater than 15m from Infestation

110kV UGC works within 15m of Infestation

R503 Road Number

Chainage 1000m — Chainage

Invasive Species Survey:

Infestation ID: IS_R18

ITM: 582284,659450

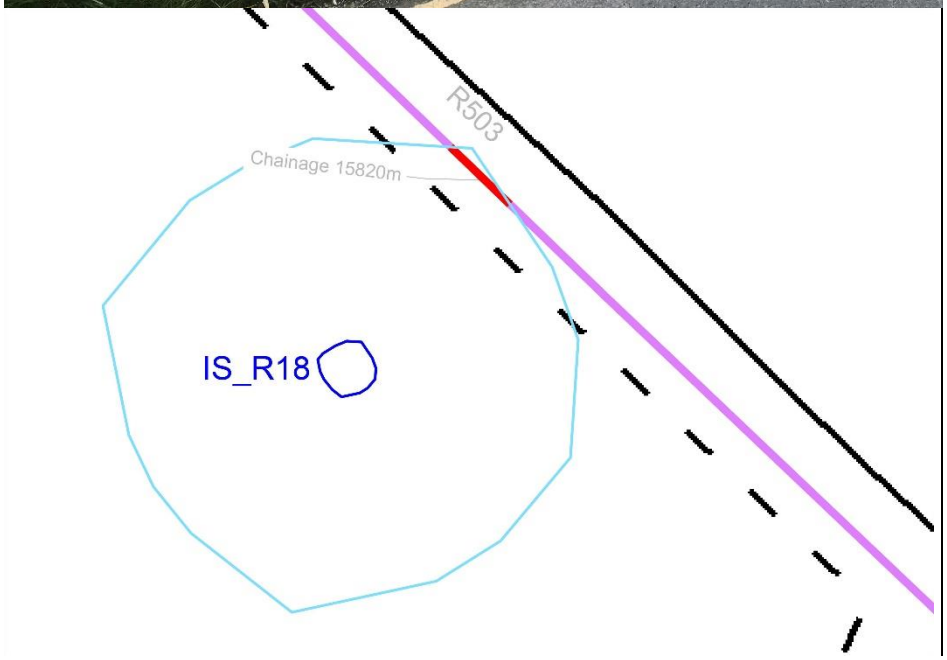
Infestation Type: Rhododendron

Dimensions of Infestation: 4m x 4m

Separation Distance: 12m

Infestation Specific Biosecurity Measures

No measures required due to distance from works



Boundary of Infestation

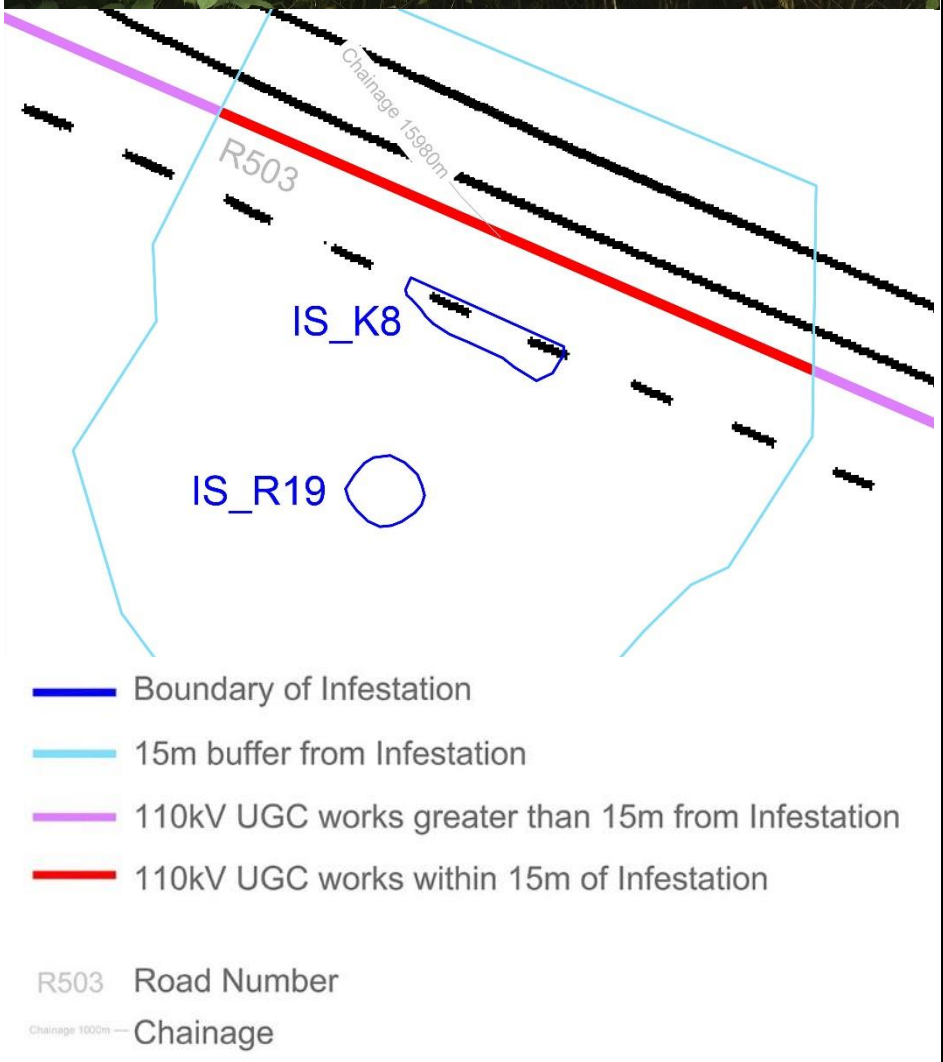
15m buffer from Infestation

110kV UGC works greater than 15m from Infestation

110kV UGC works within 15m of Infestation

R503 Road Number

Chainage 1000m — Chainage



Invasive Species Survey:

Infestation ID: IS_R19

ITM: 582412,659360

Infestation Type: Rhododendron

Dimensions of Infestation: 4m x 4m

Separation Distance: 10m, behind Knotweed

Infestation Specific Biosecurity Measures
No measures required due to distance from works

Invasive Species Survey:

Infestation ID: IS_R20

ITM: 583844,659437

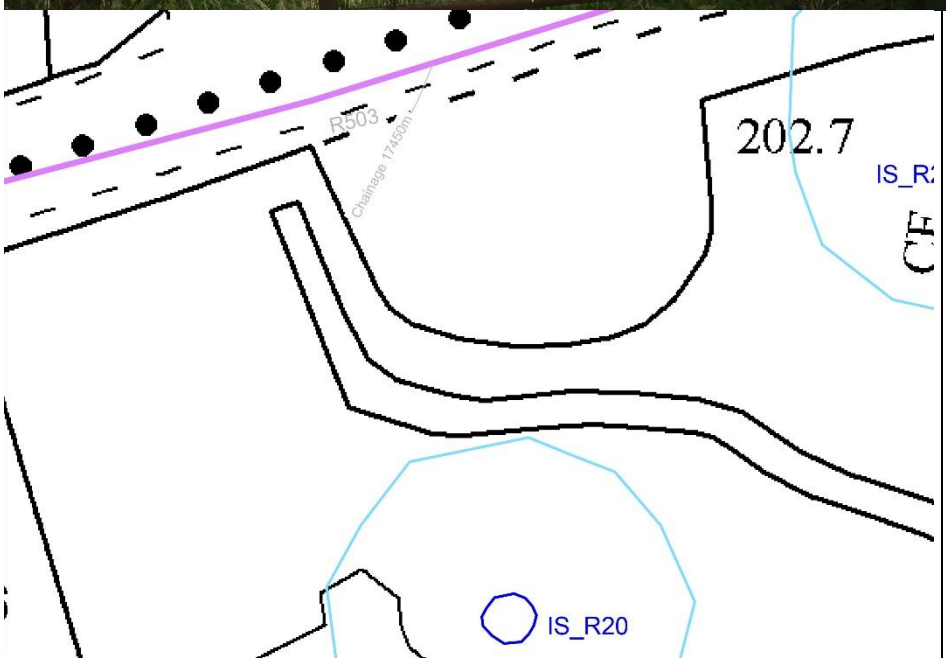
Infestation Type: Rhododendron

Dimensions of Infestation: 5m x 4m

Separation Distance: 50m *(from construction works)*

Infestation Specific Biosecurity Measures

No measures required due to distance from works



Boundary of Infestation

15m buffer from Infestation

110kV UGC works greater than 15m from Infestation

110kV UGC works within 15m of Infestation

R503 Road Number

Chainage 1000m — Chainage

Invasive Species Management Plan

EMP

Invasive Species Survey:

Infestation ID: IS_R21

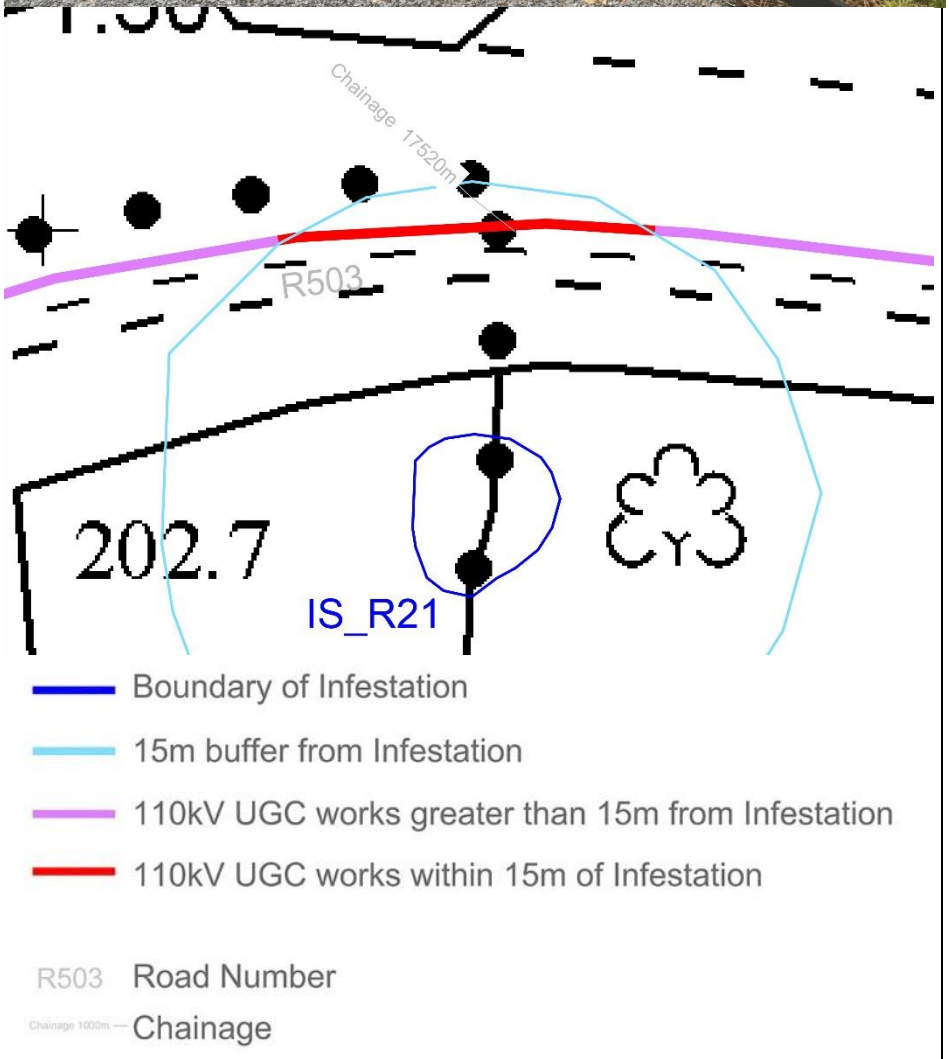
ITM: 583891,659489

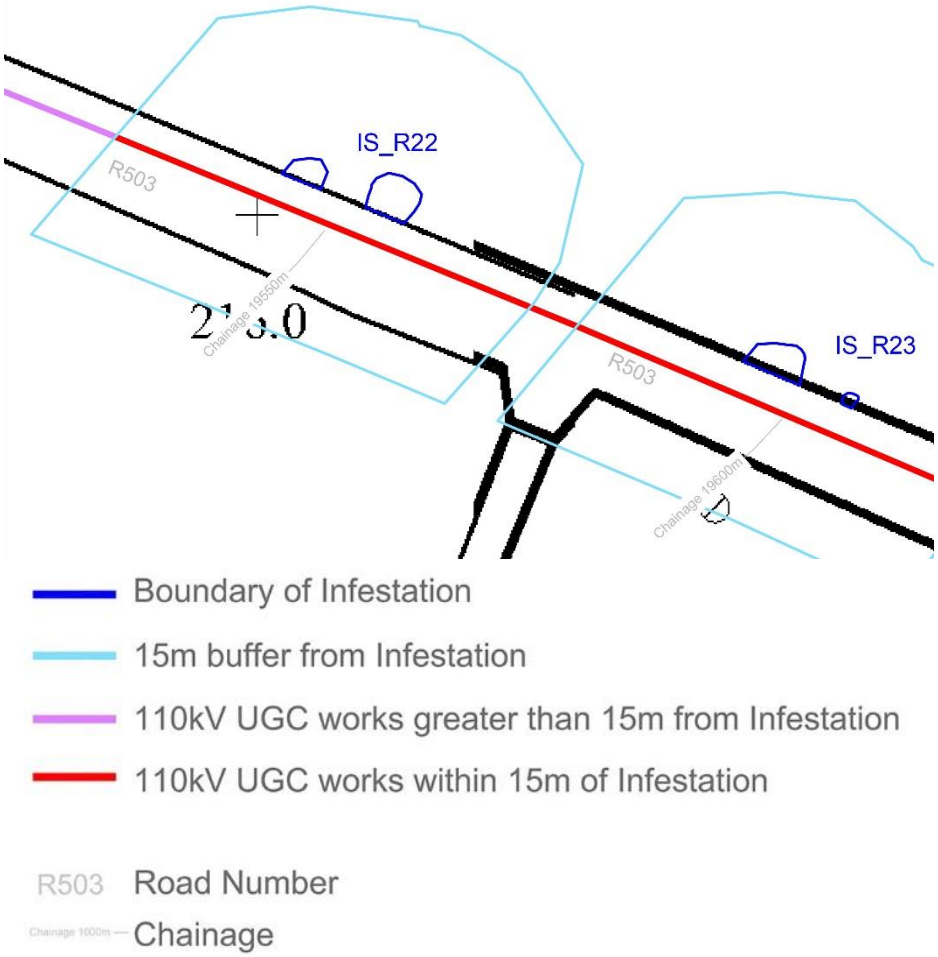
Infestation Type:
Rhododendron

Dimensions of Infestation:
8m x 8m

Separation Distance: 10m
(from construction works)

Infestation Specific Biosecurity Measures
No measures required due to distance from works





Invasive Species Survey:

Infestation ID: IS_R22

ITM: 585791,658815

Infestation Type: Rhododendron

Dimensions of Infestation: 3m x 2m & 5m X 4m (2 locations)

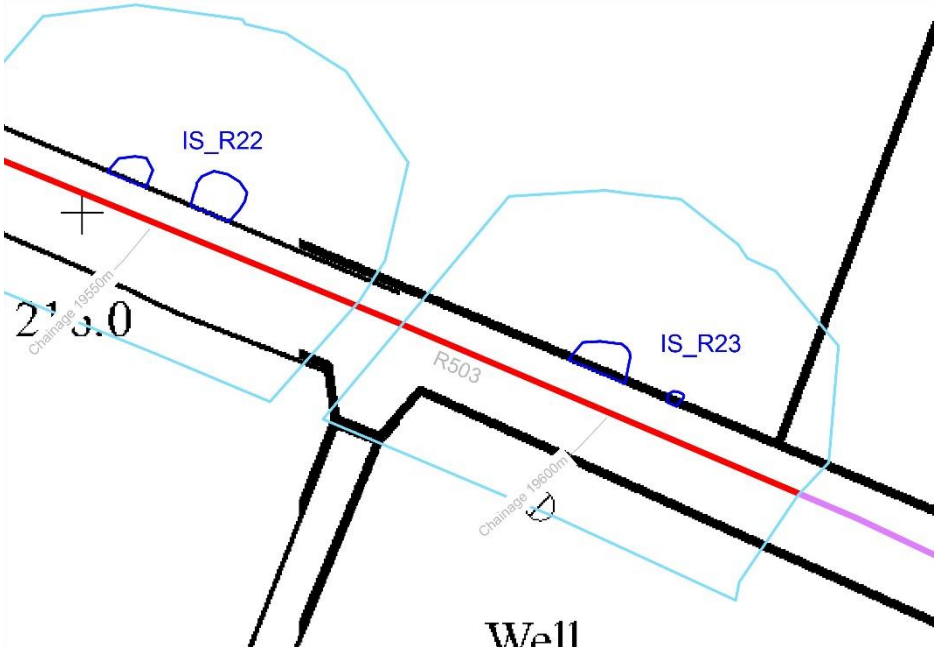
Separation Distance: 0m - At Edge of roadway

Infestation Specific Biosecurity Measures:

Construction machinery will not come into contact with any of the adjacent vegetation during excavation of the ducting channel.

Construction works adjacent to the infestation will be carried out under supervision of the invasive species specialist.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Boundary of Infestation

15m buffer from Infestation

110kV UGC works greater than 15m from Infestation

110kV UGC works within 15m of Infestation

R503 Road Number

Chainage 1000m — Chainage

Invasive Species Survey:

Infestation ID: IS_R23

ITM: 585837,658797

Infestation Type: Rhododendron

Dimensions of Infestation: 5m x 3m & 1 X 1 (2 locations)

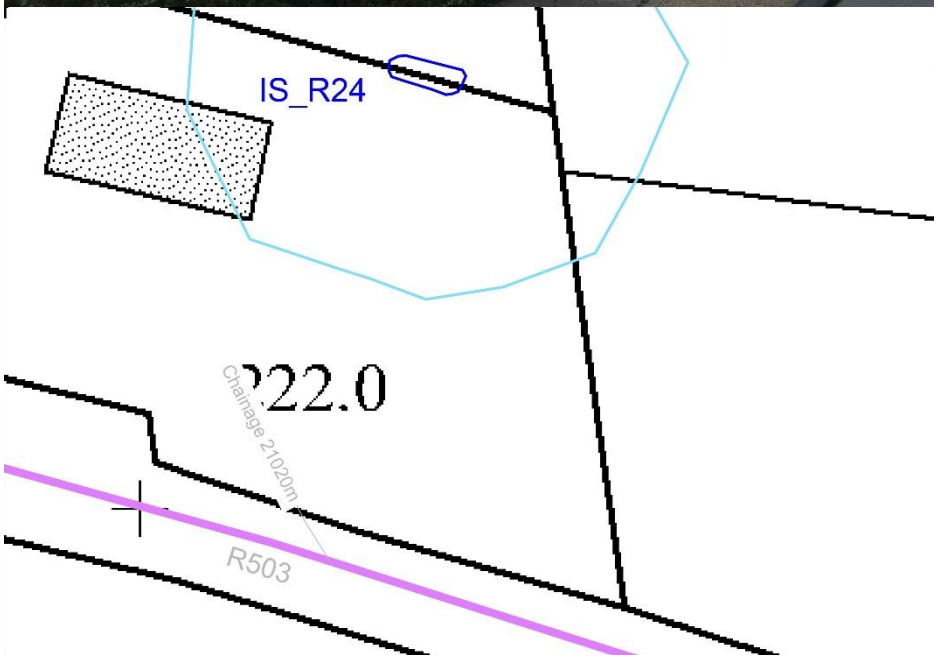
Separation Distance: 0m - At Edge of roadway

Infestation Specific Biosecurity Measures:

Construction machinery will not come into contact with any of the adjacent vegetation during excavation of the ducting channel.

Construction works adjacent to the infestation will be carried out under supervision of the invasive species specialist.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.



Boundary of Infestation

15m buffer from Infestation

110kV UGC works greater than 15m from Infestation

110kV UGC works within 15m of Infestation

R503 Road Number

Chainage 1000m — Chainage

Invasive Species Survey:

Infestation ID: IS_R24

ITM: 586972,658306

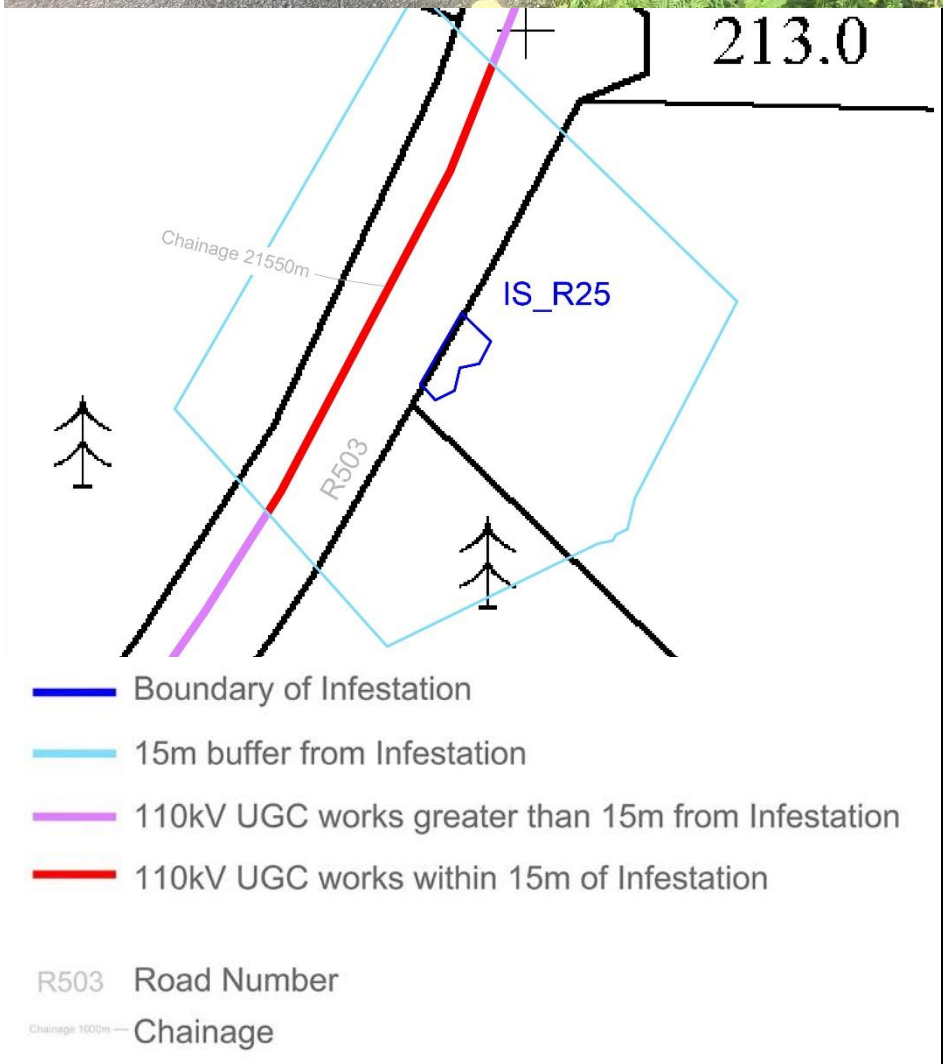
Infestation Type: Rhododendron

Dimensions of Infestation: 5m x 2m

Separation Distance: 35m *(from construction works)*

Infestation Specific Biosecurity Measures

No measures required due to distance from works



Invasive Species Survey:

Infestation ID: IS_R25

ITM: 587417,658297

Infestation Type: Rhododendron

Dimensions of Infestation: 6m x 3m

Separation Distance: 0m - At Edge of roadway

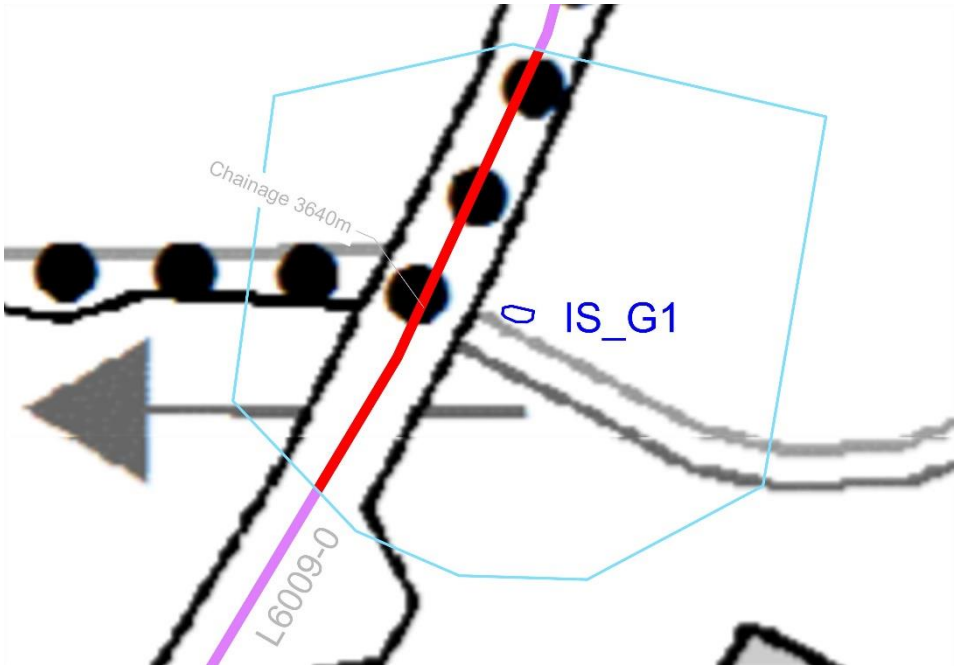
Infestation Specific Biosecurity Measures:

Construction machinery will not come into contact with any of the adjacent vegetation during excavation of the ducting channel.

Construction works adjacent to the infestation will be carried out under supervision of the invasive species specialist.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.

2.5 Giant Hogweed Infestation



Boundary of Infestation

15m buffer from Infestation

110kV UGC works greater than 15m from Infestation

110kV UGC works within 15m of Infestation

R503 Road Number

Chainage 1600m — Chainage

Invasive Species Survey:

Infestation ID: IS_G1

ITM: 574383,662954

Infestation Type:
Giant Hogweed

Dimensions of Infestation:
1m x 2m

Separation Distance: 2.5m
(from construction works)

Infestation Specific Biosecurity Measures:

Construction machinery will not come into contact with any of the adjacent vegetation during excavation of the ducting channel.

Construction works adjacent to the infestation will be carried out under supervision of the invasive species specialist.

Excavated trenching material from the section of the 110kV UGC marked in red on the map, will be disposed as potentially contaminated material, by a licenced contractor to a suitably licenced waste facility.

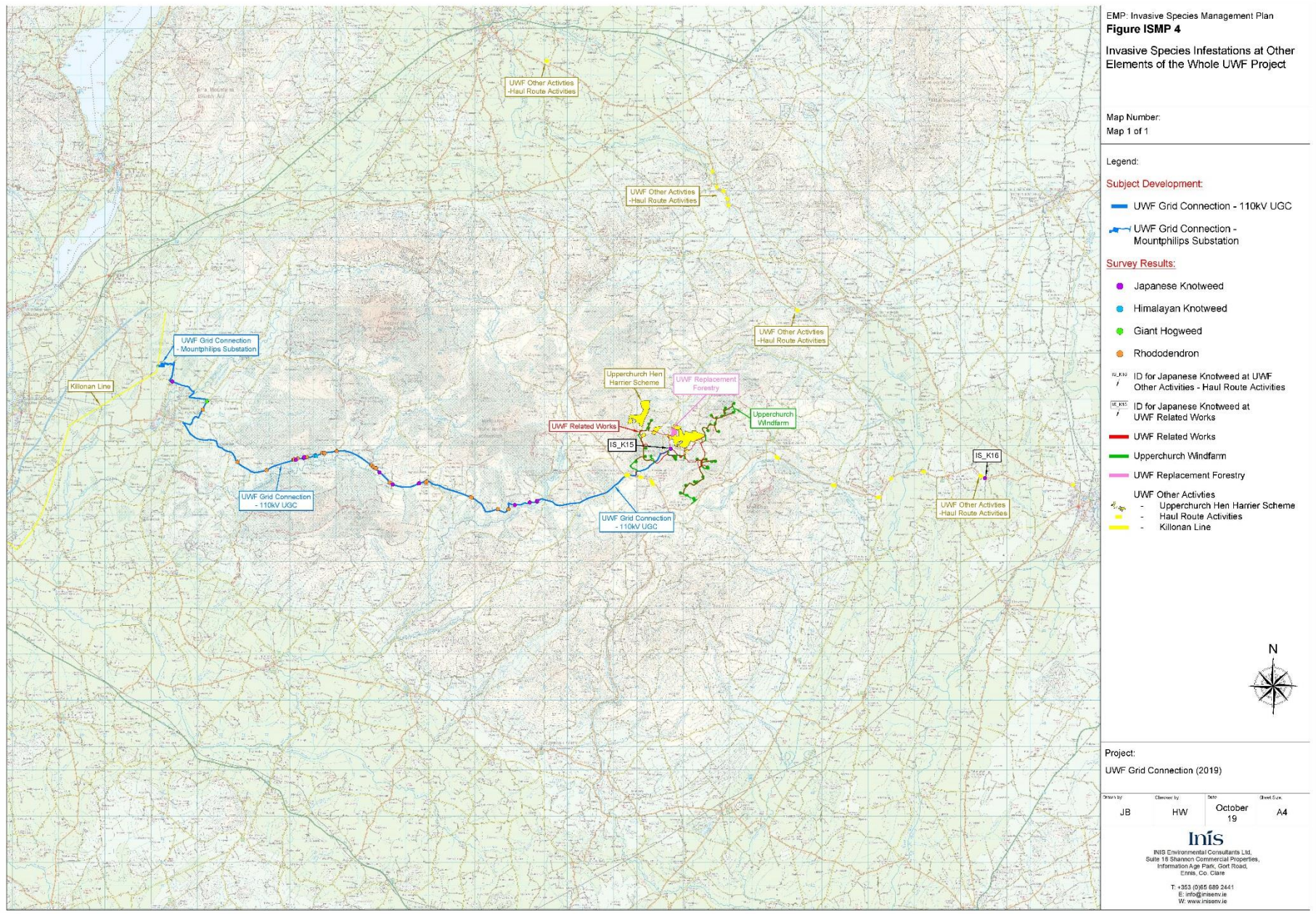
3. Invasive Species Infestations at Other Elements of the Whole UWF Project

UWF Grid Connection is part of a whole project – the Whole Upperchurch Windfarm (UWF) Project. Invasive species infestations in proximity to Other Elements of the Whole UWF Project were assessed in the Invasive Species Surveys. In summary, there is one infestation proximal to UWF Related Works, and one infestation proximal to a Haul Route Activity location (part of UWF Other Activities), as detailed below and shown on Figure ISMP 4 and Figure ISMP 5. These infestations will be dealt with, throughout the construction period, with the same comprehensive measures as the UWF Grid Connection works listed in Section 4.

The promoter of the UWF Grid Connection, Ecopower Developments Ltd, is also the promoter of the Whole UWF Project, and as such will have full control over all construction practices for the works as the Promoter. Ecopower Development is committed to implementing the Biosecurity Measures, which are described in Section 4 of this Plan, for all works and activities relating to the Whole UWF Project.

Operational Stage: It is important to note that there are currently no invasive plant infestations within the Upperchurch Windfarm boundary and as such operational risks from Invasive plant infestations are not present. The Promoter of the Upperchurch Windfarm project, will have full control of all vehicular movements within the wind farm. To avoid creating new infestations all such movements will follow specific Biosecurity Measures as listed in Section 4.

Re the Decommissioning stage of the wind farm, it is impossible to predict what infestations will be present in 25 years' time. Ecopower Developments Ltd will apply Best Practice Biosecurity Measures to assessing and dealing with any/all infestations wherever they occur within their wind farm. A new updated Invasive Species Management Plan will be produced for the decommissioning stage.


UWF Other Activities -Haul Route Activities
UWF Other Activities -Haul Route Activities
UWF Other Activities -Haul Route Activities
UWF Other Activities -Haul Route Activities
UWF Grid Connection - Mountphilips Substation
Killonan Line
UWF Grid Connection - 110kV UGC
Upperchurch Hen Harrier Scheme
UWF Replacement Forestry
Upperchurch Windfarm
UWF Related Works
IS_K15
UWF Grid Connection - 110kV UGC
IS_K16
UWF Other Activities -Haul Route Activities
EMP: Invasive Species Management Plan
Figure ISMP 4
Invasive Species Infestations at Other Elements of the Whole UWF Project
Map Number:
Map 1 of 1
Legend:
Subject Development:
UWF Grid Connection - 110kV UGC
UWF Grid Connection - Mountphilips Substation
Survey Results:
Japanese Knotweed
Himalayan Knotweed
Giant Hogweed
Rhododendron
ID for Japanese Knotweed at UWF Other Activities - Haul Route Activities
ID for Japanese Knotweed at UWF Related Works
UWF Related Works
Upperchurch Windfarm
UWF Replacement Forestry
UWF Other Activities
- Upperchurch Hen Harrier Scheme
- Haul Route Activities
- Killonan Line
N
Project:
UWF Grid Connection (2019)
Drawn by: JB
Checked by: HW
Date: October 19
Sheet Size: A4
Inis
INIS Environmental Consultants Ltd,
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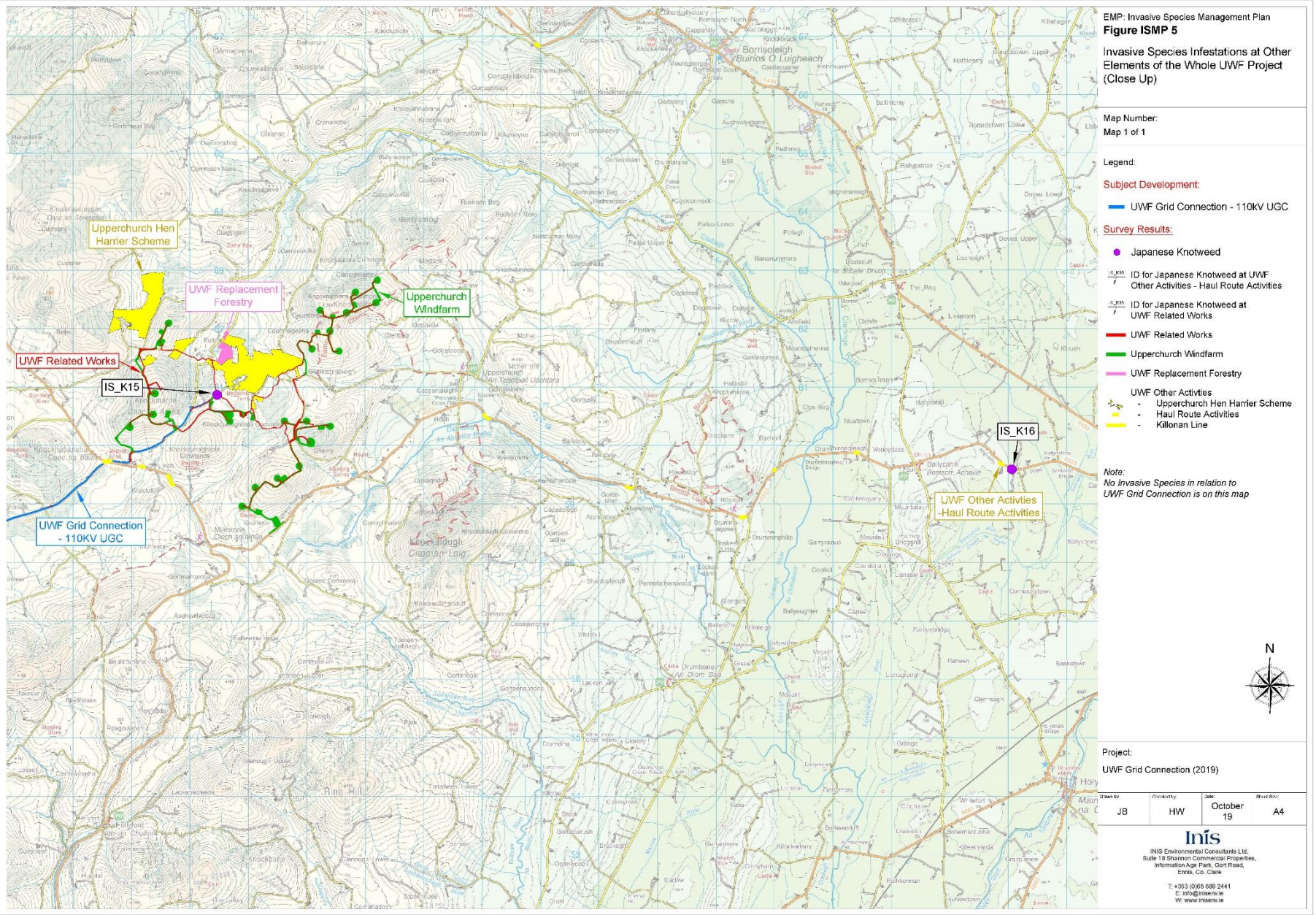
Upperchurch Hen Harrier Scheme
UWF Replacement Forestry
Upperchurch Windfarm
UWF Related Works
IS_K15
UWF Grid Connection - 110KV UGC
IS_K16
UWF Other Activties -Haul Route Activities
EMP: Invasive Species Management Plan
Figure ISMP 5
Invasive Species Infestations at Other Elements of the Whole UWF Project (Close Up)
Map Number:
Map 1 of 1
Legend:
Subject Development:
UWF Grid Connection - 110kV UGC
Survey Results:
Japanese Knotweed
ID for Japanese Knotweed at UWF Other Activities - Haul Route Activities
ID for Japanese Knotweed at UWF Related Works
UWF Related Works
Upperchurch Windfarm
UWF Replacement Forestry
UWF Other Activties
- Upperchurch Hen Harrier Scheme
- Haul Route Activities
- Killonan Line
Note:
No Invasive Species in relation to UWF Grid Connection is on this map
N
Project:
UWF Grid Connection (2019)
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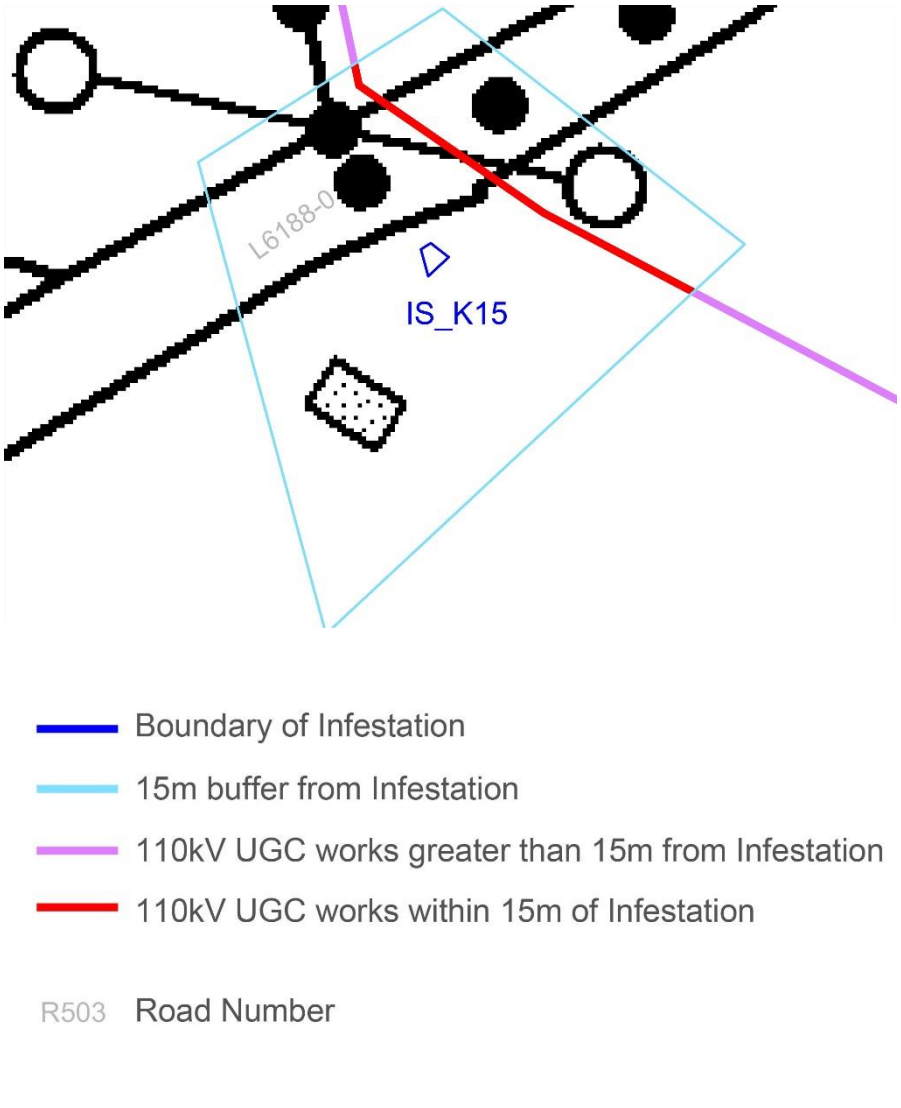


UWF RELATED WORKS

nvasive Species Survey:

Infestation ID: IS_K15

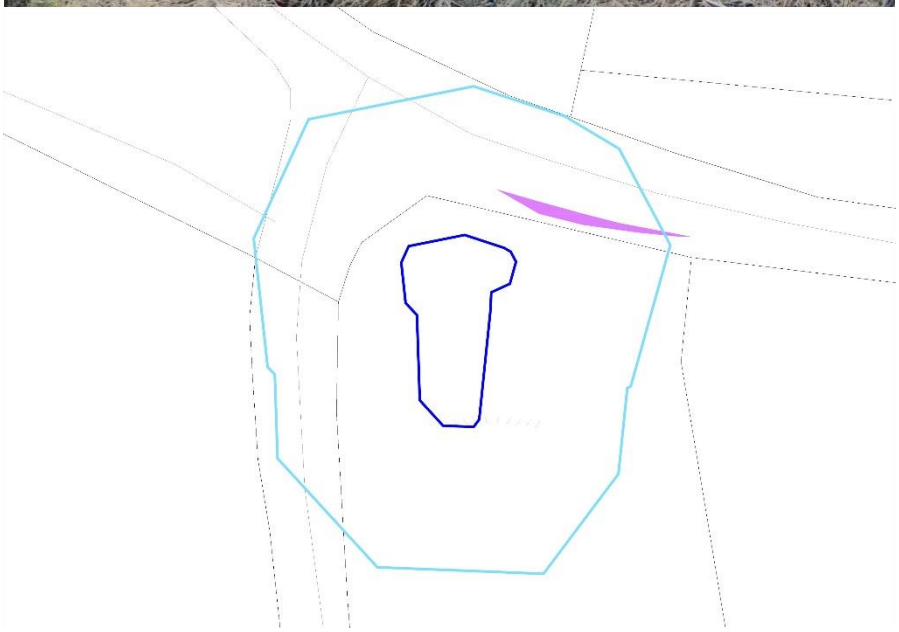
ITM: 594434 E 660905

Infestation Type:
Japanese Knotweed

Dimensions of Infestation:
2m x 2m

Separation Distance: 7m
(from UWF Related Works construction works for Internal Windfarm Cabling)

Infestation Specific Biosecurity Measures
No measures required due to distance from works



UWF OTHER ACTIVITIES
(Haul Route Activity)

Invasive Species Survey:

Infestation ID: IS_K16

ITM: 608032 E 659632

Infestation Type:
Japanese Knotweed

Dimensions of Infestation:
5m x 10m

Separation Distance: 6m
(from UWF Other Activities - Haul Route Activities)

Infestation Specific Biosecurity Measures
No measures required due to distance from works

No construction works will occur at this location

4. Biosecurity Measures for the Containment and Management of Invasive Species during the Construction Stage

The most relevant and current guidance in relation to the management of non-native invasive plant species and animal species during construction projects, will be implemented during the construction of the UWF Grid Connection project and during the development of the Other Elements of the Whole UWF Project. All works or activities in close proximity to Invasive Plant Infestations will be carried out under the supervision of an invasive species specialist.

The prescriptions for the treatment of invasive species were derived with reference to the following literature:

- Managing Japanese knotweed on development sites - The Knotweed Code of Practice produced by the Environmental Agency (2013);
- NRA Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (2010);
- Managing Invasive Non-native Plants in or near Freshwater, Environment Agency (2010);
- Best Practice Management Guidelines Japanese knotweed Fallopia japonica, Invasive Species Ireland (2015);
- IFI Biosecurity Protocol for Field Survey Work, Inland Fisheries Ireland (2010).

4.1 Biosecurity Measures for works proximate to Invasive Plant Species Infestations

4.1.1 Pre-Construction Processes

- Pre-Construction confirmatory surveys will be completed by an invasive species specialist, 3 – 4 weeks before construction begins. Mapping, showing the most up to date distribution and extent of each infestation, will be distributed to the Promoter, Owners Engineer and the Contractor;
    - A toolbox talk will be provided by the invasive species specialist with the Contractors construction site engineers and general operatives to explain about all invasive species identified along the route and the restrictions that will apply for the full construction period. The toolbox talk will cover all pertinent topics including all relevant invasive species close to construction works and the biosecurity measures to be implemented while working. The invasive species toolbox talk will cover the full lifecycle of every construction activity including, but not limited to, all onsite construction activities, mechanical excavation, transportation and disposal of all material from excavations, through to the backfilling of excavations, and reinstatement of the construction works area;
- During trenching and ducting works, it is assumed that 80 -100m per day of ducting can be completed. Covering of knotweed infestations (adjacent the works) within these 80-100m sections will be 7 days ahead of the construction program i.e. the covering of knotweed infestations will be completed on sections seven days in advance of works occurring on all sections. The infestations will be covered so that their full extent plus 1 metre is covered entirely and no vegetation is visible;
- The covering of vegetative knotweed infestations with high density polyethylene grass carpet terram at all identified locations prior to any works commencing on that section and the monitoring of construction works at that section when it happens. The polyethylene grass carpet terram covering will only be placed on and removed from the infestation under direct supervision from an invasive species specialist. When taking the terram off an infestation and moving to the next section the construction team will need to ensure that all adherent material has been removed and placed within the adjacent infestation i.e. it will be important not to spread the infestation;
- No posts will be used to secure the coverings i.e. there will be no uncontrolled ground interference

within 7 meters of any infestation during any of these operations;

- Once each knotweed infestation has been covered, works can begin at that location, an invasive species specialist will be present to provide supervision of all works adjacent to infestations;
- Rhododendron infestations and the giant hogweed infestation will not be covered with high density polyethylene grass carpet terram, instead where works occur within 5m of Rhododendron infestations or within 5m of the giant hogweed infestation, an invasive species specialist will be present to ensure that construction machinery and operatives do not come into contact with these infestations;
- The site Environmental Clerk of Works will ensure that the Contractor engages a suitable waste disposal company with the requisite license for handling any hazardous waste (i.e. invasive species material). The Contractor will maintain records of all wastes arising, and the documentation will include the waste contractor's local authority license and proof of appropriate haulage license per individual haulage vehicle.
- Excavated trenching material from the section of the 110kV UGC within 15m of an infestation, will be disposed as potentially contaminated material, by a licensed contractor to a suitably licensed waste facility.
- Construction machinery will not come into contact with any of the adjacent vegetation during excavation of the ducting channel.
- Construction works adjacent to the infestation will be carried out under supervision of the invasive species specialist.

4.1.2 Construction Phase Processes for works locations proximate to Infestations

- Before construction begins on any section, all General Operatives will attend a toolbox talk on invasive species. No General Operative will be allowed to work on the project without completing the toolbox talk;
- Once this is completed construction can begin with onsite supervision of works in close proximity to locations where invasive species occur;
- The Environmental Clerk of Works will ensure that only licensed hauliers are collecting and disposing of material from any open excavation.

4.2 Biosecurity Measures to Prevent the Spread/Introduction of Aquatic Invasive Species

To ensure the effective implementation of the biosecurity measures, an invasive species specialist will monitor each infestation location during all critical stages of construction works.

4.2.1 Inspection and Cleaning of Delivery Vehicles

- Prior to arrival on site, the contractor's vehicles and equipment will be thoroughly cleaned and then dried using high-pressure steam cleaning, with water hotter than 65 degrees Celsius, 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;
- A dedicated member of each construction crew along the 110kV UGC and at the Mountphilips Substation site will be responsible for inspecting and cleaning delivery vehicles both entering and exiting construction works areas along the 110kV UGC, and entering the Mountphilips Substation site. These persons will receive training in the correct techniques; Following cleaning, all equipment and vehicles will be visually inspected to ensure that all adherent material and debris has been removed manually. A bin will be provided at each work locations/site entrance for adherent material to be placed in. This will be emptied on a daily basis into the hazardous waste container at the Temporary Compound for removal offsite by a licensed operator; Spot checks on the efficacy of cleaning strategies will be carried out by the Project Ecologist. Records of supplies and cleaning of delivery vehicles will be kept by the flagmen, and will be regularly inspected by the Environmental Clerk of Works;
- Before works take place onsite the Contractor will have 150kg (15No. x 10kg buckets) of Virkon Aquatic available for the construction team – this will be stored in the COSSH store at the Temporary Compound at Mountphilips Substation site.
- A Virkon footbath will be available at all compound areas, construction areas and at the site entrance;
- Each construction crew will be equipped with a 'disinfection box'. This will contain Virkon Aquatic, 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 (particularly for machinery and equipment exiting the site and which has come into contact with water or soils) 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. If watercourses are present near construction works areas a small 1-foot bund will be built using sand bags on either side of the works to ensure no water can enter the watercourse – any dirty water will be directed back into the construction site/excavated trench to be treated;

4.2.2 Measures for Works at/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;
- All footwear used, or to be used, in watercourses will be dipped in or scrubbed with a disinfectant solution (e.g. 1% solution of Virkon Aquatic or another proprietary disinfection product) and thoroughly dried afterwards. This also applies to footwear use in the agricultural lands at Mountphilips Substation site and on the public or private paved roads along the route of the 110kV UGC.
- Any observations of mass mortality of Crayfish will be reported to the relevant authorities

immediately upon evidence being found;

4.3 Biosecurity Measures to Prevent the Spread/Introduction of Invasive Animal Species

On the UWF Grid Connection project (at the Mountphilips Substation site) and during the development of the Other Elements of the Whole UWF Project many trees and shrubs will be planted as part of the project. These trees/shrubs (the root balls, leaves and soil) can contain invasive animal species. 'Hitch-hiking' is a term used to describe when a species is spread by the movement of other material. This can be, for example, on plants, soil, clothing or equipment.

Good practice Biosecurity Measures will be followed on the UWF Grid Connection project and the Other Elements of the Whole UWF Project in order to avoid the unintentional introduction and spread of invasive animal species through newly imported plants or growing media.

Measures to be applied throughout the construction period will be as follows:

- Care will be taken in the use of trailers and the movement of plants onsite – inspections of all plants and shrub root balls will take place before they leave the nursery but also when they arrive onsite;
- All trailers will be checked before they leave the nursery but also when they arrive onsite;
- Staff will be appropriately trained in preventing the spread of invasive species (including training in relevant regulations).
- A toolbox talk will be provided by the invasive species specialist with the Contractors construction site engineers and general operatives to explain about all potential animal invasive species and the controls expected and that will apply for the full construction period. The toolbox talk will cover all pertinent topics including all relevant invasive species close to construction works and the biosecurity measures to be implemented.
- The invasive species toolbox talk will cover the full lifecycle of every plant delivery onsite including how to inspect deliveries and how to deal with any 'hitchhikers' if found;
- In all cases of an invasive species being found the relevant statutory authorities will be contacted immediately.

Example of 'hitchhiker'

Small mammals (e.g. White Toothed Shrew)

Hitchhike on: Trailers, larger root balls, and movement of large plants.

How to prevent it: Check plant consignments for signs of mammals. Signs would include droppings, chewed packaging materials and also seeing the animals. Avoid allowing any animals transported to your site to escape into the wild.

Insects (e.g. Red lily beetle, Harlequin ladybird)

Hitchhike on: Plants brought onto the site.

How to prevent it: Check consignments of the plants. Will require hand picking or in some cases use of pesticides. Do not release any handpicked animals into the wild.

5. Biosecurity Measures to be implemented during the Operation of UWF Grid Connection

During the operation of UWF Grid Connection Biosecurity Measures will be required to ensure that no invasive species are introduced or spread from any existing infestations. No major construction works will be required during the operation of UWF Grid Connection however strict protocols will stay in place for all planned activities for the operational life time of the UWF Grid Connection.

5.1 Overview of Operational Activities

The planned, and potential, activities for the operational life time of the UWF Grid Connection are as follows:

Mountphilips Substation – Operational Phase

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 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 Mountphilips Substation Compound and Control Building. The security and condition of the surrounding palisade fence and entrance gates, and the condition of the access road, drainage network and watercourse crossing structures 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.

Conclusion: All planned activities for the operational life time of Mountphilips Substation will be by people arriving by vehicle and completing inspections on foot.

Mountphilips - Upperchurch 110kV UGC– Operational Phase

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 road surface level, will be removed 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 drive over of the route. Traffic management will be set up as required during inspections.

Planned Maintenance: 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 road surface 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 and the road reinstated. Testing and

commissioning in a similar manner to the construction phase will then be carried out. Traffic management will be set up as required.

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 and likely to be similar to the planned maintenance activities described above.

Conclusion: Planned activities for the operational life time of Mountphilips - Upperchurch 110kV UGC will mostly involve non-intrusive drive through inspections of the cable route and testing inspections at joint bays. In addition, although extremely unlikely, there may be a requirement to open a road section to replace underperforming cabling; this work will involve an excavator and intrusive works.

Taking account of the activities that will, or may, take place during the Operational Phase of Upperchurch 110kV UGC, the following protocols will be in place for the lifetime of the Upperchurch 110kV UGC:

5.2 Biosecurity Measures for Operational Phase at Mountphilips Substation (Plants, Animals and Aquatic Invasive Species)

- Prior to arrival on site, any contractor's /ESB Networks vehicles will be thoroughly cleaned and then dried using high-pressure steam cleaning, with water hotter than 65 degrees Celsius, 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);
- Before working onsite, all boots/footwear will be disinfected;
- Before working onsite, all trailers will be checked for animal invasives;
- Visual inspections will be carried out on all vehicles for evidence of attached plant or animal material, or adherent mud or debris, before travelling to and working on Mountphilips Substation site;
- Contractors or ESB Networks RAMS (Risk Assessment Method Statement), for all works on Mountphilips – Upperchurch 110kV UGC, will be required to reflect a knowledge of all pertinent Invasive issues and the recommended procedures for each;
- In all cases of an invasive species being found the relevant statutory authorities will be contacted immediately.

5.3 Biosecurity Measures for Operational Phase at Mountphilips - Upperchurch 110kV UGC (Plants, Animals and Aquatic Invasive Species)

- Prior to arrival on site at Mountphilips – Upperchurch 110kV UGC, any contractor's /ESB Networks vehicles will be thoroughly cleaned and then dried using high-pressure steam cleaning, with water hotter than 65 degrees Celsius, 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);
- Before working onsite, all boots/footwear will be disinfected;
- Before working onsite, all trailers will be checked for animal invasives. In all cases of an invasive species being found the relevant statutory authorities will be contacted immediately;
- Visual inspections will be carried out on all vehicles for evidence of attached plant or animal material, or adherent mud or debris, before travelling to and working on Mountphilips – Upperchurch 110kV UGC;
- Before planned maintenance or unplanned repair works commence, an ecology or invasive species specialist will survey the works locations for invasive plant species infestations in proximity to the works location(s) - the infestations will be covered so that their full extent plus 1 meter is covered entirely and no vegetation is visible; any infestations of knotweed will be covered with polyethylene grass carpet terram before works and removed immediately afterwards under the supervision of the ecologist/invasive species specialist; rhododendron and giant hogweed infestations will not be covered;

the ecologist/invasive species specialist will supervise any works in proximity (5m) to infestations to ensure that construction machinery and operatives do not come into contact with these infestations;

- Contractors or ESB Networks RAMS (Risk Assessment Method Statements), for all works on Mountphilips – Upperchurch 110kV UGC, will be required to reflect a knowledge of all pertinent Invasive issues and the recommended procedures for each; the ecologist/invasive species specialist will provide a toolbox talk to works crews prior to works commencing;
- Should any works be required at watercourse crossings - 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; all footwear used, or to be used, in watercourses will be dipped in or scrubbed with a disinfectant solution (e.g. 1% solution of Virkon Aquatic or another proprietary disinfection product) and thoroughly dried afterwards. This also applies to footwear used on the public or private paved roads along the route of the 110kV UGC; any observations of mass mortality of Crayfish will be reported to the relevant authorities immediately upon evidence being found.

6. Biosecurity Measures to be implemented at Other Elements of the Whole UWF Project

UWF Grid Connection is part of a whole project – the Whole Upperchurch Windfarm (UWF) Project. Invasive species infestations in proximity to Other Elements of the Whole UWF Project were assessed during Invasive Species Surveys. In summary, there is one infestation proximal to UWF Related Works, and one infestation proximal to a Haul Route Activity location (part of UWF Other Activities), as detailed below. These infestations will be dealt with, throughout the construction period, with the same comprehensive Best Practice measures as the UWF Grid Connection works listed in Section 4.

The Promoter of the UWF Grid Connection, Ecopower Developments Ltd, is also the Promoter of the Whole UWF Project, and as such will have full control over all construction practices for the works as the Promoter. Ecopower Developments is committed to implementing the Biosecurity Measures, which are described in Section 4 of this Plan, for all works and activities relating to the Whole UWF Project.

Operational Stage: It is important to note that there are currently no invasive plant infestations within the Upperchurch Windfarm boundary and as such operational risks from Invasive plant infestations are not present. Ecopower Developments Ltd, as Promoter/owner of the Upperchurch Windfarm project, will have full control of all vehicular movements within the wind farm. To avoid creating new infestations all such movements will follow the Biosecurity Measures listed in Section 4.

Decommissioning stage of Upperchurch Windfarm: it is impossible to predict what infestations may or may not be present in 25 years' time. Ecopower Developments Ltd, as promoter/owner of the Upperchurch Windfarm project, will apply Best Practice Biosecurity Measures to assessing and dealing with any/all infestations wherever they occur within their wind farm. A new updated Invasive Species Management Plan will be produced for the decommissioning stage.

UWF Grid Connection

Environmental Management Plan (2019)

Tab 5

Waste Management Plan

ECOPOWER

October 2019

Table of Contents

LIST OF FIGURES– *included at the end of this Plan – Section 1.6*

LIST OF TABLES

Waste Management Plan

1.1 Introduction

This Waste Management Plan (WMP) will provide the basis for the preparation of a final WMP, which will include any relevant planning conditions. The appointed Contractor will appoint a Project Supervisor Construction Stage (PSCS), who will draw up the final WMP and will be responsible for carrying out and managing the construction wastes in accordance with the WMP.

1.1.1 Objective of the Waste Management Plan

This Waste Management Plan (WMP) will be implemented to minimise waste, promote a practice of reduce, reuse and recycle where possible and ultimately to ensure the correct handling and disposal of construction waste streams in accordance with the Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects, Department of the Environment, July 2006.

Construction wastes will be managed and disposed of in a way that ensures the provisions of the Waste Management Acts and new Southern Waste Management Plan.

1.1.2 Scope of Waste Management Plan (WMP)

This WMP concentrates on the construction stage of the UWF Grid Connection which is the critical phase in the context of waste management.

1.1.3 Responsibilities

The responsibility of construction waste management will be placed with the Project Supervisor Construction Stage (PSCS) so that all reuse, recycling, wastage and necessary disposal can be monitored as close to the source as possible.

The PSCS will be assigned the authority to instruct all site personnel to comply with the specific provisions of this Plan. The PSCS will work closely with the Appointed Contractor to ensure that the Plan is implemented and updated when necessary in order to ensure that a waste management hierarchy of prevent, reduce, reuse, recycle and responsibility is implemented throughout the construction stage of the project.

An Environmental Clerk of Works will be employed by the Project Promoter to monitor the implementation of the WMP throughout the construction stage of the UWF Grid Connection.

All site personnel will have a responsibility to keep the construction works areas tidy, not to litter and to bring wastes back to the site compounds on a daily basis for storage.

1.2 Overview of UWF Grid Connection

UWF Grid Connection, comprises the following elements:

- A new 110kV electrical substation at Mountphilips townland (to be called Mountphilips Substation)
- A new 110kV underground electrical cable connecting the Mountphilips Substation to the consented UWF substation (to be called Mountphilips – Upperchurch 110kV UGC or 110kV UGC), and
- ancillary works, which include a new permanent access road, a permanent site entrance and temporary site compound at the Mountphilips Substation site.

The layout of the UWF Grid Connection is illustrated on Figure WMP 1: Location of the Grid Connection on OSI Discovery Mapping, which is included at the end of this plan (Section 1.6).

The purpose of UWF Grid Connection is to connect the Consented UWF Substation at Upperchurch Windfarm (UWF) to the proposed Mountphilips 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.

This Waste Management Plan forms part of the UWF Grid Connection Environmental Management Plan, which is appended to the UWF Grid Connection EIA Report (2019). The characteristics of the UWF Grid Connection are described in more detail in the EIA Report, see Chapter 5: Description of Development (UWF Grid Connection), in Volume C2 EIAR Main Report. The construction stage, is described at Section 5.3.1, construction materials which will be brought onto the site are described at Section 5.3.1.8, and wastes are described at Section 5.4.3,of Chapter 5: Description of the Development (UWF Grid Connection).

1.3 Construction Waste & Material Arising

The greatest potential for waste occurs during the construction stage of the project.

In the course of the construction of the UWF Grid Connection, the following construction wastes/ excavated materials will arise:

Table 1: Construction Wastes/Excavated Materials

Construction Waste Material	European Waste Code
Concrete	17 01 01
Wood pallets, timber shuttering, timber profiles (cables trench)	17 02 01
Hedgerow and Trees	03 03 01
Component packaging - paper/plastic/timber	17 02 01 / 17 02 03/ 20 01 01
Hazardous Materials – oil contaminated material, oily rags, construction vehicle fuel and oil , contaminated excavated material	17 03 02
Control building general materials – tiles, blocks, insulation materials, plaster, plastic covering and pipes, concrete	17 01 07/ 17 06 04/20 01 01
Canteen Waste – mixed municipal waste, waste water from washing and toilet facilities	20 03 01
Public Road Excavated Materials – Soil and Subsoil and rock	17 05 04
Public Road Excavated Materials – Bitumen Bound Mixtures	17 03 02
Excavated Materials arising – Soil, Subsoil and rock (includes old masonry culverts)	17 05 04

1.4 Management of construction waste/excavated materials

The waste materials will be moved off site by a specialist waste service contractor, who will possess the requisite authorisations for the collection and movement of waste, and who will bring the material to a facility which holds the requisite license for the specific waste.

All waste will be segregated and securely stored at the temporary compound , at the Mountphilips Substation site, in skips and receptacles, which will be covered to protect the contents from the weather. A licensed operator, will collect and transfer the skips/receptacles of both recyclable and non-recyclable wastes as they are filled.

The temporary compound will also accommodate the temporary site offices and toilet/washing facilities and this area will be secured by fencing and manned security 24/7 to prevent unauthorised access.

1.4.1 Waste Collection And Waste Facilities Operators

A number of appropriate licensed operators have been identified in the area.

Table 2: Licenced Waste Collection Contractors and Licenced Waste Facilities

Permit Number	Permit Type	Name of Permit Holder	Address of Waste Facility	Types of Waste Permitted
NWCPO-12-02583-02	Licenced Waste Carrier	Acorn Recycling 0504-57800	Galmoy, Co. Tipperary	Oils Chemicals Hazardous Waste 17 03 02 - Bitumen Mixtures
WFP-T-16-004-01 NWCPO-17-11915-01	Licenced Waste Facility Licenced Waste Carrier	Kellys of Fantan 0504-52118	Fantan, Co. Tipperary	17 01 01 – Concrete 17 03 02 - Bitumen Mixtures 17 05 04 – Soils and Subsoil
WFP-T-08-0003-02 NWCPO-08-10599-03	Licenced Waste Facility Licenced Waste Carrier	Fogarty Concrete 0504-52151	Gurrane, Co. Tipperary	17 01 01 – Concrete 17 01 07 – Mixtures of concrete blocks and tiles 17 05 04 – Soils and Subsoil and Rock
WFP-T-08-0003-02 NWCPO-11-05-682-02	Licenced Waste Facility Licenced Waste Carrier	Kieran Kelly Haulage 065-6893012	Newmarket on Fergus, Co. Clare	17 01 01 – Concrete 17 01 07 – Mixtures of concrete blocks and tiles 17 03 02 - Bitumen Mixtures 17 05 04 – Soils and Subsoil and Rock
WO041-01	Licenced Waste Facility Licenced Waste Carrier	Enva 061-707400	Shannon, Co. Clare	Chemicals Hazardous Waste
WO184-02	Licenced Waste Facility	Enva 057-8678600	Portlaoise Co. Laois	Oils Hazardous Waste 17 02 01- Wood

	Licenced Waste Carrier			17 02 03 – Plastic 17 05 04 – Soils and Subsoil and Rock
WO0145-02	Licenced Waste Facility	Enva 021-4387200	Monkstown, Co. Cork	Waste Water
Recycling Facility		Donohill Civic Amenity Centre 062 76277	Donohill, Co. Tipperary	17 02 01- Wood 17 02 03 – Plastic 17 06 04 - Insulation materials 20 01 01 – Paper and Cardboard 20 03 01 – Mixed Municipal Waste
Recycling Facility		Nenagh Recycling Centre 076 1065000	Nenagh, Co. Tipperary	17 02 01- Wood 17 02 03 – Plastic 17 06 04 - Insulation materials 20 01 01 – Paper and Cardboard 20 03 01 – Mixed Municipal Waste
Recycling Facility		Cashel Civic Amenity Site 062 63294	Cashel, Co. Tipperary	17 02 01- Wood 17 02 03 – Plastic 17 06 04 - Insulation materials 20 01 01 – Paper and Cardboard 20 03 01 – Mixed Municipal Waste

General waste, waste water, hazardous waste, chemical waste and public road arisings will be collected from the construction site by a licensed operator for that waste material and transported to their approved licensed facilities.

1.4.2 Excavated materials arising from the 110kV UGC along the public road

Outside the Mountphilips Substation site, the excavated material from the 110kV UGC trenches in the public road and in the private paved road will be collected at the works location by a licensed operator and transported to their approved licensed facilities. There will be a total of 23,380m³ of public road arising: 20,640m³ of subsoil (Waste Code: EWC 17 05 04) and 2,740m³ of bitumen mixtures (Waste Code: EWC 17 0 302). These arising can be transported and disposed of by all operators list in the above Table 2.

Excavated material from the sections of the 110kV UGC within 15m of an Invasive Species infestation, will be classed as Hazardous Waste and disposed of as potentially contaminated material (17 03 02), by a licensed contractor to a suitably licensed waste facility. This amount to c.760m³ of the total 23,380m³ of excavated material.

1.4.3 General Building Materials – concrete, timber, metal, packaging etc.

The PSCS will ensure that materials are ordered so that the quantity delivered, the timing of the delivery and the storage of the materials does not create unnecessary waste.

All individual waste streams will be identified at source, separated into recyclable and landfill waste and stored in designated skips in a designated part of the Temporary Compound. When full, the skips will be collected by authorised waste contractor.

1.4.4 Canteen Wastes/WC facilities

Self-contained toilets and washing facilities, with integrated waste water storage tanks, will be provided for construction workers at the temporary site compound, with portable self contained toilets provide at works locations on the public roads, outside the Mountphilips Substation site. The waste water storage tanks will be emptied as needed, by the approved licensed operator, and transported to an approved water treatment plant.

All toilets will be serviced on a weekly basis. A record of servicing will be kept by a licensed waste removal operator. Servicing will include internal cleansing, emptying and recharging with water and toilet additive and replenishing of all consumables

Regular housekeeping of the temporary canteen/toilet and washing facilities will be carried out and this general waste will be stored secure from weather and vermin at the temporary compound, and collected regularly by the approved operator.

1.4.1 Hazardous materials

Appropriate storage of all hazardous wastes, such as waste oil, oily rags and contaminated materials will be in a secure, covered, bunded area in a designated part of the Temporary Compound. Storage of any hazardous wastes produced will be kept separate from other waste materials, in order to avoid further contamination.

Contaminated material arising during the construction of UWF Grid Connection will be collected by an authorised waste contractor and transported to their facility

Excavated material from the sections of the 110kV UGC within 15m of an Invasive Species infestation, will be classed as Hazardous Waste and disposed of as potentially contaminated material. Once excavated, this will be removed immediately by a licensed contractor to a suitably licensed waste facility. Any contaminated material removed from vehicles entering the Mountphilips Substation site or from delivery vehicles at works areas along the public roads, will be stored in a designed container at the Temporary Compound for removal by a a licensed contractor to a suitably licensed waste facility.

To protect the environment and site workers, off-site removal by the authorised operator, will be organised on a regular basis.

1.4.2 Training & Communication

During Site Induction training, personnel will be informed of the objectives of the WMP and their responsibilities under the Plan.

Copies of the Waste Management Plan (WMP) will be made available to all relevant personnel on site. Posters will be designed to reinforce the key messages within the Plan and will be displayed prominently for the benefit of site staff.

1.5 Waste Auditing

The PSCS will arrange for full details of all arisings, movements and treatment of construction waste discards to be recorded during the construction stage of the Project.

Each consignment of construction waste taken from the site and excavated materials arising on-site will be subject to documentation, which will conform to the table below. This will ensure full traceability of the material to its final destination.

Table 3: Waste Disposal Record Sheet

Waste Dispoal Record Sheet	
Name of Project of Origin	UWF Grid Connection (e.g. Temporary Compound)
Material being Transported	e.g. Canteen Waste Water
Quantity of Material	tonnes
Date of Material Movement	dd/mm/yyyy
Name of Carrier	e.g. Enva
Destination of Material	e.g. Monkstown, Co. Cork
Proposed Use	e.g. treatment under EPA license before discharge to waters

Details of the inputs of materials to the construction site and the outputs of wastage arising from the Project will be recorded by the PSCS in a Waste Audit, which will identify the amount, nature and composition of the waste generated on the site.

The Waste Audit will examine the manner in which the waste is produced and will provide a commentary highlighting how management policies and practices may inherently contribute to the production of construction waste.

1.5.1 Waste Audit Report

The measured waste quantities will be used to quantify the costs of management and disposal in a Waste Audit Report. This report will be produced by the PSCS using inputs from the Waste Audit. The total cost of construction waste management will be measured and will take account of the purchase cost of materials, handling costs, storage costs, transportation costs, revenue from sales, disposal costs etc.

Costs will be calculated for the full range of construction waste materials, using the format shown in the table below:

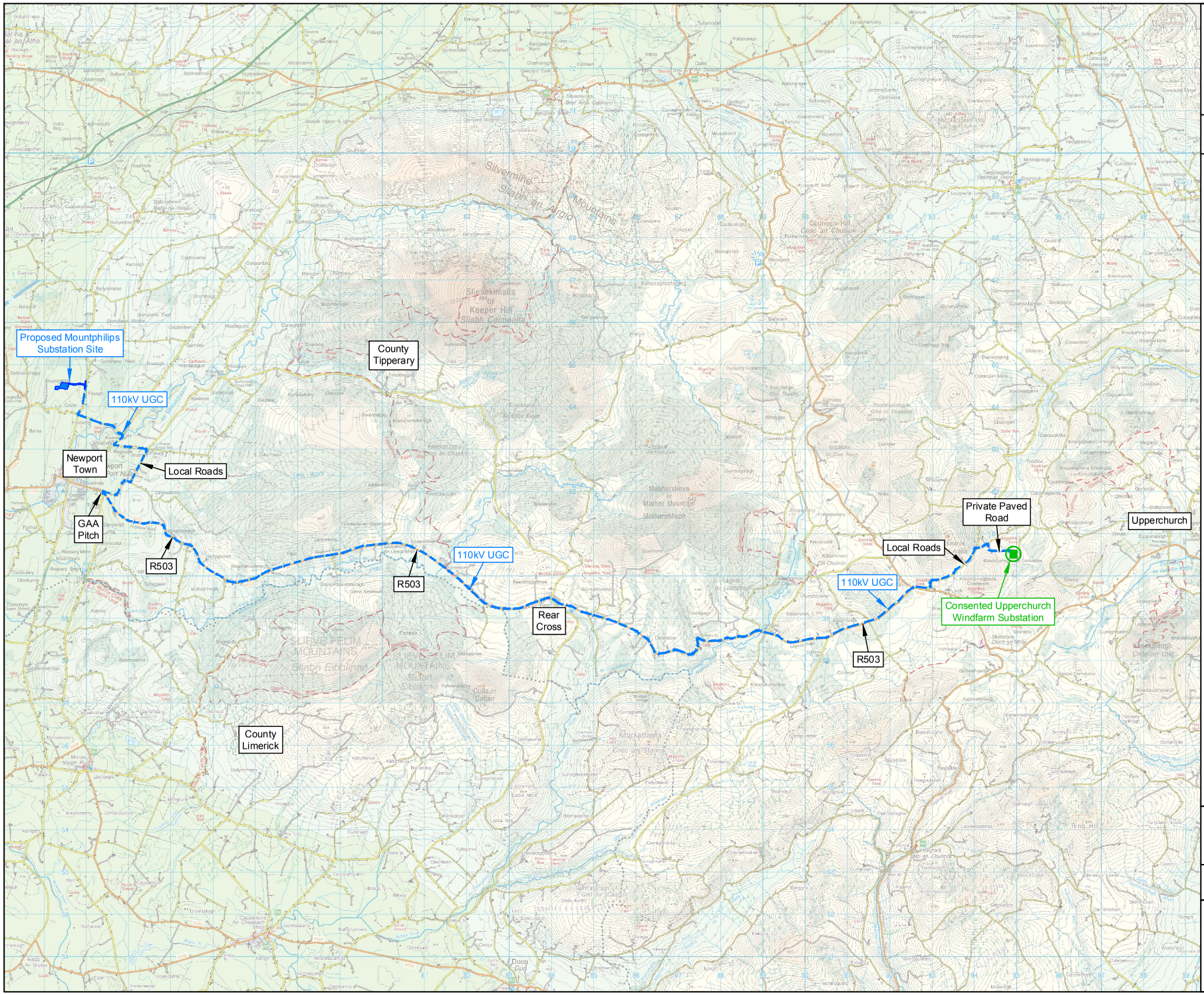
Table 4: Waste Audit Report

Waste Audit Report	
Waste Material	**Estimated Quantities & Costs**
Purchase cost of general building materials i.e. import Costs	(€)
Materials Handling Costs	(€)
Material Storage Costs	(€)
Material Transportation Costs	(€)
Revenue from Material Sales	(€)
Material Disposal Costs	(€)
Material Treatment Costs	(€)
Total Waste General Building Materials Management Costs	(€)
Unit Waste General Building Materials Management Costs	(€)

(Sample relates to General Building Materials – separate record forms will be compiled in respect of each waste material and excavated soil & stone arising).

Final details of the quantities and types of construction waste arising from the Project will be forwarded to the Environment Section, Tipperary County Council.

1.6 Figures and Mapping



EMP: Waste Management Plan

Figure WMP 1

Location of the UWF Grid Connection on OSI Discovery Mapping

Map Number:

Map 1 of 1

Legend:

- UWF Grid Connection - 110kV UGC
- UWF Grid Connection - Mountphilips Substation
- Consented Upperchurch Windfarm Substation

Project:

UWF Grid Connection (2019)

Drawn by:	Checked by:	Date:	Sheet Size:
AB	PK	October 19	A4

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ECOPOWER

UWF Grid Connection
Environmental Management Plan (2019)

Tab 6
Environmental Emergency Response Procedures

October 2019

ERP **No.**	**Environmental Emergency Response Procedures**
GC-ERP-01	Oil/Fuel Spillage
GC-ERP-02	Significant Pollution Occurrence in Local Surface Waters
GC-ERP-03	Frac-Out during Drilling Works at W8 or W9

GC-ERP-01	**Environmental Emergency Response Procedure**

Oil/Fuel Spillage

Work Sections/Locations

All construction works areas

Responsibility of	**Role/Duty**
Construction Manager	• Ensuring that all personnel are trained in emergency procedure for oil/fuel spillage. • Ensuring that all construction site plant, machinery and vehicles are equipped with spill kits. • Alerting the Environmental Clerk of Works immediately of the oil/fuel spillage.

General

- The Construction Manager will ensure that appropriately trained staff and necessary containment equipment is on site to allow immediate control of any spills.
- Contractors will be required to check all fuel and hydraulic lines, service, and document all machinery prior to the commencement of construction.
- Spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and at the designated fuel storage areas in the temporary compound. All operators will be fully trained in the use of this equipment.
- Spill response apparatus and infrastructure will be inspected on a regular basis to ensure that the kits are fully stocked and materials are of adequate condition, and where this is not the case kits will be replenished or replaced immediately.
- Spill kits will be fitted with break seals and site operatives will be required to notify the construction manager if these seals are broken.
- Spill kits will be maintained at all fuelling and oil storage locations. All mobile fuel and oil bowsers/tankers will have full spill kits, appropriate to their capacity.
- All machines that utilise hydraulic systems, such as excavators, dumpers, and cranes, will have appropriately sized spill kits on board at all times.
- It is the Construction Manager's responsibility to ensure spill kits/material is available as specified.
- All hydrocarbons will be managed appropriately to prevent their potential release to surface or ground water.
- All hydrocarbon containers will be stored in bunds. For above ground tanks, double skinned tanks will be used and all will be externally bunded. All transfer of hydrocarbons will be undertaken in a bunded area.

Procedures in the event of an oil/fuel spillage

This procedure covers the accidental spill of oils that may arise from plant failures, refuelling, etc.:

- On arrival at spill site, assess the situation. If a volatile, flammable material is spilled, immediately warn everyone in the vicinity, control sources of ignition and ventilate the area.
- If possible without risk of personal injury, stop and contain the spillage using the appropriate spill kit (as per material type).
- Have all shores and surface water drains in the area of spillage covered or protected as quickly as possible to prevent pollution.
- Report all spills immediately to the Environmental Clerk of Works and Construction Manager who will mobilize specially trained site personnel to clean up and dispose of residues and clean-up materials in an appropriate manner.
- Spill kit waste materials will be collected from the temporary construction compound by a specialised hydrocarbon and hazardous waste service provider with a valid waste collection permit for reprocessing at an EPA waste licensed facility.

Emergency Spill Response Contact: AM Environmental, Castletroy, Limerick 061-502 095, 087- 265 4081 (24hr)

GC-ERP-02	**Environmental Emergency Response Procedure**
Significant Pollution Occurrence in Local Surface Waters	
Work Sections/Locations	
All construction works areas	
Responsibility of	**Role/Duty**
Construction Manager	• Will inform the Environmental Clerk of Works immediately of any observed issues.
Environmental Clerk of Works	• Will notify an appropriate person in Tipperary County Council.
Incidents involving oil spillage	

In the unlikely event of a significant pollution occurrence in local surface waters relating to the works then the following protocol will be adopted:

- Works will be stopped while an initial investigate takes place, to determine If the source of the pollution is from the works;
- Water quality monitoring will be undertaken visually, and the Construction Manager will inform the Environmental Clerk of Works of any observed issues
- If the source is from the works then the Environmental Clerk of Works will notify an appropriate person in Tipperary County Council.
- If the source is from the works, work will not continue again until the source of the pollution is identified and eliminated.

GC-ERP-03	**Environmental Emergency Response Procedure**
Frac-Out during Drilling Works	
Work Sections/Locations	
Horizontal Directional Drilling locations - Watercrossings W8 & W9	
Responsibility of	**Role/Duty**
Construction Manager	• Liaising with the Mud Engineer and Drilling Contractor regarding the status of drilling works and the deployment of contingency measures
Mud Engineer	• Supervising water course bed and drilling works, including drilling pressures, implementation of contingency measures

Purpose of Frac-Out Contingency Measures

- Minimize the potential for a frac out associated with horizontal directional drilling activities through the implementation of GC-OCM-16;
- Provide for the timely detection of frac outs;
- Protect the watercourse and the piped water supply attached to the bridge above;
- Ensure an organised, timely, and "minimum impact" response in the event of a frac out and the release of drilling mud.

Contingency Measures

- In the event of break-out occurring in the river bed, the rig will immediately shut off the pumps and the drilling assembly will be pulled off to reduce annular pressures.
- In the event of break-out on the road an excavator will be available to dig a pit to contain fluid with vacuum trucks/pumps available to transfer drill fluid from the containment point back to the recycling point.
- Drilling fluid additives designed to plug the formation will be introduced to the circulation system and let set.

UWF Grid Connection
Environmental Management Plan (2019)

Tab 7
Scheduling & Timing of Works Measures

ENVIRONMENTAL PROTECTION MEASURE – Scheduling and Timing of Works	
Responsibility of	**Role/Duty**
Project Manager	Liaising with the Construction Manager, Environmental Clerk of Works and specialist environmental experts (e.g. Site Ecologist) regarding temporal restrictions
Scheduling of Works included as Project Design Environmental Protection Measures *(in some instances, only those parts of a PD which are relevant to scheduling or timing is included below)*	
PD01	UWF Grid Connection construction works during the Hen Harrier breeding season (March to August inclusive) will only take place at the Mountphilips Substation Site; construction of the 110kV UGC between the Mountphilips Substation site and the Consented UWF Substation compound will be carried out during the months of September to February inclusive.
PD02	If works at Mountphilips Substation site 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 entire construction works area boundary. These surveys will be completed prior to the start-up of all construction activities. No works will take place within 2 km of any identified active Hen Harrier nest during the hen harrier breeding season.
PD03	Although no hen harrier roosts are currently known to occur within 1km of UWF Grid Connection, confirmatory surveys will be completed to record any roosting locations within 1km of UWF Grid Connection. Should a hen harrier roost occur within 1km of UWF Grid Connection works, then construction works within 1km of a roost will be limited to the period between 'one hour after sunrise' to 'one hour before sunset' during the Hen Harrier roosting season (October to February inclusive).
PD04	All construction works will be carried out during daylight hours.
PD06	Construction works will not be carried out within 150m of Rear Cross National School or Lackamore National School, during school hours. In addition, the project Community Liaison Officer will keep each school informed of construction timetables and scheduling.
PD07	110kV UGC construction works along the local roads L2264-50 and L6188-0, will not take place at the same time as the UWF Related Works Haul Route Works on these roads. The 110kV UGC construction works will also be scheduled so that the works do not occur on the same days as concrete deliveries for Consented UWF Turbines along these local roads.
PD11	Construction works for the 110kV UGC in Knocknabansha, Knockmaroe, Knockcurraghbola Crownlands 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 where those works also occur within 350m.
PD12	As requested by the Roads Department of Tipperary County Council, during pre-planning consultations, the works along the public road network will be scheduled to minimise impacts on schools and local businesses. The works will be scheduled so that they do not disrupt or interfere with Tipperary County Council's road works programme on the R503 through Newport town.
PD25	Construction works along the 110kV UGC route will cease during heavy or prolonged rainfall events, and any open trenches or excavations will be covered. Use of weathering forecasting will be undertaken in advance of works.
PD26	A phased approach will be undertaken in relation to excavations, excavation dewatering and any culvert

	replacement works, where these works occur within 50m of a watercourse. The phased approach will only permit one of main potential sediment producing activities (i.e. excavations, excavation dewatering or culvert replacement works), to be carried out within 50m of a watercourse, at any one time.
PD29	Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff. None of these 110kV UGC sections are within the Lower River Shannon SAC.
PD31	Works to bridge parapet walls at watercourse crossings W7, W36, W53 will be carried out during dry weather, and debris netting will be fixed to the outside of the walls in order to prevent any debris falling into the watercourse below.
PD32	At Mountphilips Substation site, instream construction works at the watercourse crossings W1, W2 and W3 will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). 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 margins to stabilise banks, add flood protection and provide riparian buffer; and the use of deflector plates during the restoration of flow. Instream works at W1, W2 and W3 at the Mountphilips Substation site will be undertaken during dry weather within the IFI instream works window (July – September inclusive). As per PD41, instream works at W1, W2 and W3 will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed. Although intended for the purpose of the WFD, this measure will also indirectly contribute to downstream water quality protection in the SAC.
PD49	In-stream works at Mountphilips Substation site and culvert replacement works at W14 along the R503 Regional Road will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
PD53	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 and outside of 1 hours after sunrise or before sunset during winter.
PD54	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 breeding females or cubs are present in the holt and NPWS will be notified immediately
PD58	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. This includes hedgerow and scrub removal in addition to hedgerow trimming.
PD59	Works will not take place at any bridge during the Dipper breeding season (Feb-June inclusive) without a confirmatory survey to determine Dipper presence or absence. If Dippers are present, where possible works will not proceed until breeding has completed. All works at these and other bridges will be overseen by a project ecologist to ensure the requirements of the Wildlife Acts are being met. During culvert replacement works at W13, a Dipper nest box will be fitted to the new crossing structure. Additional nest boxes (c.10) will be provided for Dipper at suitable bridges to provide a net gain for this species.

PD61	Works will not take place at any bridge during the Kingfisher breeding season (March to July inclusive) without a confirmatory survey to determine the presence of nesting Kingfisher within 150m upstream or downstream of the bridge. If nesting Kingfishers are present, works will not proceed until breeding has completed.
PD63	All construction works will be carried out during daylight hours. Security lighting will be used at the temporary compound at Mountphilips Substation site. 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.
PD65	While it is not expected that any trees with high suitability for roosting bats will be felled, the following measures will be implemented where a tree with moderate or high bat suitability is to be felled: a presence/absence bat surveys will be carried out; 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; and 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. Bat boxes will be placed on an exposed section of tree trunk at a minimum height of 4-5m, providing a clear space in front of the box for bats to enter and exit. Boxes will be placed in locations that will receive at least 6-7 hours of sunlight during summer months, and will be placed on the southern side of the tree. The Project Ecologist will supervise the installation of bat boxes in order to ensure that they are sited appropriately.
PD67	No badger setts were recorded within 50m of the UWF Grid Connection during pre-planning surveys. Confirmatory surveys will be carried out within 50 m of either side of the construction works area boundary 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. Should a badger sett be confirmed, the following measures will be implemented: NWPS will be notified immediately of any new active setts which are 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); No construction works will be carried within 50m of an active badger sett during the main breeding season (December 1st to June 30th); and Construction activity in the environs of an 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 will not take place within 10m of sett entrances.

UWF Grid Connection
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Tab 8
Environmental Surveying and Monitoring Measures

ENVIRONMENTAL PROTECTION MEASURE – Environmental Surveying and Monitoring Measures	
Responsibility of	**Role/Duty**
Environmental Clerk of Works	Engaging specialist environmental and engineering experts to carry out Environmental Survey Requirements
Environmental Survey requirements included as Project Design Environmental Protection Measures *(in some instances, only those parts of a PD which are relevant to scheduling or timing is included below)*	
PD02 Hen Harrier	If works at Mountphilips Substation site 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 entire construction works area boundary. These surveys will be completed prior to the start-up of all construction activities. A report including nesting activity and levels of usage will be provided to the Competent Authority and NPWS following the completion of each survey season. The Project Ecologist will keep NPWS informed of the real-time status of nesting Hen Harrier as a result of the monitoring associated with this project.
PD03 Hen Harrier	Although no hen harrier roosts are currently known to occur within 1km of UWF Grid Connection, confirmatory surveys will be completed to record any roosting locations within 1km of UWF Grid Connection. A report including roosting activity and levels of usage, will be provided to the Competent Authority and NPWS following the completion of each survey season.
PD08 Material Assets	Confirmatory consultations with Irish Water, Eir and ESB and review of all relevant infrastructure mapping before works, along with confirmatory ground surveys at service locations will be carried out ahead of works.
PD14 Archaeology	All initial groundworks within 500m of an RMP or NIAH site, 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..
PD16 Underwater archaeology	Where excavations occur at culvert replacement locations along the 110kV UGC, and at the 3 No. new watercourse crossing at the Mountphilips Substation site, excavations will be monitored by an appropriately qualified archaeologist under license from the National Monuments Service, the excavated material will be examined for any evidence of archaeological material and metal detected as part of a finds retrieval strategy.
PD32, PD41 Water quality	The instream works at W1, W2 and W3 at Mountphilips Substation site, and the culvert replacement works at the 13 existing culverts on the public road, and all works (including concrete placement) within the boundary of the Lower River Shannon SAC, will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice Measures are followed.
PD45 Water quality	The horizontal directional drilling works at W8 and W9 will be supervised and managed by a competent and experienced Mud Engineer who understands the technicalities and challenges of drilling works. The Mud Engineer will monitor the watercourse bed during drilling works, and will supervise the drilling works including the drilling pressures and the implementation of any contingency measures.
PD46	All construction works will be monitored on a daily basis by the Environmental Clerk of Works and by members of the Environmental Clerk of Works team (for example Site Ecologist) as required, for

All	compliance with the Environmental Commitments, which include the Project Design Measures, as per the Environmental Management Plan for UWF Grid Connection (see Volume D).
PD47 Water Quality	Surface water quality monitoring of the main watercourses downstream of the works will be carried out to ensure that the downstream water quality status in the receiving water is maintained. The surface water monitoring locations and sampling programme are defined in the Surface Water Management Plan for UWF Grid Connection.
PD52 Otter	Confirmatory surveys for active Otter holts and breeding activity will be carried out 150m upstream and downstream of watercourse crossing locations including those watercourses evaluated as unsuitable for Otter in the current appraisal.
PD59 Dipper	Works will not take place at any bridge during the Dipper breeding season (Feb-June inclusive) without a confirmatory survey to determine Dipper presence or absence.
PD60 Grey Wagtail	Where works will be carried out at parapet walls, no works will take place between the period April-August without confirmatory survey as to the presence or absence of breeding Grey Wagtail.
PD61 Kingfisher	Works will not take place at any bridge during the Kingfisher breeding season (March to July inclusive) without a confirmatory survey to determine nesting/breeding Kingfisher presence or absence within 150m upstream or downstream of the bridge.
PD62 General birds	All bridges/structures where works are proposed will be subject to confirmatory surveys for General breeding birds prior to works commencing.
PD64 Bat	Tree felling only pertains to the Mountphilips Substation site. Confirmatory surveys will be carried out at all trees that will require felling or other major modifications (e.g. removal of rotten branches) in order to confirm the findings of the 2016 / 2017 surveys regarding the suitability of the trees for roosting bats. 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.
PD65 Bat	While it is not expected that any trees with high suitability for roosting bats will be felled, the following measures will be implemented where a tree with moderate or high bat suitability is to be felled: a presence/absence bat surveys will be carried out; The Project Ecologist will supervise the installation of bat boxes in order to ensure that they are sited appropriately.
PD66 Bat	All bridges of moderate suitability for bats will be subject to a confirmatory survey prior to the commencement of construction works. Bridges of negligible or low suitability do not need to be surveyed, but this will be reviewed by the Environmental Clerk of Works and Project Ecologist.
PD67 Badger	No badger setts were recorded within 50m of the UWF Grid Connection during pre-planning surveys. Confirmatory surveys will be carried out within 50 m of either side of the construction works area boundary 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.
PD69 Invasive Species	All covering of vegetative invasive knotweed infestations with high density polyethylene grass carpet terram will take place, at all identified locations prior to any works commencing on UWF Grid Connection or any other element of the Whole UWF Project. The covering of these infestations will only be carried out under the direct supervision of an ecologist with prior experience of this type of work i.e. this work cannot be carried out by any general construction staff.
Traffic Management	Along the 110kV UGC route on the public road, confirmatory condition surveys involving pre-construction and post-construction inspections, high definition video surveys and FWD surveys will

Plan	be undertaken Along the additional local road L5337-1 at Tullow, which will be used for construction materials haulage only (i.e. no trenching works), 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 works locations on the local road network.

Surface Water Management Plan	<u>Drainage Inspections at Mountphilips Substation site</u>
	The following periodic inspection regime at Mountphilips Substation site will be implemented, and inspections recorded:
	• Daily general visual inspections by Environmental Clerk of Works;
	• Weekly (existing & new drains) inspections by site Construction Manager;
	• All inspection to include all elements of drainage systems;
	• Inspections required to ensure that drainage systems are operating correctly and to identify any maintenance that is required;
	• Any changes, such as discolouration, odour, oily sheen or litter should be noted and corrective action should be implemented immediately.
	• High risk locations such as settlement ponds will be inspected on a daily basis by the Construction Manager;
	• Daily inspections checks will be completed on plant and equipment, and whether materials such as straw bales or oil absorbent materials need replacement;
	• Event based inspections by the Environmental Clerk of Works as follows:
	  ○ >10 mm/hr (*i.e.* high intensity localised rainfall event);
	  ○ >25 mm in a 24 hour period (heavy frontal rainfall lasting most of the day); or,
	  ○ Rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week).
	• Weekly, Fortnightly and Monthly (depending on weather conditions and the nature of on-going construction works) site inspections by the Project Hydrologist during construction phase
	
	<u>Water Quality Monitoring</u>
	• Daily field monitoring of water quality parameters and collection of samples will be undertaken by the Environmental Clerk of Works. He/she will be appropriately trained on the required monitoring methods and the use, calibration and maintenance of all monitoring equipment used.
	• Regular (i.e. weekly or fortnightly depending on weather conditions) field monitoring will be carried out by the Project Hydrologist.
	• Surface water quality will be monitored during the construction phase and this monitoring will also extend into the post construction phase. Proposed monitoring locations downstream of the works areas. The locations of the surface water monitoring points will be agreed with Inland Fisheries Ireland and Tipperary County Council in advance of the construction phase.
	• Laboratory analysis of water samples will also be undertaken as part of the monitoring programme by an independent and appropriately certified laboratory.
	
	<u>Frequency of Water Quality Monitoring</u>
	• Daily visual checks at watercourse crossing locations where works are taking place;
	• Weekly sampling for suspended solids and turbidity in catchments where earthworks or watercourse crossing work is on-going;
	• Fortnightly sampling for the full suite of parameters (Table 7) in catchments where works are on-going;
	• Event based sampling, e.g. after heavy rainfall;
	• Additional sampling in the event of trigger level exceedance, after heavy rainfall, etc; and,

	• Post construction sampling programme (monthly sampling) for a period of six months
Invasive Species Management Plan	Pre-Construction confirmatory surveys will be completed by an invasive species specialist, 3 – 4 weeks before construction begins. Mapping, showing the most up to date distribution and extent of each infestation, will be distributed to the Client, Owners Engineer and the Contractor; The covering of vegetative knotweed infestations with high density polyethylene grass carpet terram at all identified locations prior to any works commencing on that section and the monitoring of construction works at that section when it happens; To ensure the effective implementation of the biosecurity measures, an invasive species specialist will monitor each infestation location during all critical stages of construction works; Visual inspections will be carried out on all machinery and equipment (particularly for machinery and equipment exiting the site and which has come into contact with water or soils) for evidence of attached plant or animal material, or adherent mud or debris.
Best Practice Measures for Water quality	• The Construction Manager will be responsible for monitoring weather conditions • All construction works will be monitored on a daily basis by the Environmental Clerk of Works and by members of the Environmental Clerk of Works team (for example Site Ecologist) as required, for compliance with the Environmental Commitments • Surface water quality monitoring of the main watercourses downstream of the works will be carried out to ensure that the downstream water quality status in the receiving water is maintained. The surface water monitoring locations and sampling programme are defined in the Surface Water Management Plan for UWF Grid Connection • Daily monitoring of the compound works area, the water treatment and pumping system and the percolation area will be completed by a suitably qualified person during the construction phase All permanent overburden storages areas will be checked / monitored daily until stabilised to ensure no drainage issues of surface water quality impacts are occurring
Best Practice Measures for Dust Control	• Public roads works areas will be regularly inspected for cleanliness, and swept to remove mud and aggregate materials from their surface, as necessary; • The private paved road in Knockcurraghbola Commons will also be regularly inspected for cleanliness, and swept to remove mud and aggregate materials from its surface, as necessary;
Best Practice measures for Local employment	• Monitor the recruitment and training of local employees in line with Local Employment & Local Sourcing Policy
Best Practice Measures for operational UWF Grid Connection	• A confirmatory survey of Electromagnetic Field emissions from the Mountphilips 110kV Substation and from locations along the 110kV UGC will be carried out by a competent engineer following commissioning of the UWF Grid Connection. • Recording and reporting of the annual renewable electricity production of the operational Upperchurch Windfarm.

UWF Grid Connection
Environmental Management Plan (2019)

Tab 9
Best Practice Measures

ECOPOWER

October 2019

Table 1: List of Best Practice Measures for the UWF Grid Connection

BPM No.	Best Practice Measures
GC-BPM-01	Best Practice Measures for Protection of Surface Water Quality and Watercourse Morphology during instream works at Mountphilips Substation site
GC-BPM-02	Best Practice Measures for Protection of Surface Water Quality and Watercourse Morphology during replacement of existing culverts along the 110kV UGC outside Mountphilips Substation site
GC-BPM-03	Best Practice Design of New Permanent Watercourse Crossing Structures and Existing Culvert Replacements to Prevent Flood Risk
GC-BPM-04	Best Practice Surface Water Quality Protection Measures for Site Runoff during the Mountphilips Substation Site Construction Works
GC-BPM-05	Best Practice Measures to Protect Surface Water and Groundwater Quality during use of Cement Based Compounds
GC-BPM-06	Best Practice Measures to Protect Surface Water and Groundwater Quality During Storage and Handling of Fuels, Oils and Chemicals
GC-BPM-07	Best Practice Measures to Protect Surface Water Quality During Storage of Overburden at the Mountphilips Substation Site
GC-BPM-08	Best Practice Measures for Minimising Dust Emissions from Site Activities
GC-BPM-09	Local Employment and Local Sourcing
GC-BPM-10	Measuring Operational EMF Emissions
GC-BPM-11	Measuring Operational Electricity Production

Best Practice Measure GC-BPM-1	
Title:	**Best Practice Measures for Protection of Surface Water Quality and Watercourse Morphology during instream works at Mountphilips Substation site**
Relevant Watercourse Crossing Points	
W1, W2, W3 at Mountphilips Substation site	
Responsibility of	**Role/Duty**
Construction Manager	Monitor weather conditions and supervise instream works. Ensure instream works are carried out in accordance with project design measures and best practice measures.

Surface Water Quality Protection Measures

Timing

- Instream works at W1, W2 and W3, at the Mountphilips Substation site will be undertaken during dry weather within the IFI instream works window (July – September inclusive).

Supervision & Monitoring Measures

- The instream works at W1, W2 and W3, at the Mountphilips Substation site will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed.
- All construction works will be monitored on a daily basis by the Environmental Clerk of Works and by members of the Environmental Clerk of Works team (for example Site Ecologist) as required, for compliance with the Environmental Commitments
- Surface water quality monitoring of the main watercourses downstream of the works will be carried out to ensure that the downstream water quality status in the receiving water is maintained. The surface water monitoring locations and sampling programme are defined in the Surface Water Management Plan for UWF Grid Connection

General Measures to be implemented for instream works at W1, W2, W3

- Double silt fencing will be placed along each side of the watercourse;
- Machinery will only work from access roads, and the operation of machinery and use of equipment within the 10m buffer will be kept to a minimum to avoid any unnecessary disturbance;
- Double silt fencing and berms will be placed at the crossing to prevent sediment/runoff from the access road surfaces from entering the watercourse;
- Disturbance of bankside soils and watercourse sediments will be kept to the minimum to avoid unnecessary impact on the watercourse morphology;
- Clay bunds will be placed within any adjacent upslope cables trench on both sides of the watercourses to prevent the trench acting as a drain towards the watercourse;
- Watercourse crossing W1 involves the installation of underground cabling (under the bed of the watercourse) and the installation of a temporary Bailey bridge crossing structure. The flume/pipe watercourse crossing method will be used at W1; A pipe/flume with sufficient capacity/size to accommodate the flow rate of the stream, will be placed on the watercourse bed without disturbance to the bed;
- Watercourse crossings W2 and W3 involve the installation of underground cabling for the 110kV UGC and the local electricity supply to the substation compound, in addition to the construction of new permanent crossing structures. The damming and over-pumping method will be used at W2 and W3 at Mountphilips Substation Site;
- Dams will be installed at both the upstream and downstream ends of the pipe/flume/pump in order to direct the water flow through the pipe/flume/pump hose, therefore allowing work to be carried out on a dry streambed;
- Dams will be made of sand (clean) bags, cobbles or clean well-graded coarse gravel fill. Poorly sorted material will not be used as it would be a potential source of fine sediment;

- A temporary sump will be constructed in the watercourse bed at the proposed dam location if a natural pool does not already exist. The sump will be lined with clean rockfill to prevent scouring and erosion during pumping at the intake;
- An energy dissipater (such as clean rock fill or splash plates) will be placed on the watercourse bed downstream of the pipe/flume/pump outfall. This will prevent scouring and erosion of the watercourse bed at the outfall;
- Once the watercourse flow is isolated from the excavation area, excavation works can commence to install the cable ducting and install the crossing structures;
- Under the supervision of an aquatic ecologist, any spawning gravels will be removed at the culvert location and will be temporarily stored in bags at a point greater than 10m from the watercourse;
- Once the lean mix concrete is in place in the trench, a layer of fine sand (5 – 10cm) will be laid over the concrete prior to final backfilling. This will prevent release of cement into the watercourse when flow is restored;
- Only precast concrete culverts or structures will be used at W2 and W3. No batching of wet cement will take place on-site. (Project Design Measure); A steel Bailey bridge will be temporarily installed at W1.

Measures to reinstate the watercourses at crossing points W1, W2 and W3 at Mountphilips Substation site

At Mountphilips Substation site, instream construction works at the watercourse crossing W1, W2 and W3 will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). 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;
- planting along the riparian margins to stabilise banks, add flood protection and provide riparian buffer; and
- the use of deflector plates during the restoration of flow.

References

IFI (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters.
NRA (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.

Best Practice Measure GC-BPM-2	
Title:	**Best Practice Measures for Protection of Surface Water Quality and Watercourse Morphology during replacement of existing culverts along the 110kV UGC outside Mountphilips Substation site**
W13, W14, W15, W17, W19, W20, W32, W34, W55, W57, W60, W61 and W64 along the public road on the route of the 110kV UGC.	
Responsibility of	**Role/Duty**
Construction Manager	Monitor weather conditions and supervise instream works. Ensure instream works are carried out in accordance with project design measures and best practice measures.

Surface Water Quality Protection Measures

Timing

- Culvert replacement works at W14 along the R503 Regional Road will only be undertaken during the IFI specified period (July, August and September).
- Culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included

Supervision & Monitoring Measures

- Culvert replacement works at the 13 existing culverts on the public road, will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed.
- All construction works will be monitored on a daily basis by the Environmental Clerk of Works and by members of the Environmental Clerk of Works team (for example Site Ecologist) as required, for compliance with the Environmental Commitments
- Surface water quality monitoring of the main watercourses downstream of the works will be carried out to ensure that the downstream water quality status in the receiving water is maintained. The surface water monitoring locations and sampling programme are defined in the Surface Water Management Plan for UWF Grid Connection

General Measures to be implemented for culvert replacement works

- Sand (clean) bags will be placed along the road pavement edges on each side of the watercourse;
- Machinery will only work from the public road, and the operation of machinery and use of equipment within the 10m of the watercourse will be kept to a minimum;
- Sand (clean) bags will be placed at the crossing to prevent sediment/runoff from the public road surfaces from entering the watercourse;
- Bunds will be placed within any adjacent upslope cables trench on both sides of the watercourses to prevent the trench acting as a drain towards the watercourse;
- Culvert replacement works will involve the removal of the existing culvert and the installation of a new crossing structure in its place. The damming and over-pumping method will be used during works.
- Dams will be installed at both the upstream and downstream ends of the pump in order to direct the water flow through the pump hose, therefore allowing work to be carried out on a dry streambed;
- Dams will be made of sand (clean) bags, cobbles or clean well-graded coarse gravel fill;
- A temporary sump will be constructed in the watercourse bed at the proposed dam location if a natural pool does not already exist. The sump will be lined with clean rockfill to prevent scouring and erosion during pumping at the intake;
- An energy dissipater (such as clean rock fill or splash plates) will be placed on the watercourse bed downstream of the pump outfall. This will prevent scouring and erosion of the watercourse bed at the outfall;

- Once the watercourse flow is isolated from the works area, excavation works can commence to install the cable ducting and install the crossing structures;
- Under the supervision of an aquatic ecologist, any spawning gravels will be removed at the culvert location and will be temporarily stored in bags at a point greater than 10m from the watercourse;
- Once the lean mix concrete is in place in the trench, a layer of fine sand (5 – 10cm) will be laid over the concrete prior to final backfilling and structure installation.;
- Only precast concrete culverts or structures will be used for replacement culverts along the 110kV UGC. No batching of wet cement will take place on-site. (Project Design Measure).

Measures to reinstate the watercourses following culvert replacement works

Culvert replacement works along the 110kV UGC, outside the Mountphilips Substation site, will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). 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;
- the use of deflector plates during the restoration of flow.

References

IFI (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters.
NRA (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.

Best Practice Measure GC-BPM-3	
Title:	**Best Practice Design of New Permanent Watercourse Crossing Structures and Existing Culvert Replacements to Prevent Flood Risk**
Work Sections/Locations	
Proposed new permanent watercourse crossings at W1, W2, W3; and Potential replacement of existing culverts on the public road at W13, W14, W15, W17, W19, W20, W32, W34, W55, W57, W60, W61 and W64.	
Responsibility of	**Role/Duty**
Construction Manager	Ensure appropriate culvert/bridge design. Supervise the construction works.
Surface Water Quality Protection Measures	
• All new permanent watercourse culverts at the Mountphilips Substation site and any replacement culverts along the public road for the 110kV UGC will be sized to cope with a minimum 100-year flood event. (Project Design Measure); • A freeboard of 300mm, or as required by OPW, will be kept below the crossing structure during a 100-year flood event; • At a minimum, all new pipe culverts will be 900mm in diameter regardless of the anticipated flood flow (*i.e.* minimum 900mm culvert will be used in Class 3/Class 4 watercourses regardless of flows); • 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), • As agreed with OPW (telephone consultation, February 2018) will be subject to a Section 50 application to OPW.	
References	
(DoEHLG, 2009) The Planning System and Flood Risk Management Guidelines; OPW (2013) Construction, Replacement or Alteration of Bridges and Culverts; NRA (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.	

Best Practice Measure GC-BPM-4	
Title:	**Best Practice Surface Water Quality Protection Measures for Site Runoff during the Mountphilips Substation Site Construction Works**
Environmental Commitment	
Prevention of surface water quality impacts during the Mountphilips Substation and End Mast Construction Works.	
Work Sections/Locations	
Mountphilips Substation Site	
Responsibility of	**Role/Duty**
Construction Manager	Monitor weather conditions. Supervise excavation works and drainage works.

Surface Water Quality Protection Measures

- The substation compound and end mast construction work area will be marked out with fencing or flagging tape to avoid unnecessary disturbance of vegetation;
- A minimum 25-meter vegetative buffer zone will be maintained between the substation works area and the stream to the west of the site;
- There will be no storage of material / equipment, excavated overburden or overnight parking of machinery inside the 25m buffer zone;
- Before any ground works are undertaken, double silt fencing will be placed upslope of the local watercourses. The first line of the silt fencing will be placed 25m from the stream bank and the second line of silt fencing will be placed 5m from the stream bank;
- Double silt fencing will also be placed along the watercourses (drains) which run along the field boundary to the north of the proposed site;
- Additional silt fencing or temporary rectangular straw bales (pinned down with stakes) will be placed across any natural surface depressions / channels that slope towards the local stream;
- Silt fencing will be embedded into the local soils to ensure all site water is captured and filtered;
- As the earthworks proceeds at the substation site, permanent earthen berms will be constructed around the substation compound site, and these berms will be used to contain surface water runoff during the substation compound work;
- Silt fencing will be placed along the base of the berms until they have vegetated;
- As construction advances, there will a requirement to collect and treat small volumes of surface water that is contained within the footprint of the compound. This will be completed using perimeter swales and sumps at low points inside the compound;
- Water will be pumped from the sumps into a settlement pond(s) which will allow primary settlement of solids. From the settlement pond(s), water will be pumped to a proposed percolation area, at least 25m from the local stream;
- Discharge onto vegetated ground at the percolation area will be via a silt bag. This action will filter any remaining sediment from the pumped water. The entire percolation area will be enclosed by a perimeter of double silt fencing;
- Any sediment laden water from the works area will not be discharged directly to a watercourse or drain.
- The construction works areas for the End Masts is located on the western side of the local stream, and a minimum 25-meter vegetative buffer zone will be maintained between the works area and the stream. Silt fencing, straw bales and sediment treatment will be arranged as described for the substation works;
- Excavation works will not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted;
- Daily monitoring of the compound works area, the water treatment and pumping system and the percolation area will be completed by a suitably qualified person during the construction phase. All necessary preventative

measures will be implemented to ensure no entrained sediment, or deleterious matter is discharged to the local stream;

- If high levels of silt or other contamination is noted in the pumped water or the treatment systems, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied;
- As a final catch-all contingency, a mobile 'Siltbuster' or similar equivalent specialist treatment system will be available at the substation compound in order to treat sediment entrained waters from the excavation should it be required. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction-sites with sensitive downstream receptors;
- There will be no batching or storage of cement within 30m of the local stream;
- There will be no refueling allowed within 100m of the local stream; and,
- All plant will be checked for purpose of use prior to mobilisation at the site.

References

IFI (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
NRA (2008) Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes.
CIRIA (Construction Industry Research and Information Association) Report No. C648, 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects.
CIRIA Report No. C532, 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors.

Best Practice Measure GC-BPM-5	
Title:	**Best Practice Measures to Protect Surface Water and Groundwater Quality during use of Cement Based Compounds**
Environmental Commitment	
Prevention of surface water and groundwater quality impacts during use of Cement Based Compounds.	
Work Sections/Locations	
110kV UGC Mountphilips Substation Site	
Responsibility of	**Role/Duty**
Construction Manager	Monitor weather conditions. Ensure best practice storage and use of Cement Based Compounds.

Measures

- Only precast concrete culverts or structures will be used at the 3 no. watercourse crossing locations at Mountphilips Substation site and for any culvert replacements along the 110kV UGC. Only precast concrete chambers will be used at Joint Bay locations. No batching of wet cement will take place on-site. (Project Design Measure)
- Only chutes will be washed out on site; at Mountphilips Substation site, chute washout will be into the designated concrete wash settlement pond; along the 110kV UGC, chute washout will be at the works locations into the cable trench. At works locations within the Lower River Shannon SAC boundary, the concrete chute washouts will take place into designated bins for removal to the designated concrete wash settlement pond at the Mountphilips Substation site. In all cases, the washout of the tank will take place at the concrete supplier depot. (Project Design Measure)
- Any spills no matter how small or material or overburden contaminated with cement mix will be moved off-site for disposal at a licensed facility;
- Outfalls or natural pathways *(i.e.* preferential flow paths) from excavations towards any local drain or watercourse will be prevented. Outfalls or natural pathways will be temporarily blocked using sand bags and geotextile until the cement mix has set;
- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event
- At watercourse crossing locations, a layer of fine sand (5 – 10cm) will be placed over the cement mix within the trench prior to final backfilling. This will prevent release of cement into the watercourse when flow is restored.

References

IFI (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters.
NRA (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.
CIRIA (Construction Industry Research and Information Association) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006)
CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors.

Best Practice Measure GC-BPM-6	
Title:	**Best Practice Measures to Protect Surface Water and Groundwater Quality During Storage and Handling of Fuels, Oils and Chemicals**
Environmental Commitment	
Prevention of water quality impacts during storage and handling of fuels, oils and chemicals.	
Work Sections/Locations	
Construction works area boundary	
Responsibility of	**Role/Duty**
Construction Manager	Monitor weather conditions. Ensure best practice use and storage of fuels, oils and chemicals on-site.

Manage of on-site refueling

- On site re-fueling of immobile machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refueling trailer will be re-filled off site, and will be towed around the site by a 4x4 jeep to where machinery is located;
- There will be no refuelling of vehicles or plant permitted within 100m of a watercourse;
- Mobile measures such as drip trays and fuel absorbent mats will be used during all refueling operations;

Storing fuel properly

- There will be no storage of fuel or refueling or mobile plant permitted within 100m of a watercourse.
- The fuel bowser will be parked on a level area in the temporary construction compound when not in use and only designated, trained and competent operatives will be authorised to refuel plant on site;
- 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 at the Mountphilips Substation site.
- All fuel will be stored in bunded, locked storage containers.
- The designated storage location will be greater than 100m from a watercourse.

Avoid leakage from plant and tools

- The plant, machinery and tools used during construction will be regularly inspected for leaks, fitness for use;
- All generators and suction pumps used at watercourse crossing locations will have a double skinned fuel tank or be placed on a drip tray.

Contingency for spillages

- Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment (Project Design Measure);
- Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored at the designated storage location in the temporary compound and all operators will be fully trained in the use of this equipment.
- The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills – see TAB 6 of the Environmental Management Plan for UWF Grid Connection;
- Any spills no matter how small or material or overburden contaminated with fuel/oil will be moved off-site for disposal at a licensed premise.

References

CIRIA (Construction Industry Research and Information Association) Report No. C648, 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects.
CIRIA Report No.C532, 2006: Control of Water Pollution from Construction Sites-Guidance for Consultants & Contractors.

Best Practice Measure GC-BPM-7	
Title:	**Best Practice Measures to Protect Surface Water Quality During Storage of Overburden at the Mountphilips Substation Site**
Environmental Commitment	
Prevention of surface water quality impacts during Permanent Storage of Overburden at the Mountphilips Substation Site.	
Work Sections/Locations	
Mountphilips Substation Site	
Responsibility of	**Role/Duty**
Construction Manager	Monitor weather conditions. Supervise overburden works.
Surface Water Quality Protection Measures	

- At Mountphilips Substation site, all excavated material will be removed for temporary or permanent storage at designated berms, which will be located more than 25m away from the watercourses on Mountphilips Substation site. (Project Design Measure)
- All storage berms will be graded and sealed following emplacement. The berms will be covered if there is a risk of erosion. (Project Design Measure)
- Temporary silt control methods such as silt fencing will be placed around all overburden storage areas. (Project Design Measure)
- The existing vegetative buffer between the berms and the nearest watercourses will be maintained and no works will occur in the buffer zone. (Project Design Measure)
- The permanent storage berms around the substation compound will be sown with grasses and flower species common to the surrounding vegetation. The permanent storage berms along the new access road will be planted with local provenance native fruiting hedge species, with grasses and native flower species sown along the sides of the berms. Revegetation works will take place at the soonest practicable opportunity after emplacement. (Project Design Measure)
- At permanent storage areas along proposed permanent access roads, silt trap / silt fence arrangements will be placed within the proposed road drainage and left in place until the mound has been stabilised by vegetation;
- All permanent overburden storages areas will be checked / monitored daily until stabilised to ensure no drainage issues of surface water quality impacts are occurring.

References

IFI (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters;
NRA (2008) Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes CIRIA C648 (2006) Control of Water Pollution from Linear Construction Sites;

Best Practice Measure GC-BPM-8	
Title:	**Best Practice Measures for Minimising Dust Emissions from Site Activities**
Environmental Commitment	
Minimise dust emissions from site activities	
Work Sections/Locations	
All construction works locations	
Responsibility of	**Role/Duty**
Construction Manager	Provide site induction to site personnel and contractors regarding the dust control measures

Training and Communication

- Provide site induction to site personnel and contractors regarding the dust control measures.
- Community engagement before works commence will be carried out.
- The name and contact details of the Community Liaison Officer and Environmental Clerk of Works will be displayed on the informational signage at the Mountphilips Site Entrance. The Community Liaison Officer and the Environmental Clerk of Works will be the point of contact regarding air quality and dust issues.

Measures to minimize dust emissions

- Public roads works areas will be regularly inspected for cleanliness, and swept to remove mud and aggregate materials from their surface, as necessary;
- the private paved road in Knockcurraghbola Commons will also be regularly inspected for cleanliness, and swept to remove mud and aggregate materials from its surface, as necessary;
- Any road that is likely to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions;
- The new access road at Mountphilips Substation site will be restricted to essential site traffic;
- There will be a 20 km/hr speed limited at the Mountphilips Substation site;
- During movement of materials both on and off-site, truck loads will be covered with tarpaulin.
- A dry wheel wash will be used at the Mountphilips Substation site entrance, if required;
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Materials will be adequately covered, especially if being stored for long periods of time to prevent dust emissions primarily during dry or windy periods.
- Permanent stockpiles of soil, at Mountphilips Substation site, will be reseeded as soon as practical following placement;
- If dust issues start to occur, additional measures will be put in place as per 'Guidance on the Assessment of Dust from Demolition and Construction';
- Site induction will be provided to site personnel and contractors regarding the dust control measures.

References

TII, 2011: Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes
IAQM, 2014: Guidance on the Assessment of Dust from Demolition and Construction

Best Practice Measure GC-BPM-9	
Title:	**Local Employment and Local Sourcing**
Environmental Commitment	
Where feasible, to source contracts, materials and workforce locally during the construction stage of the UWF Grid Connection	
Responsibility of	**Role/Duty**
Construction Manager	Where possible, to operate a local bias when recruiting employees and sourcing materials. Develop a Local Employment and Local Sourcing Policy
Community Liaison Officer (CLO)	Management of local employment and resources database. Engage with service businesses in the area ahead of construction works. Monitor the recruitment and training of local employees in line with Policy.
Increasing potential for local sourcing and local employment	
• Contact local business ahead of works and contracts being awarded, so that the main contactors are aware of the services and materials available locally. • Management of local employment and resources database. • Engage with service businesses in the area ahead of construction works. • Monitor the recruitment and training of local employees in line with Policy.	

Best Practice Measure GC-BPM-10	
Title:	**Measuring Operational EMF Emissions**
Environmental Commitment	
Confirmatory of levels of Electromagnetic Field emissions	
Work Sections/Locations	
Mountphilips Substation and 110kV UGC route	
Responsibility of	**Role/Duty**
Operational Manager – UWF	Ensure operational EMF emissions are measured.
Measuring Operational EMP Emissions	
• A confirmatory survey of Electromagnetic Field emissions from the Mountphilips 110kV Substation and from locations along the 110kV UGC will be carried out by a competent engineer following commissioning of the UWF Grid Connection. • Reporting by the competent engineer of the operational EMF emission levels with the levels.	
References	
UWF Grid Connection EIA Report (2019)	

Best Practice Measure GC-BPM-11	
Title:	**Measuring Operational Electricity Production**
Work Sections/Locations	
Consented Upperchurch Windfarm Substation	
Responsibility of	**Role/Duty**
Operational Manager – UWF	Record annual electricity production levels
Annual Renewable Electricity Production	
• Recording and reporting of the annual renewable electricity production of the operational Upperchurch Windfarm.	
References	
UWF Grid Connection EIA Report (2019)	

UWF Grid Connection
Environmental Management Plan (2019)

Tab 10
Outline Construction Methodologies

(Further methodologies post planning consent / pre-construction)

ECOPOWER

October 2019

Outline Construction Methodologies (OCMs) UWF Grid Connection

The Outline Construction Methodologies for all of the main works and activities of UWF Grid Connection are presented below to provide information to assist the evaluation and assessment of the cumulative effects of the UWF Grid Connection. All Outline Construction Methodologies (OCMs) for UWF Grid Connection are listed in Table 1 and then presented individually.

Table 1: List of Outline Construction Methodologies for the UWF Grid Connection

OCM Ref:	OCM Title
GC_OCM_01	Pre-Construction Activities
GC_OCM_02	Mountphilips Substation Compound
GC_OCM_03	New End Masts west of Mountphilips Substation
GC_OCM_04	Temporary Access Road to End Masts
GC_OCM_05	Instream Works and Temporary Bailey Bridge Crossing At W1
GC_OCM_06	New Permanent Access Road at Mountphilips Substation Site
GC_OCM_07	Installation of 110kV UGC and new crossing structures at W2 and W3
GC_OCM_08	Permanent Site Entrance at Mountphilips Substation Site
GC_OCM_09	Temporary Compound at Mountphilips Substation Site
GC_OCM_10	Formation of Overburden Storage Berms at Mountphilips Substation Site
GC_OCM_11	Reinstatement of Lands at Mountphilips Substation Site
GC_OCM_12	110kV Trenching & Ducting
GC_OCM_13	110kV Joint Bays and Associated Chambers
GC_OCM_14	110kV Cable Pulling
GC_OCM_15	110kV Cable Jointing
GC_OCM_16	Replacing existing culverts along the 110kV UGC
GC_OCM_17	Raising road level and parapet walls at Rockvale Bridge (W6), Tooreenbrien Bridge (W36) and Anglesey Bridge (W53)
GC_OCM_18	Horizontal Directional Drilling at W8 and W9

Outline Construction Methodology			
Title:	**Pre-Construction Activities**	**Ref:**	**GC-OCM-01**

General Description

Certain activities, will take place prior to the commencement of the main construction stage of the UWF Grid Connection, these include detailed design, management appointments and confirmatory surveys, along with the setting out of the construction works areas at Mountphilips Substation site.

Duration

Over a 6 month period prior to the commencement of the main construction stage

Personnel	Machinery & Equipment	Materials
▪ Main Contractor ▪ Project Manager ▪ Environmental Clerk of Works ▪ Specialist engineering Consultants ▪ Environmental Consultants ▪ Site engineer ▪ 2 civil works personnel	▪ GPS equipment ▪ Hand tools ▪ Survey equipment	▪ 4 x 4 vehicle and trailer ▪ Fencing posts ▪ Fencing wire ▪ Tape ▪ Portable electric fencer ▪ Goal posts ▪ Signage ▪ Wooden pegs ▪ Spray Paint

Design and Management Activities

- The Project Manager, Main Contractor, and the Environmental Clerk of Works will be appointed.
- The Environmental Management Plan will be reviewed and updated to include the planning permission details and conditions, the identification of key project personnel and the addition of the Contractors method statements,
- The Traffic Management Plan will be updated with details of other road works, road maintenance or traffic diversions, etc. that might be planned for the area at the same time as the construction works. This information will be obtained from the Roads Department of Tipperary County Council. The updated Traffic Management Plan will be submitted, along with road opening license applications to the Roads Department of Tipperary County Council,
- Method statements will be prepared by the Contractor. These method statements will be based on the Outline Construction Methodologies.
- Pre-construction monitoring and confirmatory surveys will be carried out by specialist engineering and environmental consultants, and will include public road condition monitoring surveys, water quality monitoring surveys, and ecological confirmatory surveys.
- At Mountphilips Substation site, the construction works area boundary will be temporarily fenced off with wooden posts and wire, or with electric fences if there is livestock present; the boundaries of any hydrological, ecological or environmental buffer zones, such as buffer zones around watercourses, will be fenced off with marker tape to prevent unauthorised access by construction crews, plant and machinery; goal posts will be erected under overhead lines; and the footprint of the widened site entrance, access road, substation compound, and end mast locations will be marked out by an engineer.

END

Outline Construction Methodology			
Title:	**Mountphilips Substation Compound**	**Ref:**	**GC-OCM-02**

General Description

The proposed 110kV Mountphilips Substation will facilitate a new looped-in substation connection to the existing Killonan – Nenagh 110kV overhead line (See also OCM-03). The new 110kV Mountphilips Substation will be constructed to the east of the existing 110kV overhead line in the townland of Mountphilips near Newport. The Mountphilips Substation compound will be c.10290m2 in area, and will contain a control building, surge arrestors, lightening masts, circuit breakers, busbars and other ancillary electrical equipment. The new substation compound secured by a 2.6m high palisade fence.

Duration

10 – 12 Months Approx.

Personnel	Machinery & Equipment	Materials
▪ 10 to 15 electrical personnel ▪ 10 to 15 civil works personnel ▪	▪ Excavators ▪ Tipper Trucks / loaders ▪ tractors and trailers ▪ Crane ▪ Hoist ▪ Teleporter ▪ Power Tools ▪ Generator ▪ Scaffolding ▪ Vibrating roller ▪	▪ Clause 804 stone ▪ 6F2 capping stone ▪ Paving. ▪ Fencing ▪ Geotextile ▪ Concrete and concrete blocks ▪ Roofing Timber and other general building materials ▪ Reinforcing steel ▪ Tiles and cladding ▪ Steel Doors ▪ Substation Electrical Equipment ▪ Cabling ▪ Ducting

Standard Methods

- A drainage system will be installed around the compound area.
- Topsoil and subsoil (including rock) will be removed to a depth of 350mm from the footprint of the compound using excavators. The excavated material will be temporarily stored in adjacent permanent berms, as per GC OCM-09: Formation of Overburden Storage Berms at Mountphilips Substation.
- A layer of geotextile material will be laid over the excavated footprint of the compound.
- Using an excavator, a base layer of crushed stone material will be laid on top of the geotextile followed by a 6F2 capping stone layer which will provide the finished surface.
- Each layer will be compacted using a 13 ton vibrating roller.
- The control building, electrical equipment, lightening protection and internal access roads within the compound will then be constructed. .
- Two sets of underground 110kV cables will be constructed between the two new end masts to be located along the Killonan to Nenagh 110kV overhead line and the substation compound, these underground cables will be connected into the substation at the western side of the compound.
- The underground Mountphilips – Upperchurch 110kV cables will run from Upperchurch Windfarm Substation and will be connected into the Mountphilips substation at the eastern side of the Mountphilips compound.
- Once the High Voltage (HV) and Low Voltage (LV) equipment is installed and the protection and control cabinets are commissioned and tested, the substation can then be energised and commissioned.

Photographs

Example of similar 110kV substation with end masts connecting to overhead 110kV line

Relevant Drawings from Volume C3 EIAR Figures

Extracts from Figure GC 5.4: Plan of Mountphilips Substation Compound

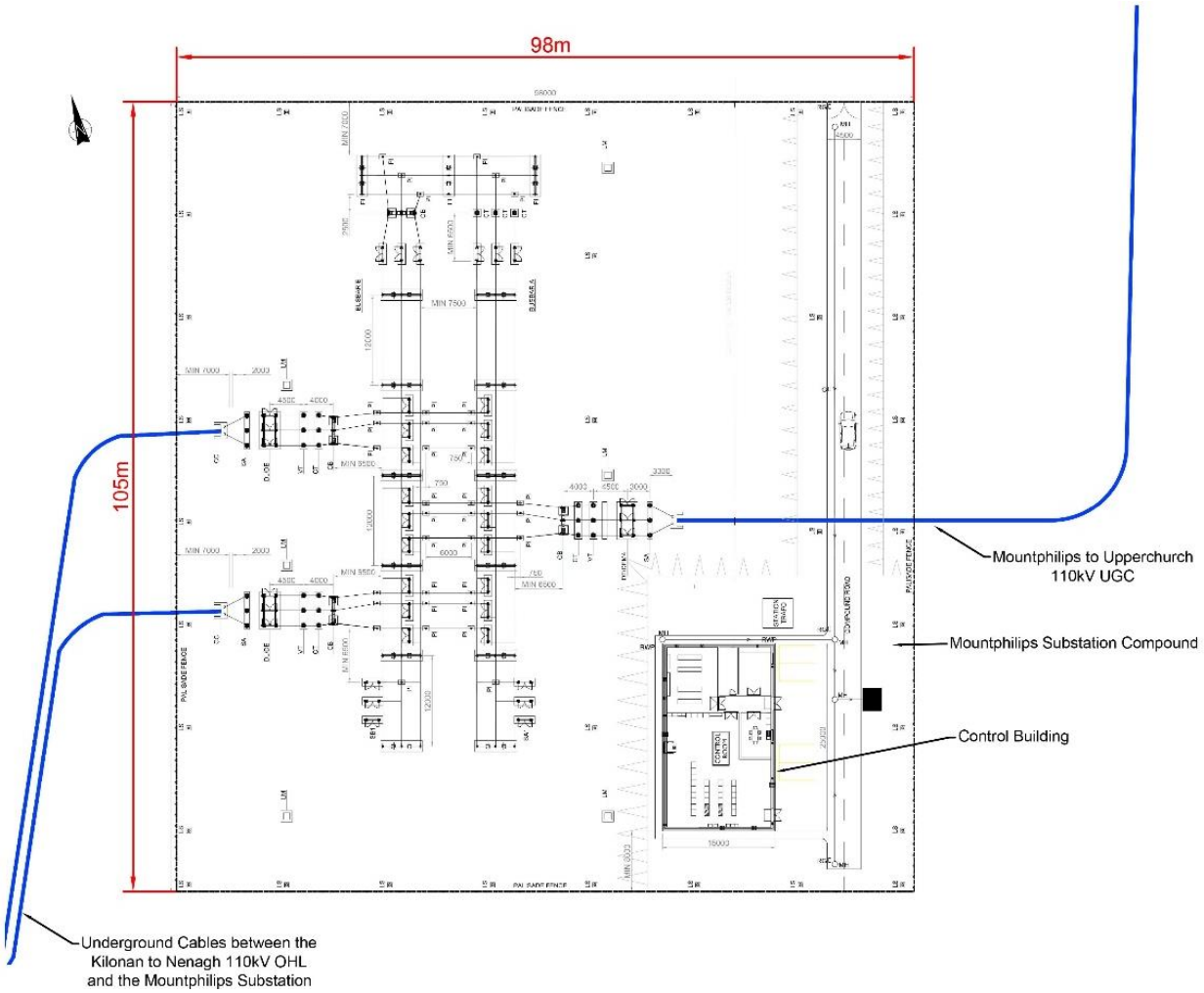


Figure GC 5.5: Elevation Mountphilips Substation Compound

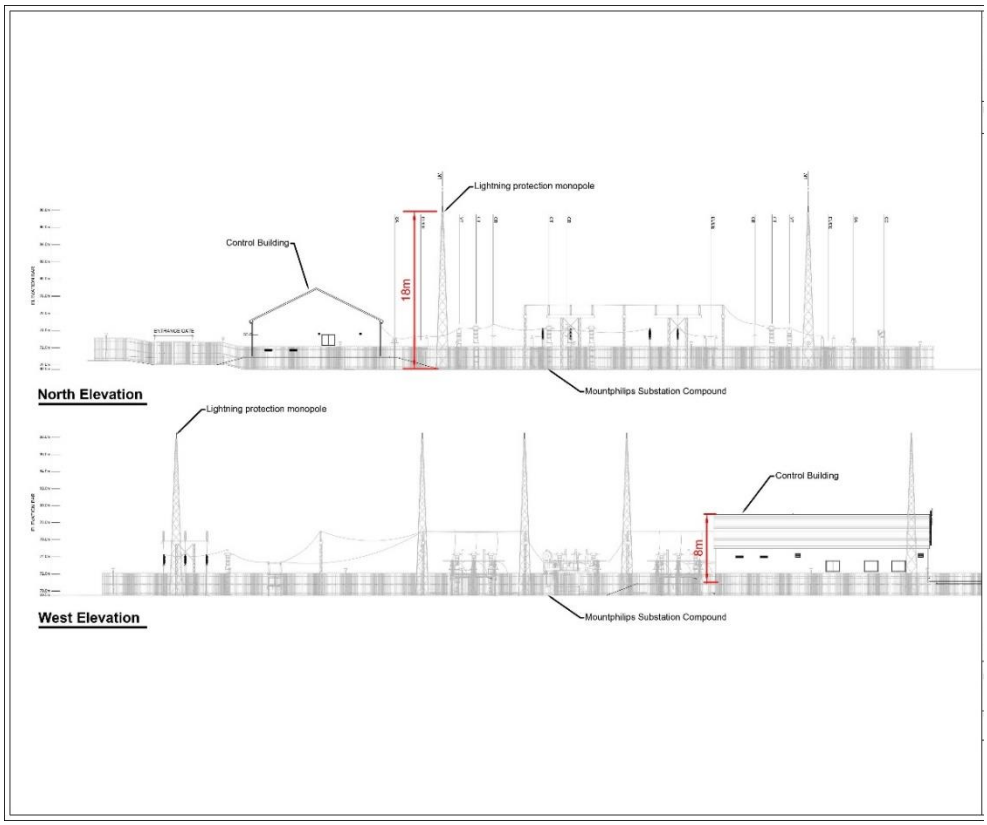
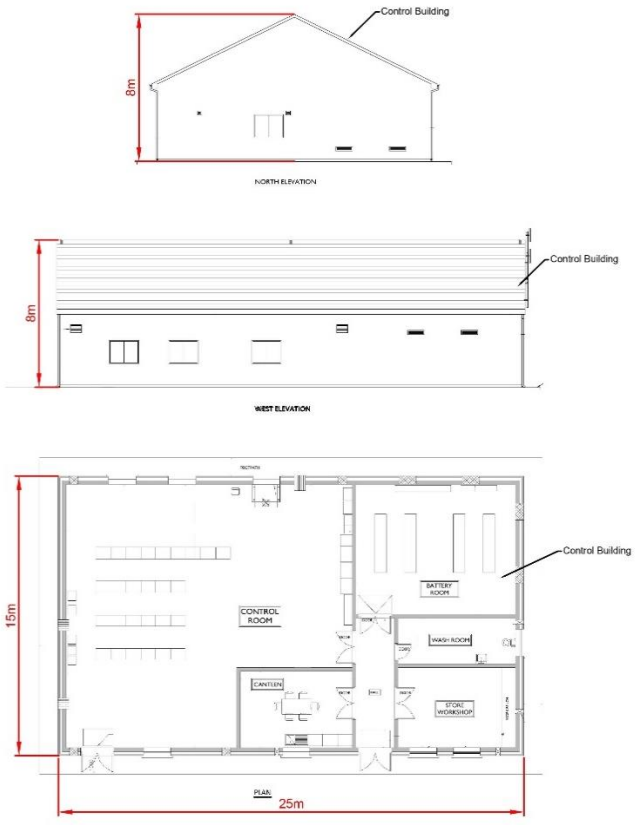


Figure GC 5.6: Plan and Elevation of the Control Building at Mountphilips Substation



END

Outline Construction Methodology			
Title:	**New End Masts west of Mountphilips Substation**	**Ref:**	**GC-OCM-03**

General Description

Two end masts will be constructed approximately 20m apart at a point along the existing Killonan – Nenagh 110kV Overhead Line, to the west of the 110kV Mountphilips Substation. The existing 110kV overhead line will be cut and connected to the End Masts. The End Masts will connect into the Mountphilips Substation Compound through underground cables. This will allow electricity to flow from the end masts, through Mountphilips Substation and back to the end masts thus forming a "loop-in" connection of the Mountphilips Substation to the National Grid.

Duration

- Construction of end mast foundations – 7 days.
- Erection of towers - 3 days, weather dependant
- Cable jointing – 5 days per tower.

Personnel	Machinery & Equipment	Materials
▪ 5 operatives	▪ 4x4 vehicle ▪ Tractor and trailer ▪ Crane Teleporter ▪ Chains / small tools ▪ Excavator ▪ Tipper Truck ▪ Teleporter	▪ Lattice steel towers sections ▪ Cable Interface platform ▪ Insulators ▪ Electrical Connections (Jumpering conductors) ▪ Cable sealing ends ▪ Concrete (foundation) ▪ Copper/Aluminum Conductor ▪ Aggregate ▪ Concrete pipes 1m high 1.5m diameter ▪ Reinforcing bars ▪ Cables and ducting

Standard Methods

- Each end mast will be assembled on four steel supporting legs. For each leg of the two End Masts (8 in total) a foundation c.3.3m x 3.3m and 3m deep will be excavated and the formation levels (depths) will be checked by the onsite foreman. The excavated material will be temporarily stored close to the excavation site.
- To aid construction, a concrete pipe, 1m high and 1.5m in diameter, will be placed into each excavation to allow operatives level the legs at the bottom of the excavation. Once the legs are levelled and are in situ, the frame of the reinforcing bars will be prepared and strapped to the concrete pipe with spacers as required.
- 1m x 1m shuttering will be installed around the individual legs of each tower and will protrude 300mm over ground level.
- Concrete will then be poured directly into the shuttering up to the required levels.
- Once the foundation concrete is set the shuttering will be removed and the concrete will be allowed to cure for approx. 28 days.
- The excavated area around the end mast foundations will be backfilled with the sub soil material already excavated at the location. The backfill will be placed and compacted in layers with excavated topsoil placed at surface level and any excess material will be permanently stored in the berms formed around the Mountphilips Substation compound.
- Once the concrete is sufficiently cured, work can commence on erecting the bases of the end masts.
- A temporary hardstand area for the crane will be constructed adjacent to the end mast foundations by laying geogrid material on the ground and overlaying this geogrid with a suitable grade of aggregate.

- When the bases for the masts are assembled and in place, the upper sections of the masts will be assembled horizontally on the ground beside the mast bases.
- The overhead line will then be switched out (de-energised).
- The overhead line will then be moved off center using stay wires and weights.
- The pre-assembled upper mast sections will then be lifted onto the base sections using the crane and guide ropes and bolted into position.
- When the masts are complete and secured to the bases, the overhead line will be centered and attached to the end masts. The section of the electric line between the two masts will then be cut and removed.
- Cable interface platforms will be lifted into place on the masts and all electrical equipment will be bolted down onto these platforms.
- Two sets of underground cables will be constructed from the Mountphilips Substation and will connect to the end masts, one cable set to each mast. The cables will be brought up in steel trunking along the front face of the masts to the cable interface platforms.
- Jumpering Conductors (for electrical connections) will be installed from the overhead line down onto the interface platform and jointed to the cables.
- Scaffolding will be erected at the side of both towers to enable the cable jointers to work in a controlled environment.
- Once all works have been completed on the platforms the scaffolding will be taken down and the area cleared of all work materials.
- The circuit will be tested in both directions before the overhead line is re-energised.
- The temporary crane hardstand will be removed and the area reinstated and reseeded.

Reference Documents

ESB specification Drawing PE610-D005-024-001-000

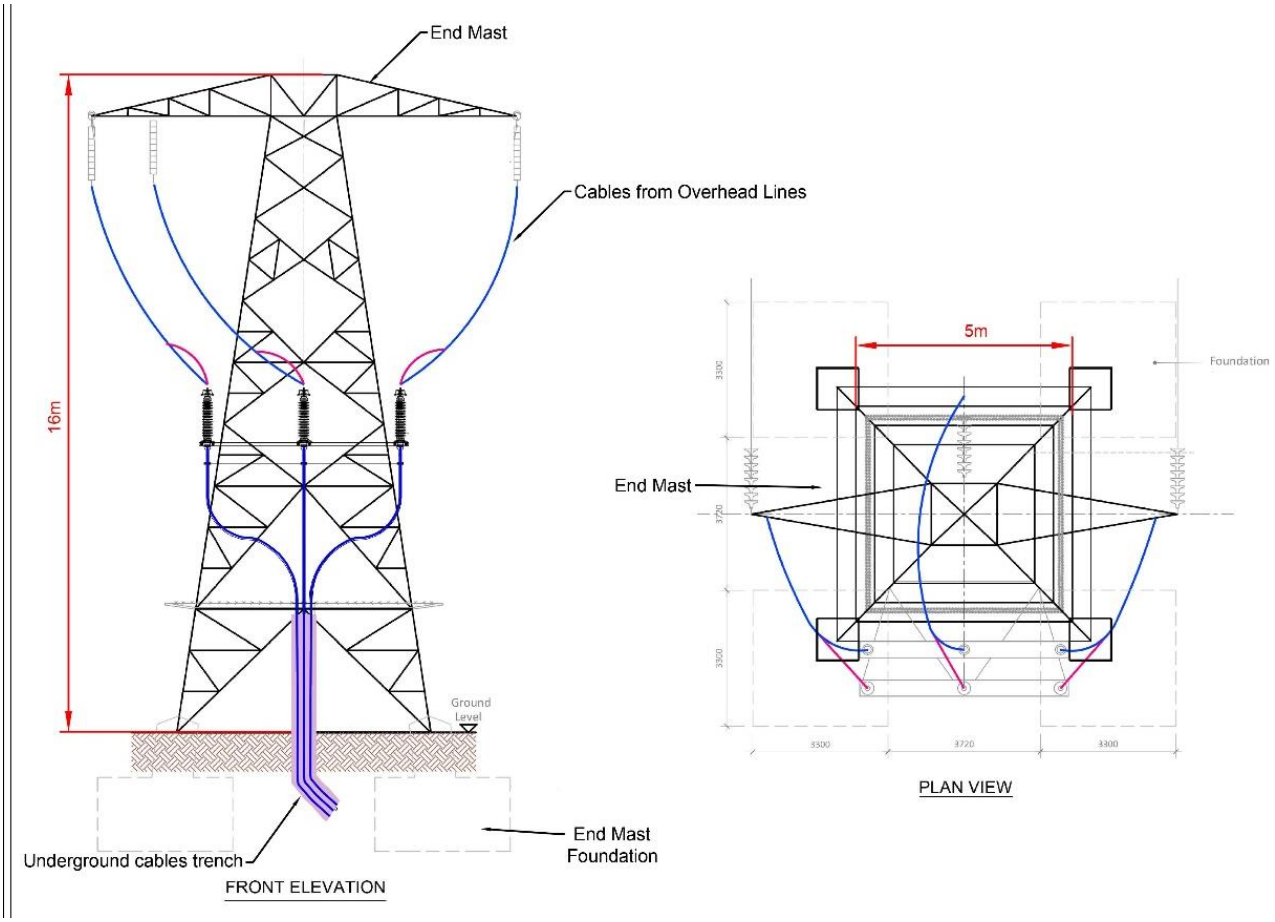
Photographs

Typical tower base

Cont..

Relevant Drawings from Volume C3 EIAR Figures

Extract from Figure GC 5.7: Plan and Elevation of the End Masts at Mountphilips Substation



END

Outline Construction Methodology			
Title:	**Temporary Access Road to End Masts**	**Ref:**	**GC-OCM-04**

General Description

A temporary access road will provide access to End Mast No.1 and No2 at Mountphilips. The temporary access road will be circa 3.5m in width.

Duration

3 days

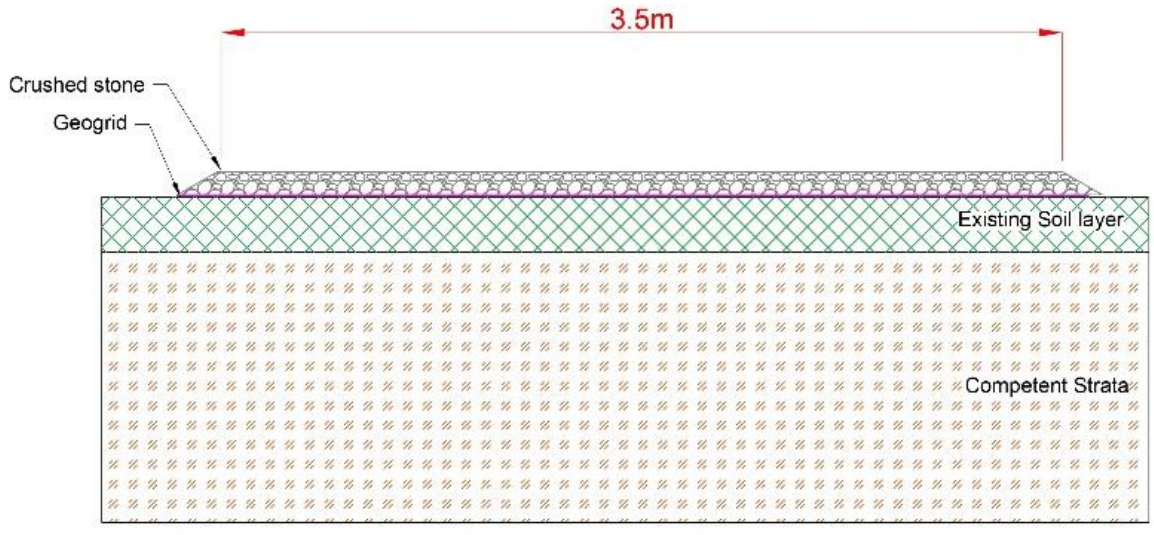
Personnel	**Machinery & Equipment**	**Materials**
▪ Site Engineer ▪ 3 General Operatives ▪ 1 Excavator Operator	▪ 4x4 vehicle ▪ Tipper Truck ▪ 360˚ excavator ▪ Vibrating roller	▪ Geotextile ▪ 50mm crushed stone

Standard Method - 3.5m wide excavated and stoned temporary access road

- A layer of geotextile material will be laid over the existing ground.
- A layer of 200mm deep of 50mm crushed stone will then be overlaid on the geotextile and compacted in suitable layers using a vibrating roller.
- Reinstatement will take place when the End Mast works are completed. The layer of stone and geogrid will be removed and either re-used at the Mountphilips Substation compound or along the new permanent access road at the Mountphilips Substation site.
- The area will be reinstated and reseeded as per GC_OCM_10: Reinstatement of Land at Mountphilips Substation Site.

Relevant Drawings from Volume C3 EIAR Figures

Extract from Figure GC 5.11: Cross Section of Temporary Access Road at Mountphilips Substation



Cross Section of Temporary Access Road

END

Outline Construction Methodology			
Title:	**Instream Works and Temporary Bailey Bridge Crossing At W1**	**Ref:**	**GC-OCM-05**

General Description

Instream works will be required at Mountphilips Substation Site in order to install the underground cables across the local stream at W1. A temporary crossing will also be constructed at this location.

To facilitate the works, these watercourses will be dammed and the water diverted through a flume pipe. Following the completion of works at the watercourse, the dam and flume will be removed and the watercourse reinstated.

Duration

1-2 Days

Personnel	Machinery & Equipment	Materials
• Site engineer • 3-4 operatives • 1 Excavator Operator	• Tipper Truck • 360˚ excavator • Mobile water pumps and hoses • 4 x 4 vehicle and trailer	• Sand Bags containing washed sand • Geotextile membrane • Straw bales • Flume pipes • Splash plate • Silt Buster • Washed round stones • Silt trap material

Standard Method: Dam & Flume for Cables Trench

- The flume pipe(s) will be set out on the bed of the watercourse.
- A dam will be constructed using sand bags so that all the flow is diverted through the flume pipe(s).
- A splash plate will be placed at the downstream end of the flume pipe where the water re-enters the water-course in order to prevent erosion of the stream bed.
- Silt traps, such as geotextile membrane. will be placed downstream of the in-stream works location to mini-mise sedimentation
- The works will be carried out under/around the flume pipe(s).
- If required, a temporary sump will be established and used to collect any additional water. This water will be removed by pumping to an infiltration trench or settlement pond if the soil is not saturated, otherwise the water will be pumped to a suitably sized water treatment train, such as a Siltbuster, where any sediment will be allowed settle before the water is released.
- A cables trench will be excavated in the dry stream bed, under the flume, and cable ducts will be laid and the trench backfilled with existing material.
- Following the completion of works at the watercourse, the dam and flume pipes will be removed and the watercourse reinstated as per Instream Reinstatement outlined below.

Standard Method: Temporary Crossing (Temporary Bailey Bridge)

- A temporary access road will be constructed in advance of the arrival of the Bailey bridge.
- On each side of the watercourse, a 4m x 4m area of top soil will be removed and the area will be laid with geotextile. Clause 804 stone will then be in-filled and compacted to form a bearing pad which will support each end of the bailey bridge.
- The bridge will be delivered to the crossing point on a low loader.
- The bridge will be assembled using hand tools and lifted into place using the Hi-Ab mounted on the delivery truck.
- When the End Mast works are complete, the temporary Bailey bridge will be removed.

- The bridge will be dismantled, loaded onto a low loader and removed from site.
- The stone will be removed from the bearing pads and the excavated soil reinstated and reseeded.

Standard Method: Instream Reinstatement

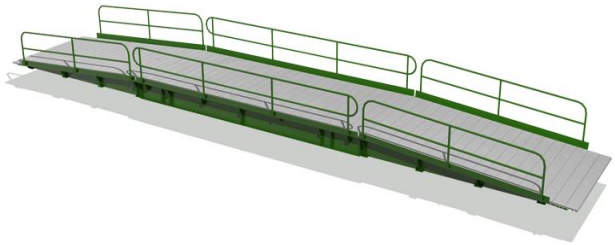
- Following the completion of works at W1 and the End Masts, the dam and flume will be removed – deflector plates will be used during the restoration of flow in the watercourse.
- The watercourse will be reinstated by reinstating the bank slopes and character and stabilizing the banks using boulder armour or willow/brush bank protection, and reinstating instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting will be carried out along the riparian margins.

Reference Documents

Groundforce Bridge – Temporary Bridge (https://www.vpgroundforce.com/ire/temporary-bridges/)

Photographs

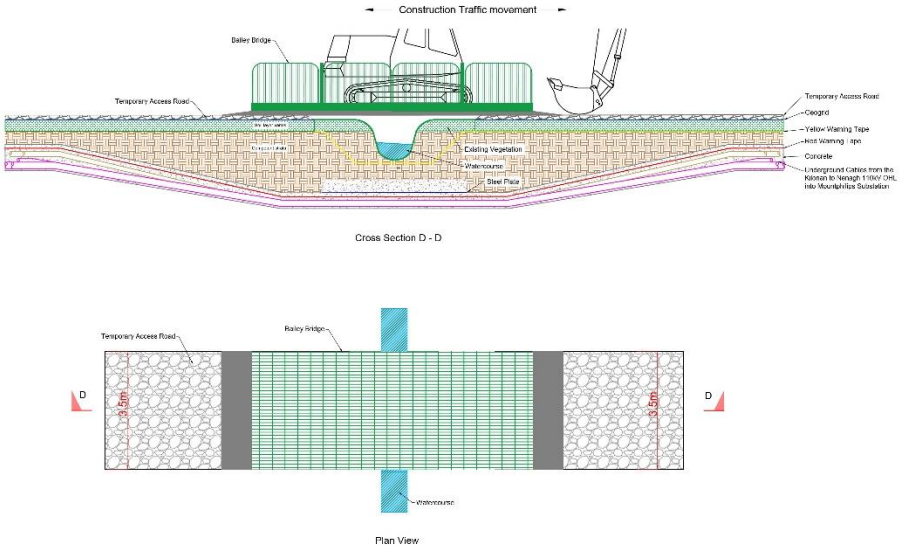
PVC Flume Pipes



Bailey Bridge

Relevant Drawings from Volume C3 EIAR Figures

Extract from Figure GC 5.12: Cross Sections of Temporary Bailey Bridge Crossing at Mountphilips Substation Site



END

Outline Construction Methodology			
Title:	**New Permanent Access Road at Mountphilips Substation Site**	**Ref:**	**GC-OCM-06**

General Description

New permanent access road 4.5m in width, will be constructed to provide vehicular access to Mountphilips Substation

Duration

5 days, c.100m/day

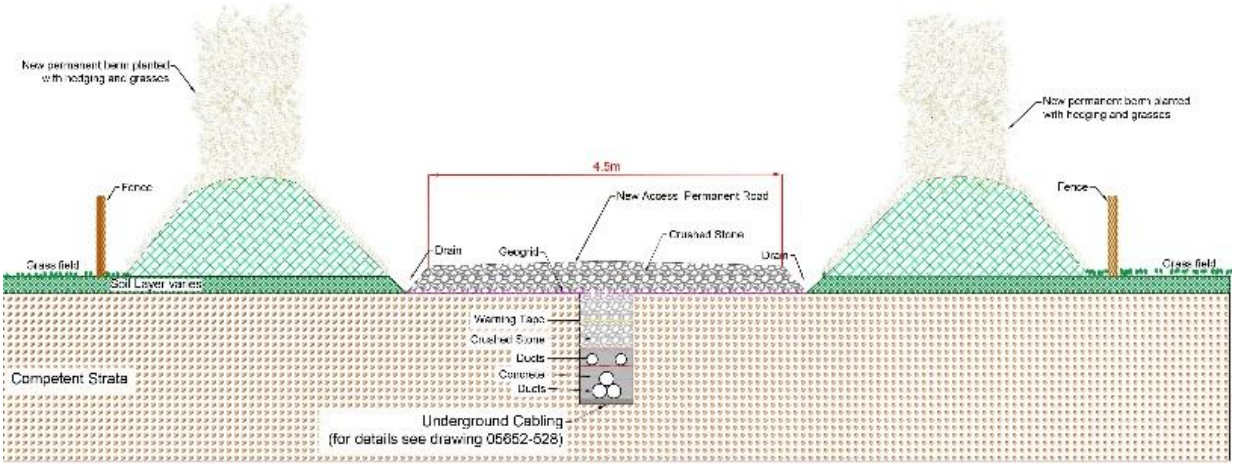
Personnel	Machinery & Equipment	Materials
▪ Site Engineer ▪ 3 General Operatives ▪ Excavator Operator	▪ 4x4 vehicle ▪ Wheeled Tipper Trucks ▪ 360˚ excavator. ▪ Vibrating Roller ▪ Chainsaws	▪ Pre-cast culverts ▪ 50mm crushed stone ▪ Geotextile ▪ Granular fill as per design

Standard Method

- An excavator will excavate the width of the new access road which will include a roadside drainage channel. All organic material and soft subsoil will be removed to formation level. Soft spots will be excavated and filled with suitable granular material. Excess material will be stored in permanent berms alongside the new access road to Mountphilips Substation.
- Geotextile material will be laid where necessary (subject to site conditions).
- A minimum sub-base will be laid which will consist of 250mm of crushed stone and compacted in layers.
- A surface layer of granular fill will then be laid and compacted. A 13 ton vibrating roller will compact each layer.
- The surface of the new road will be finished with a 1% gradient to allow water run-off.
- Land will be reinstated and reseeded with grasses and flower species common to the surrounding vegetation. Local provenance native wildflower seed of flowering plants like Clovers, Vetches and Knapweed will be sown.

Relevant Drawings from Volume C3 EIAR Figures

Extract from Figure GC 5.10: Cross Sections of New Permanent Access Road at Mountphilips Substation



Cross Section of New Permanent Access Road to Mountphilips Substation

END

Outline Construction Methodology			
Title:	**Installation of 110kV UGC and new crossing structures at W2 and W3**	**Ref:**	**GC.OCM-07**

General Description

Instream works will be required at Mountphilips Substation site in order to install the 110kV UGC and new permanent crossing structures at W2 and W3.

Duration

1-2 Days per location

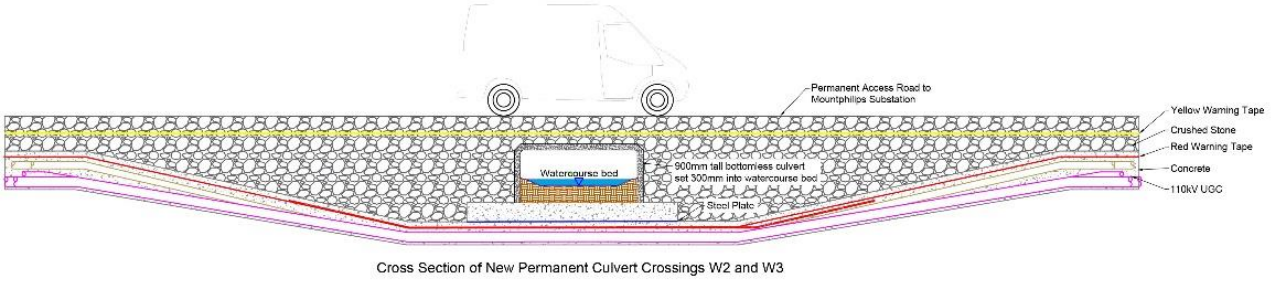
Personnel	**Machinery & Equipment**	**Materials**
▪ 6 general operatives ▪ 2 excavator operators ▪ 1 engineer ▪ Hydrologist ▪	▪ 13 ton excavator ▪ 1 tipper truck ▪ Vibrating compaction plate ▪ Consaw ▪ Hand tools ▪ Cones ▪ Compressor and airspades ▪ Steel plates ▪ Cable detector	▪ Pre-cast bottomless culverts ▪ Clause 804 Material ▪ 150mm rock fill ▪ 160mm and 125mm diameter uPVC ducting ▪ Red cable marker strip ▪ Yellow marker warning tape ▪ CGBM4 semi dry lean mix concrete ▪ Duct spacers ▪ Boulder armour, sandbags, willow

Installation of a new culvert structure or replacing an existing culvert structure

- A dam will be constructed, upstream of the works location, using sand bags containing washed sand.
- A mobile pump will be set up beside the watercourse and will pump the water through hoses, from the up-stream side of the dam to a point downstream below the works. The pumped water from the hose will be released downstream onto a suitable splash plate to prevent erosion.
- Silt traps, such as geotextile membrane, will be placed upstream and downstream of the in-stream works to minimise sedimentation effects.
- The cable trenching and crossing structure works can then be carried out in the dry bed.
- If required, a temporary sump will be established and used to collect any leakages of water from the dam. This water will be removed by pumping to an infiltration trench or settlement pond if the soil is not saturated, otherwise the water will be pumped to a suitable water treatment train, such as a Siltbuster, where any sediment will be allowed settle before the water is released.
- A trench will be excavated in the dry stream bed and cable ducts will be laid and trench backfilled with existing bed material.
- A precast bottomless box culvert will be installed at watercourse crossing W2 and W3, the walls of the bottomless culvert will be placed at the sides of the watercourse, 300mm into the streambed
- Following the completion of works at W2 and W3, the dam will be removed – deflector plates will be used during the restoration of flow in the watercourse.
- The watercourse will be reinstated by reinstating the bank slopes and character and stabilizing the banks using boulder armour or willow/brush bank protection, and reinstating instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting will be carried out along the riparian margins.

Relevant Drawings from Volume C3 EIAR Figures

Extract from Figure GC 5.13: Cross Sections of New Permanent Culvert at Mountphilips Substation Site



Cross Section of New Permanent Culvert Crossings W2 and W3

END

Outline Construction Methodology			
Title:	**Permanent Site Entrance at Mountphilips Substation Site**	**Ref:**	**GC-OCM-08**

General Description

The site entrance to Mountphilips 110kV Substation at Coole will be permanently widened and roadside hedgerows will be removed to achieve sightlines at this entrance.

Duration

3 days

Personnel	Machinery & Equipment	Materials
▪ Site Engineer ▪ 6 General Operatives ▪ 2 Excavator Operator	▪ 4x4 vehicle ▪ 3 Tipper Trucks ▪ 3 excavators. ▪ Chains / hand tools ▪ Vibrating rollers ▪ Chainsaws	▪ 50mm Crushed Stone ▪ Geotextile ▪ Fencing materials – Gates, Timber posts, Rail fence ▪ Granular fill ▪ Hedging ▪ Silt fences

Standard Method - Permanent Site Entrances, E1 at Coole

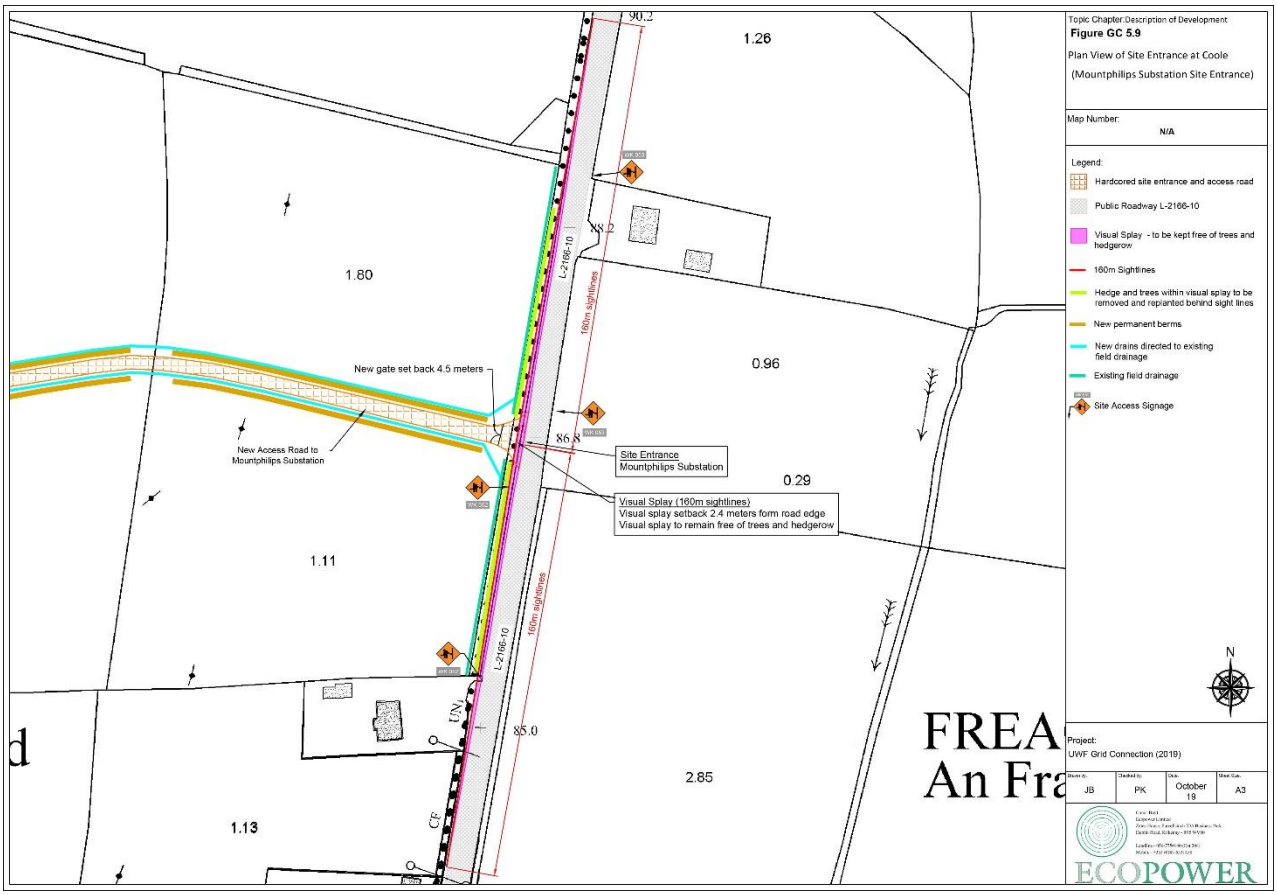
- Prior to works at the entrances commencing, traffic management controls will be put in place on the public road and flagmen deployed.
- The roadside fencing, hedgerows and trees will be cleared back until adequate sightlines are achieved,
- Permanent fencing will be erected and boundary wire mesh fencing will be used to improve visibility if necessary.
- The existing site entrance will be widened and soil and subsoil excavated. A concealed drain will be installed;
- A base layer of stone, followed by subsequent layers of smaller graded stone and a final layer of capping stone will be laid over the excavated area. A vibrating roller will be used to compact each layer.
- The final capping layer will be profiled to the new access road to Mountphilips Substation and will provide a suitable surface to accommodate the delivery of materials, plant or equipment.
- Any hedgerows or trees removed during widening of the entrance will be replaced with an equivalent length of new hedgerow and equivalent number of semi mature trees behind the new sightlines along the line of the new permanent fencing.
- The new verge at each side of the widened site entrance will covered with soil and reseeded. Excess material will be stored in permanent berms alongside the new access road to Mountphilips.

Photographs

Existing farm field entrance at Coole for Mountphilips Substation

Relevant Drawings from Volume C3 EIAR Figures

Extract from Figure GC 5.09: Plan View of Permanent Site Entrance at Coole (Mountphilips Substation Site Entrance)



END

Outline Construction Methodology			
Title:	**Temporary Compound at Mountphilips Substation Site**	**Ref:**	**GC-OCM-09**

General Description

A temporary construction compound is a secure fenced area that will be used to store construction materials, equipment, machinery, fuel and waste, and will provide facilities for construction crews including offices, canteen and toilet facilities and parking. A temporary construction compound will be set up at the Mountphilips Substation site.

Duration

2 days

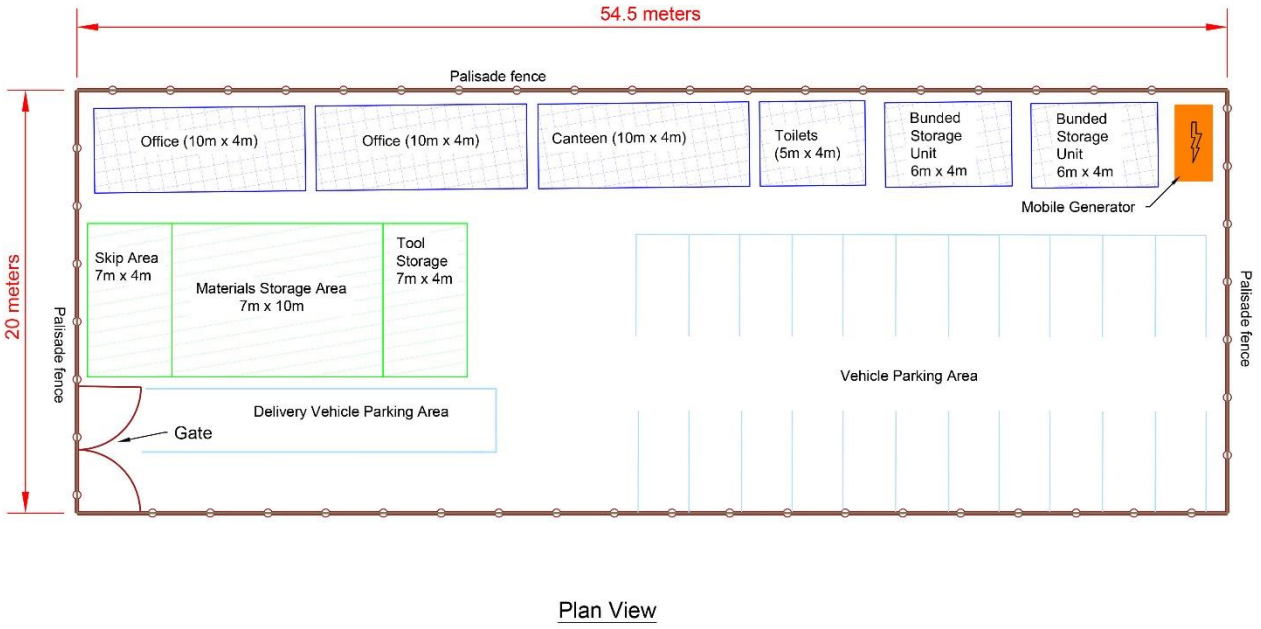
Personnel	Machinery & Equipment	Materials
▪ Site Engineer ▪ 6 General Operatives ▪ 2 Excavator Operator	▪ 4x4 vehicle ▪ 3 Tipper Trucks ▪ 3 excavators ▪ Hand tools ▪ Vibrating rollers ▪ Teleporter	▪ Stone ▪ Geotextile ▪ Security Fencing ▪ Lighting ▪ Portable Cabins ▪ Bunded Storage Units ▪ Generators

Standard Methods

- A drainage system will be excavated and installed around the compound area.
- A layer of geotextile material will then be laid over the footprint of the compound,
- Using an Excavator, a base layer of 100mm to 250mm of granular fill will be laid on the geotextile material and compacted followed by a capping layer of 100mm of Clause 804 which will provide the finished surface.
- Security fencing will be erected around the compound and access gates will be installed at the entrances.
- Portable cabins to be used for site offices, canteen and toilets will be delivered to the compound and set up.
- Bunded storage units will be installed in the compound.
- Parking areas will be marked out and signage will be erected.
- Cowled lighting will be installed around the compound area
- Once all works have been completed on the UWF Grid Connection, the Temporary Compound will be cleared of all work materials, cabins, storage units and fencing. The area will be reinstated and reseeded with grasses and flower species common to the surrounding vegetation.

Relevant Drawings from Volume C3 EIAR Figures

Extract from Figure GC 5.8: Plan View of the Temporary Construction Compound at Mountphilips Substation



Plan View

END

Outline Construction Methodology			
Title:	**Formation of Overburden Storage Berms at Mountphilips Substation Site**	**Ref:**	**GC-OCM-10**

General Description

Overburden will result from excavations for the UWF Grid Connection works at Mountphilips, mainly from the footprint of the substation compound, and also from the permanent access road. This overburden will be permanently stored in berms adjacent to the new permanent access road and around the Mountphilips Substation. Temporary storage will also take place at the End Mast locations.

Duration

For the duration of the construction works

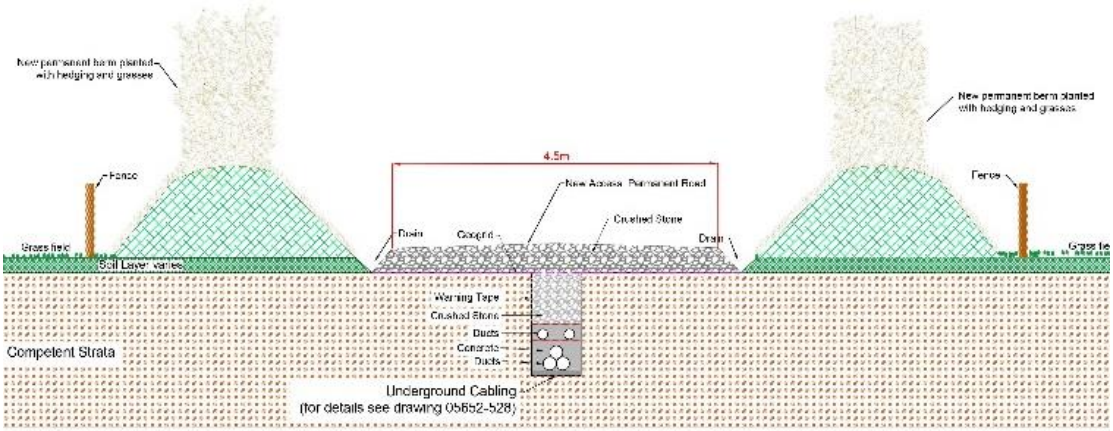
Personnel	**Machinery & Equipment**	**Materials**
▪ Site engineer ▪ 2-3 general operatives ▪ 1 Excavator Operator	▪ Tipper Truck. ▪ 360˚ excavator	▪ Grass seed ▪ Hedging ▪ Geotextile material/tarpaulin

Standard Methods

- The excess overburden resulting from excavations at the Mountphilips Substation site will be loaded onto a dump truck and transported to the overburden storage berm location.
- When the overburden material is tipped from the dump truck an excavator will place the material along the selected berm path and shape it to a height of circa 1.6m.
- The sides will be battered at angles of 45 degrees or less and a light covering of topsoil/subsoil will be added.
- Permanent berms will be reseeded with grasses and flower species common to the surrounding vegetation. Local provenance native wildflower seed of flowering plants like Clovers, Vetches and Knapweed will be sown.
- The permanent berms alongside the new access road will also be planted with hedgerow.
- Berms will be covered if there is a risk of erosion.

Relevant Drawings from Volume C3 EIAR Figures

Extract from Figure GC 5.10: Cross Sections of New Permanent Access Road at Mountphilips Substation



Cross Section of New Permanent Access Road to Mountphilips Substation

END

Outline Construction Methodology			
Title:	**Reinstatement of Lands at Mountphilips Substation Site**	**Ref:**	**GC-OCM-11**

General Description

During construction works, vegetation, topsoil and subsoil will be removed from lands at the Mountphilips substation site to facilitate the construction of the UWF Grid Connection. Following the completion of construction works, these lands will be reinstated.

Duration

1 – 4 days per location

Personnel	**Machinery & Equipment**	**Materials**
▪ Site engineer ▪ 2-3 general operatives ▪ 1 Excavator Operator	▪ 4x4 vehicle ▪ Tipper Truck. ▪ 360˚ excavator ▪ Sub-soiler plough ▪ Levelling harrow	▪ Native grass and flower seeds ▪ Native semi-mature trees ▪ Native fruiting hedgerow species

Standard Methods

- Following the completion of works, any remaining building materials and any wastes and excess material will be removed to a licensed facility.
- The construction works area will, where required, be sub-soiled using a sub-soil plough to loosen any compacted areas.
- Sub-soil will be spread using the excavator.
- Topsoil will be spread evenly over the subsoil to surface level using an excavator.
- The ground will be levelled using a levelling harrow so as to present a level surface and to ensure that the restored area will follow the contours of the surrounding undisturbed ground after restoration is completed.
- All stones in excess of 50mm will be removed from the surface.
- The soil will be reseeded with grasses and flower species common to the surrounding vegetation. Local provenance native wildflower seed of flowering plants like Clovers, Vetches and Knapweed will be sown.
- Fertilizer will be spread on any sections of improved grassland.
- The lands will remain fenced until sufficiently revegetated, at which time all fencing will be removed off-site.

Reinstating hedgerows and trees

- New hedgerows and trees will be planted along the new permanent berms adjacent to the new access road and around the Mountphilips Substation.
- New hedgerows and trees will be planted behind the visual splay at the Mountphilips Substation site entrance.
- New hedgerow and trees will be fenced to protect from livestock.

END

Outline Construction Methodology			
Title:	**110kV Trenching & Ducting**	**Ref:**	**GC-OCM-12**

General Description

A trench of c.1.25m deep, 0.6m wide will be dug in the road to accommodate 5 No. ducts necessary for the grid connection works. Three of these ducts will be used to contain the grid connection electrical cables and 2 of them will be used to house the telecommunications cables and copper cables.

Duration

- The civil contractor will complete 80-100 linear meters of trench per crew per day depending on the site conditions.
- Circa 4 crews will work at any one time. It is anticipated that multiple trenching and ducting crews will be working on the cable route simultaneously during the construction period. At times some crews will be completing joint bays and road reinstatement and will be coordinated intermittently with the trenching and ducting crews throughout the construction phase.
- Approximate duration 6 - 8 months for trenching & ducting, 10 – 12 months in total for 110kV UGC works outside the Mountphilips Substation site, with 110kV UGC works taking place over an 18 month period.

Personnel	Machinery & Equipment	Materials
▪ 6 general operatives per crew ▪ 2 Excavator Operators per crew ▪ 1 Engineer per crew	▪ 13 ton excavators ▪ Small excavator/Teleporter ▪ Tipper trucks ▪ Vibrating compaction plates ▪ Brush & mandrel ▪ Consaw ▪ Hand tools ▪ Traffic Cones and traffic signage ▪ Compressor and airspades ▪ Cable detector	▪ Blinding Concrete where necessary ▪ Bedding sand ▪ Clause 804 Material ▪ 150mm rock fill ▪ 160mm & 125mm diameter uPVC ducting ▪ Red cable marker strip ▪ Yellow marker warning tape ▪ CGBM4 lean mix concrete ▪ Duct spacers ▪ Nylon ropes ▪ Road surface dressing ▪ Sand (clean) bags

Standard Methods for Trenching & Ducting

- Along public road sections, traffic management plans will be implemented. Each work area will be secured with adequate protective barriers and traffic signs and traffic management controls to the approval of the Engineer and as outlined in "Guidance for the Control and Management of Traffic at Road Works" and "Chapter 8 - Temporary Traffic Measures and Signs for Roadworks.
- A surface check will be carried out for underground services with appropriate equipment. Service owners will be contacted to confirm service locations.
- Along public road sections, the road surface will be saw cut to the depth of existing asphalt/bitmac layers and/or concrete surfacing.
- The cable trench will be excavated to a distance of circa 50m ahead of the ducting works. Once the ducting is installed the trench will be backfilled using a mini digger so that only circa 100m of trench is open per crew at any one time along the cable route.
- All material removed from the trench will be loaded immediately and taken away to licenced landfill.
- The trench floor will be graded, smoothed and trimmed when the required 1250mm depth and 600mm width has been achieved.
- A bedding layer of lean mix concrete or bedding sand will be placed at the bottom of the trench.
- Three ducts, through which the electrical cables will be pulled, will be installed by hand in trefoil formation as detailed on the design drawings. Spacers will be used as appropriate to establish horizontal duct spacing.
- The ducts will be surrounded and covered with the lean mix concrete and concrete will then be compacted.

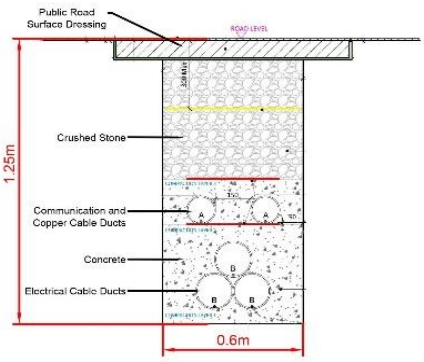
- Red cable marker warning strips will be placed on the compacted lean mix concrete directly over the three ducts which will contain the electrical cables.
- The top two ducts, which will contain the telecommunication cables and copper cables, will then be placed on top of the red cable marker.
- The top ducts will then be surrounded and covered with lean mix concrete material and compacted.
- Another layer of red cable protection strip will then be placed on top.
- A layer of Clause 804 backfill as specified will then be laid to within 300mm of ground surface and compacted.
- Yellow warning tape, will be placed over the compacted Clause 804 backfill.
- Immediate reinstatement will be carried out using road surfacing material to surface level in accordance with arrangements with Tipperary County Council Roads Section and the Road Opening Licence for the works.

Reinstatement of New Permanent Access Road at Mountphilips

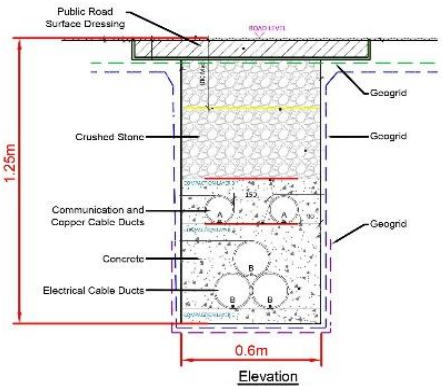
- At Mountphilips Substation site, the 110kV UGC will be backfilled with crushed stone to ground level.

Relevant Drawings from Volume C3 EIAR Figures

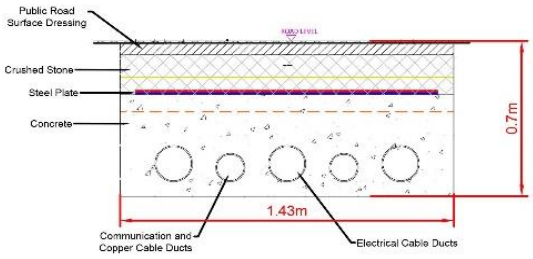
Extract from Figure GC 5.14: Cross Section of 110kV UGC in the Public Road



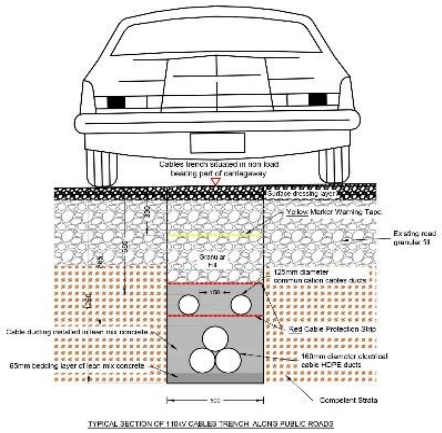
Elevation
110kV UGC
(along majority of UGC route)



Elevation
110kV UGC
(Supported trench through peat, if required)



Elevation
110kV UGC
(in Flat Formation over Bridges / Culverts / Services, if required)



TYPICAL SECTION OF 110kV CABLES TRENCH ALONG PUBLIC ROADS

Reference Documents

ESB Specification

Standard Trench Cross Section Trefoil Formation (PE424-D7001-001-003-005)

Standard Trench Cross Section Flat Formation (PE424-D7001-001-005-002)

END

Outline Construction Methodology			
Title:	**110kV Joint Bays and Associated Chambers**	**Ref:**	**GC-OCM-13**

General Description

Joint bays are locations where lengths of cable are joined. Bays are required approximately every 550m-850m and will be located within the bounds of the road. Joint bay dimensions are typically in the order of 6m long, 2.5m wide and 2m deep and are designed to be covered over and the road above reinstated to its original surface. The communication chamber and link box chamber are smaller in size.

Duration

2-3 days per joint bay location

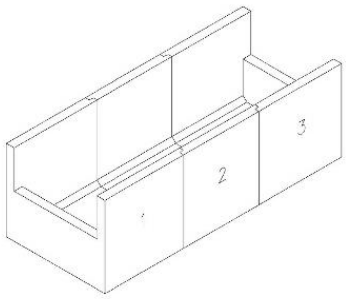
Personnel	Machinery & Equipment	Materials
▪ 2-3 General Operatives per crew ▪ 1 Excavator Operator per crew	▪ 360˚ excavator ▪ 1 no. tipper truck/tractor and trailer ▪ Water Pump & Hoses ▪ Compactor ▪ Consaw ▪ Hand tools ▪ Traffic Cones ▪ Compressor and airspades ▪ Cable detector ▪ Hi Ab	▪ Bedding sand ▪ Clause 804 Material ▪ HDPE ducting ▪ Precast Chamber Units ▪ Link Box Chamber ▪ Copper cable (for earthing of the link box and joint bay chamber) ▪ Earth Rods

Standard Methods

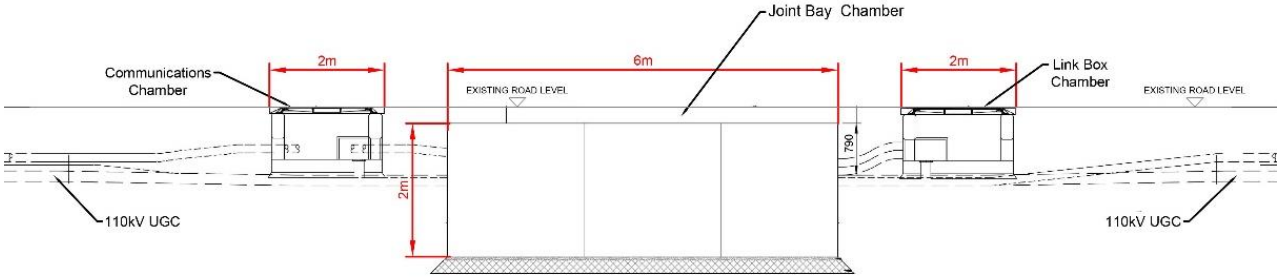
- A pit will be excavated to a depth of c.2.3m, deep enough to accommodate the joint bay chamber, c.6m long and 2.5m wide.
- A layer of 200 mm deep Clause 804 granular material will be placed on the bottom of the excavation. A 75mm layer of sand will be then be laid on top of the Clause 804 to provide a level base for the pre-cast joint bay chamber. The joint bay will then be lifted and placed on the sand layer using the excavator or a Hi Ab if fitted on the delivery truck. The level of bottom of the joint bay will adjusted so that the finished level of the top of the joint chamber will match the surrounding ground surface level.
- 2 smaller pits will be excavated adjacent to the joint bay pit for the communication chambers and earth sheath link chambers. These pits are c.1m deep, c.1.5m long and c.1.1m wide. The pre-cast concrete sections for the communication chambers and earth sheath link chambers will also be placed on sand bedding and installed so that the top of the chambers will be level with the surface ground levels.
- Earthing rods and earthing cables will be installed as per design. Typically, steel rods are driven into the ground and connected back to the chambers using copper conductor or wire.
- The excavations around the precast concrete joint bays will be backfilled with granular fill and compacted in layers up to the existing ground level. The chambers will be covered temporarily filled with sand with steel plates or concrete lids on top until the cable installation works commence.
- Following the completion of works the area will cleared of all equipment, machinery, materials and traffic management measures.
- Along the 110kV UGC where the chambers are being installed in a public roadway, or in the private paved road at the eastern end of the route, temporary road surface reinstatement will be carried out.

Relevant Drawings from Volume C3 EIAR Figures

Extract from Figure GC 5.15: Views of 110kV UGC Joint Bays



ISOMETRIC VIEW OF PRECAST CHAMBER



COMMUNICATION CHAMBER / JOINT BAY CHAMBER / LINK BOX CHAMBER ELEVATION

END

Outline Construction Methodology			
Title:	**110kV Cable Pulling**	**Ref:**	**GC-OCM-14**

General Description

Cables will be pulled, from one joint bay to the next joint bay along the cable route, through the ducting installed in the cable trench using a cable pulling winch. Three electrical cables and two communication cables will be pulled into the ducts, one cable to each duct. The electrical and communication cables will be supplied on steel or timber cable drums.

Duration

Site specific, 1 day per cable section between joint bays depending on conditions

Personnel	Machinery & Equipment	Materials
• 2-4 electrical personnel	• Wire Rope Cable Winch and four wheel drive vehicle. • Nylon Ropes & Rope Guide Roller. • Swivel Link. • Drum trailer and tractor.	• Cable attachment lugs • 110kV Electrical Cable • Fibre optical cable • Cable Pulling stockings • Road surface dressing, if required.

Standard Methods for Cable Pulling

- Prior to cable installation, traffic management signage will be reinstated and the works area secured.
- Three consecutive joint bays will be opened and the sand material removed and stored appropriately for reuse.
- The cable is supplied in pre-ordered lengths on large cable drums. The cable drums will be transported from the temporary compound to the Joint Bay locations using a truck and low loader or tractor and drum trailer.
- The cable pulling winch will be transported to the next joint bay location along the route using a tractor or four wheel drive vehicle.
- The winch will be parked and anchored at the mouth of the joint bay and the winch wire rope will be pulled, using nylon ropes, through the ducts to the next joint bay along the cable route where the cable drum is parked.
- When the winch rope emerges from the duct at the joint bay where the cable drum is parked, it will be connected to the cable using approved suitably sized and rated cable pulling stockings and swivels or alternatively using a pulling head fitted to the cable by the manufacturer**.**
- Rope guide rollers will be placed at the duct opening to guide the cable into the duct.
- If required, lubrication will be applied to the cable coating before it enters the duct. Lubricants will be stored in designated bunded storage areas in the temporary construction compound.
- The winch will pull the cable from the cable drums through the ducts until it reaches the joint bay where the winch is located.
- Once the pulled cable has reached the winch, the cable is cut, coiled and placed back into the joint bay chamber in preparation for Cable Jointing.
- Where the cable jointing work is not scheduled to take place immediately after the cable has been pulled into the joint bay, the joint bay will be covered until the jointing works can take place. Along public road sections, temporary reinstatement of the road surface will be carried out over the joint bay.

END

Outline Construction Methodology			
Title:	**110kV Cable Jointing**	**Ref:**	**GC-OCM-15**

General Description

Cable jointing is carried out at the joint bays in order to join two lengths of cable.

Duration

Circa 2 days per joint bay

Personnel	Machinery & Equipment	Materials
▪ 2 Cable Jointers ▪ 1 Excavator Operator	▪ Tractor Unit and trailer with Hi-Ab or City Crane ▪ Heating blankets ▪ Hand tools ▪ Jointing Container ▪ 360˚ excavator ▪ 1 no. Tipper Truck or tractor and trailer	▪ Sand for pipe bedding ▪ Cement-bound sand ▪ Sand bags ▪ Road surface dressing, if required.

Standard Method

- Prior to cable installation, traffic management signage will be reinstated and the works area secured.
- A jointing container will be transported to the joint bay location and lifted into place and positioned over the joint bay using a Hi-Ab or city crane,
- The jointing container will provide a controlled environment in the joint bay where the cables will be heated for several hours using heating blankets.
- After the cables are heated the cable jointing procedure will be carried out,
- Jointing works will involve the joining of the cables and the sealing of ducts in the joint bay using hand held equipment ensuring the area and cable is kept clean from any dust or dirt.
- Following the completion of jointing and duct sealing works in the joint bay, the cable joints will be supported by placing compacted cement-bound sand in c. 200 mm layers up to the level of the cable joint.
- Testing will then be carried out on the joint once it is fully supported by the sand base.
- Once testing is complete additional layers of cement-bound sand will be laid and compacted in the joint bay chamber until the cement-bound sand is 100mm above the level of the top of the joint,
- A cable protection strip is then placed over the compacted sand 100mm above the joint.
- The surface over the chambers are then permanently reinstated using manhole type covers and road surfacing material to surface level in accordance with arrangements with Tipperary County Council Roads Section and the Road Opening Licence for the works.

Photographs

Typical HV cable jointing container

END

Outline Construction Methodology			
Title:	**Replacing existing culverts along the 110kV UGC**	**Ref:**	**GC.OCM-16**

General Description

Up to 13 No. old masonry culverts may require replacement during 110kV UGC construction works. These crossings locations are W13, W14, W15, W17, W19, W20, W32, W34, W55, W57, W60, W61 and W64.

Duration

1-2 Days per location

Personnel	**Machinery & Equipment**	**Materials**
▪ 6 general operatives ▪ 2 excavator operators ▪ 1 engineer ▪ Hydrologist	▪ 13 ton excavator ▪ 1 tipper truck ▪ Vibrating compaction plate ▪ Consaw ▪ Hand tools ▪ Cones ▪ Compressor and airspades ▪ Steel plates ▪ Cable detector	▪ Pre-cast bottomless culverts (for W14) ▪ Precast concrete pipe culverts ▪ Clause 804 Material ▪ 150mm rock fill ▪ 160mm and 125mm diameter uPVC ducting ▪ Red cable marker strip ▪ Yellow marker warning tape ▪ CGBM4 semi dry lean mix concrete ▪ Duct spacers ▪ Road Dressing surface material

Installation of a new culvert structure or replacing an existing culvert structure

1. A new HDPE culvert or precast pipe culvert will be installed in the watercourse.
2. Minimum 900mm culverts will be used and will be set 300mm into the stream bed. A precast bottomless box culvert will be used at watercourse crossing W2, W3 and W14, the walls of the bottomless culvert will be placed at the sides of the watercourse, 300mm into the streambed.
3. The trench will be backfilled with crushed stone and the road surface reinstated

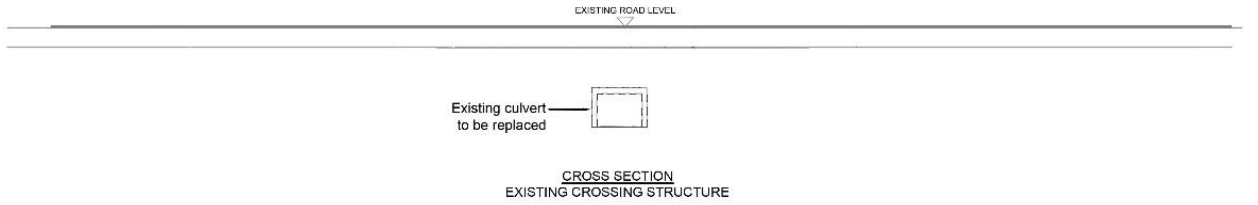
- A dam will be constructed, upstream of the works location, using sand bags containing washed sand.
- A mobile pump will be set up beside the watercourse and will pump the water through hoses, from the upstream side of the dam to a point downstream below the works. The pumped water from the hose will be released downstream onto a suitable splash plate to prevent erosion.
- Silt traps, such as geotextile membrane, straw bales etc. will be placed upstream and downstream of the in-stream works to minimise sedimentation effects.
- The cable trenching and crossing structure works can then be carried out in the dry bed.
- If required, a temporary sump will be established and used to collect any leakages of water from the dam. This water will be removed by pumping to an infiltration trench or settlement pond if the soil is not saturated, otherwise the water will be pumped to a suitable water treatment train, such as a Siltbuster, where any sediment will be allowed settle before the water is released.
- A trench will be excavated in the dry stream bed and cable ducts will be laid and trench backfilled with existing bed material.
- At W14, a precast bottomless box culvert will be installed at watercourse crossing W2 and W3, the walls of the bottomless culvert will be placed at the sides of the watercourse, 300mm into the streambed.
- At the remaining locations, precast concrete culverts, (sized for peaked flood flows) will be set 300mm into the watercourse bed.
- Following the completion of works at the watercourses, the dam will be removed – deflector plates will be used during the restoration of flow in the watercourse.

- The watercourse will be reinstated by reinstating the bank slopes and character and stabilizing the banks using boulder armour or willow/brush bank protection, and reinstating instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting will be carried out along the riparian margins.
- The road above the works area will be backfilled and a road surface dressing will be laid.

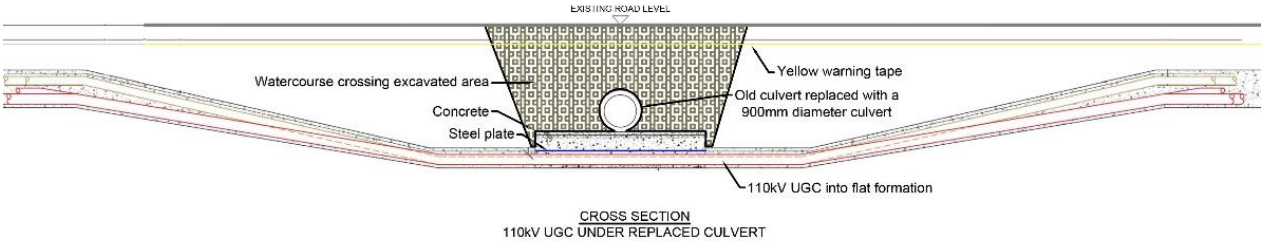
Relevant Drawings from Volume C3 EIAR Figures

Extract from Figure GC 5.20: Cross Sections of Replaced Culvert along the 110kV UGC

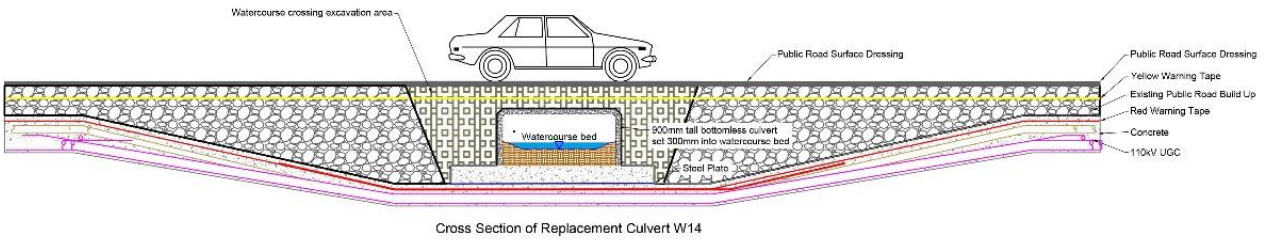
Existing culvert



Replaced culvert



Bottomless culvert at W14



END

Outline Construction Methodology			
Title:	**Raising road level and parapet walls at Rockvale Bridge (W6), Tooreenbrien Bridge (W36) and Anglesey Bridge (W53)**	**Ref:**	**GC-OCM-17**

General Description

Following the installation of the 110kV UGC over watercourse bridge crossing W7, W36 and W53, the parapets walls and road surface level will be raised slightly.

Duration

1-3 days per location

Personnel	Machinery & Equipment	Materials
• Site engineer • 2-3 stone masons • Engineer • Conservation archaeologist • Conservation engineer	• Masonry tools • Hand tools • Surface dressing machine	• Pre-mixed mortar • Cut stone • Stainless steel railings and posts • Debris netting • Surface dressing

Standard Method: Raising Parapet Walls at W36 and W53

- Works to bridge parapet walls at watercourse crossings W7, W36, W53 will be carried out during dry weather, and debris netting will be fixed to the outside of the walls in order to prevent any debris falling into the watercourse below. (Project Design Measure)
- Cut stone and pre-mixed mortar will be delivered to the works location as required.
- The existing coping stones will be removed, existing parapet walls will be repaired and then built up to 1.25m above the final road level. The wall will be capped with the original coping stones.
- Care will be taken to ensure no debris falls into the debris netting.
- Following the completion of works the area will cleared of all equipment, machinery and materials.

Standard Method: Installation of Stainless Steel Rail at W7 and W53

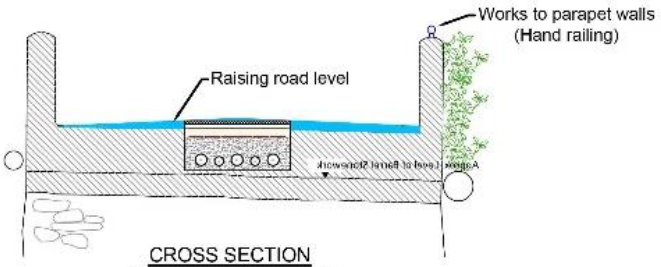
- At bridge crossing W7, a 150mm high stainless steel railing will be installed along the top of one parapet wall. At bridge crossing W53 there is an option to install a 250mm high stainless steel railing on top of both parapet walls.
- Works to bridge parapet walls at watercourse crossings W7, W36, W53 will be carried out during dry weather, and debris netting will be fixed to the outside of the walls in order to prevent any debris falling into the watercourse below. (Project Design Measure)
- The railing will be installed by core drilling the top of the parapet wall and setting the railing posts in concrete in the cores. The rails will then be attached to the posts once set in place.
- Following the completion of works the area will cleared of all equipment, machinery and materials.
-

Raising Road Surface Levels at W7, W36 and W53

- The full road surface over bridge crossings W7, W36 and W53 will be surface dressed after the completion of all works at these locations. Surface dressing will be carried out using road surfacing material in accordance with arrangements with Tipperary County Council Roads Section and the Road Opening Licence for the works.
- The final road surface level will be c.23cm, c.14cm and c.35cm higher than existing levels over bridge crossings W7, W36 and W53 respectively.

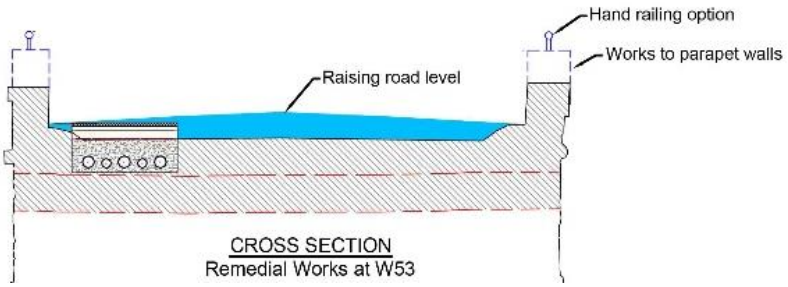
Relevant Drawings from Volume C3 EIAR Figures

Extract from Figure GC 5.17: Remedial Works to Bridges at W7, W36 and W53



CROSS SECTION
Remedial Works at W7

CROSS SECTION
Remedial Works at W36



CROSS SECTION
Remedial Works at W53

END

Outline Construction Methodology			
Title:	**Horizontal Directional Drilling at W8 and W9**	**Ref:**	**GC-OCM-18**

General Description

Horizontal Directional Drilling (HDD) will be used to install the 110kV UGC under the 2 no. bridges at watercrossing W8 and W9.

Duration

2-3 days per location

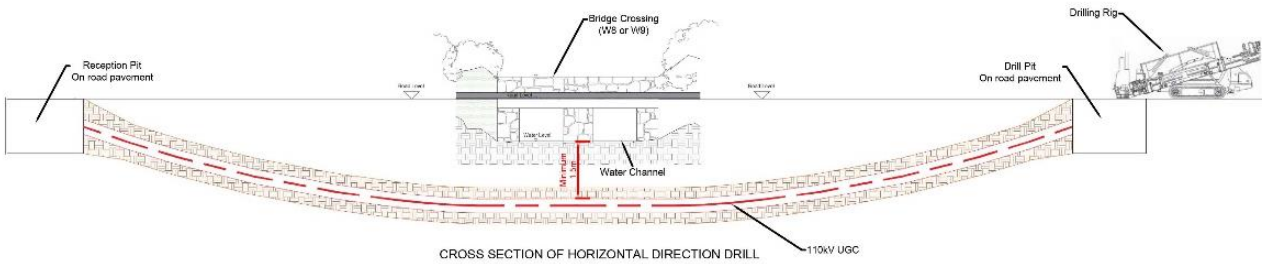
Personnel	Materials	Machinery & Equipment
▪ 1 Mud Engineer ▪ 1 Watercourse watcher ▪ 2-3 Drillers ▪ 1 Excavator Operator ▪	▪ Fencing materials ▪ 50mm crushed Stone ▪ Ducting ▪ Bentonite ▪ Silt fencing ▪ Sand Bags containing washed sand ▪ Straw bales ▪	▪ Horizontal Directional Drilling Rig ▪ Drilling fluid recycling system ▪ 360˚ excavator ▪ 1 no. Tipper Truck or tractor and trailer ▪ Tractor and vacuum tank ▪ Siltbuster ▪ Plastic or timber mats ▪ PVC bunds. ▪

Standard Methods

- Drilling activities will be carried out at least 10m from the watercourse crossings W8 and W9 along the public road. Silt fencing and Sand Bags containing washed sand will be set up between the drilling rig and the watercourse.
- A launch pit and a reception pit (5m wide x 2m long x 1.5m deep) will be excavated within the public road, all excavated material will be loaded and taken away to licenced landfill.
- An overflow pit will be created beside the launch pit to cater for any excess drilling fluid. All runoff from the construction works area will be directed into a suitable water treatment train such as a Siltbuster and treated for sediment. This will also mean that any contaminated water can be contained and removed off-site to a licensed waste facility.
- The location assembly will be fitted in the drill head by the system operator, and the driller will push the drill string into the ground and will steer a bore path beneath the bed of the water course.
- The drill head will be fitted with a sensor to allow early detection of an obstruction across the drilling path. This will allow the drilling rods to be retracted and steered around the obstacle avoiding the potential for pressure to build up inside the borehole.
- The system operator will constantly monitor fluid volume, pressure, pH, weight and viscosity during the drilling works to ensure that the modelled stresses and collapse pressures are not exceeded.
- The cutting material will be flushed back by drilling fluid. The excess material will be collected in a container and removed off site to a licensed waste facility.
- While the drilling is in progress below the river bed, a mud engineer will be deployed in the watercourse to monitor the watercourse bed, in order to alert the driller at the earliest time of a developing frac out.
- When the pilot bore reaches the reception pit at the other side of the river, the drill head will be removed and a reamer will be fitted. The reamer will be drilled back enlarging the borehole to the desired size. The ducting is then attached to the swivel behind the reamer and pulled back to the rig through the borehole. At all times the driller engineer monitors the pulling forces and pressures down hole.
- The duct will then be cleaned and proven and its as-laid location recorded.
- On completion of the works, the drilling rig will be removed from the launch pit and all equipment will be removed from site.
- The pits will be backfilled and road surface reinstated, the silt fences and sand bags will then be removed.

Relevant Drawings from Volume C3 EIAR Figures

Extract from Figure GC5.18: Horizontal Directional Drilling at W8 and W9



END

UWF Grid Connection
Environmental Management Plan (2019)

Tab 11
An Bord Pleanála Order
including Planning Conditions

(post planning consent)

ECOPOWER

UWF Grid Connection
Environmental Management Plan (2019)

Tab 12

Feedback from consultations with Statutory Bodies and Other Parties

(post planning consent)

ECOPOWER

UWF Grid Connection
Environmental Management Plan (2019)

Tab 13
Construction Contract Documents

(post planning consent / pre-construction)

ECOPOWER