Appendix to Chapter 5: Description of the Development – UWF Grid Connection

Appendix 5.5: Complied Description of Upperchurch Windfarm

The data and descriptions in this appendix have informed the cumulative evaluations in the EIA Main Report.

A5.5 - 5.1 Introduction to Appendix 5.5

An application for planning permission for Upperchurch Windfarm (UWF) was made to Tipperary County Council in January 2013. The windfarm was permitted by Tipperary County Council in January 2014 and the permission was upheld by An Bord Pleanála in August 2014. The application was accompanied by an EIA Report (known as EIS at the time) and Natura Impact Statement. The full planning documents for consented UWF can be found in **Volume F: Whole UWF Project Reference Documents.**

This Compiled Description of Upperchurch Windfarm, has been compiled from information in the original 2013 UWF EIS, in the 2013 Reply to Further Information, in the additional information submitted during the planning process and planning conditions attaching to the Grant of Permission, in order to present a description of the development, in the final form, as has been granted permission. This compilation chapter has been prepared in the same format as the Description of the Development chapters (Main EIA Report Chapter 5's) for the UWF Grid Connection, the UWF Related Works and the UWF Replacement Forestry in particular Sections 5.2, 5.3, 5.4 and 5.5. For ease of cross referencing the number system used here is also the same, i.e. A5.5-5.2, A5.5-5.3 etc. Figures and drawings are included at the end of this compilation document, and are as submitted as part of the consented Upperchurch Windfarm Planning Application.

The data and descriptions in this appendix have informed the environmental factor evaluations in the EIAR Main Report, in relation to the evaluation of cumulative effects of the subject development together with the other elements of the Whole UWF Project and with other existing or consented projects or activities.

Upperchurch Windfarm (UWF) is described in this compilation chapter, in the following order:

Appendix 5.5 Sections	Section Heading	Relevant Individual Project Element
A5.5-**5.2**	Characteristics of Upperchurch Windfarm (UWF)	Upperchurch Windfarm
A5.5-**5.3**	Life Cycle Stages of the UWF The durations and timing, main activities, personnel and material requirements for both the construction and operation stages. Any changes to the Project, such as decommissioning.	
A5.5-**5.4**	The use of natural resources, emissions and production of wastes for each stage.	
A5.5-**5.5**	The vulnerability of the Project to major accidents and natural disasters.	
A5.5-**5.6**	Figures and Mapping	

List of Figures for Appendix 5.5

A5.5 - 5.2 Characteristics of Upperchurch Windfarm

Upperchurch Windfarm (UWF) will comprise 22 No. wind turbines, 2 No. meteorological masts, 22 No. turbine foundation and crane hardstanding areas, site roads and an electrical substation.

A5.5 - 5.2.1 Purpose of Upperchurch Windfarm (UWF)

These 22 No. wind turbines will produce 150 million kWh of green electricity, capable of supplying 23,000 houses in the region. The production of 150million kW/h per annum of green electricity will avoid the emission of 128,118 tonnes of greenhouse gases per annum which would have resulted from generating the same amount of electricity by fossil fuel plant. Unlike conventional power sources, the creation of electricity from the wind does not pollute the physical environment; it creates no contribution to climate change or acid rain and emits no radiation or nuclear waste.

A5.5 - 5.2.2 Location and overview description of UWF

The Upperchurch Windfarm site is located in the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnaman, Gleninchnaveigh, Coumnageeha, Coumbeg, Knocknamena Commons, Glenbeg and Seskin. This is an area 2km west of Upperchurch village and 18km to the west of Thurles, County Tipperary.

The windfarm and ancillary works will be constructed on a series of small hills ranging in elevation from 280m to 401m OD, set out generally over four areas. The electrical substation will be constructed in Knockcurraghbola Commons and the wind turbines will be connected by underground cables to this substation. There will be two meteorological masts erected, one in Grousehall and a second in Knocknamena townlands. Ancillary Works will include borrow pits in Shevry, Knocknamena, Knockmaroe and Grousehall; 1 No. site entrance from the R503 Regional Road at Graniera; and 10 No. site entrances from local public roads, through and around the site, which will provide access to the windfarm.

Relevant Figures (contained at the end of this Appendix 5.5)

Figure UWF-1: Location of Upperchurch Windfarm

A5.5 - 5.2.3 Characteristics of UWF

Upperchurch Windfarm comprises:

- Consented UWF Turbines
- Consented UWF Substation
- Consented UWF Roads
- UWF Ancillary Works

Note: "Consented" prefixes each part of the already consented Upperchurch Windfarm in order to clearly identify the already consented elements of the whole windfarm project, throughout the project documents.

A5.5 -5.2.3.1 Consented UWF Turbines

Planning Permission has been received to develop 22 No. wind turbines of the three-bladed, tubular tower model, light grey in colour not exceeding an overall height of 126.6 metres and a hub height of 81.6 metres. The turbines will be constructed on concrete bases, 225m^2 in plan, with an adjacent concrete hardstand of 1040m^2 in plan area. There is no requirement for fencing of turbine areas. The turbines will be connected by underground cables to the Consented UWF Substation.

Relevant Figures (contained at the end of this Appendix 5.5)
Figure UWF 2: Wind Turbine Elevation

A5.5 -5.2.3.2 Consented UWF Substation

Planning Permission has been received to build an electrical substation at the windfarm, comprising an 110kV substation compound which includes a control building, main transformer and an end–mast enclosed in a compound by a palisade fence. The substation will measure 64m x 41m and will be 2624m^2 in plan area.

Relevant Figures (contained at the end of this Appendix 5.5)
Figure UWF 3: Electrical Substation Compound Elevation View

A5.5 -5.2.3.3 Consented UWF Roads

Planning Permission has been received to build 11.6km of windfarm access roads, comprising 8km of newly built, 5m wide roads and 3.6km of existing farm roads which will require upgrading and widening (average by 2m widening).

Relevant Figures (contained at the end of this Appendix 5.5)
Figure UWF 4: Proposed Internal Roads Details

A5.5 -5.2.3.4 Consented UWF Ancillary Works

A5.5 -5.2.3.4.1 Meteorological Masts

Planning Permission has been received to erect two meteorological masts with wind measuring equipment attached, not exceeding a height of 80 metres. One mast is permitted in Grousehall and the second in Knocknamena townlands.

A5.5 -5.2.3.4.2 UWF Site Entrances

Planning Permission has been received to develop 1 No. site entrance from the R503 Regional Road at Graniera, which is the main site entrance (No.1) and; 10 No. site entrances from Local Roads, through and around the site, which will provide access to the Consented UWF Roads and thereon to the wind turbines and substation.

Site Entrance No.1 at Graniera is an existing field gate on Regional Road R503. This entrance will be widened to satisfy the sightline requirements as set out in Table 10.1 of the North Tipperary County Development Plan 2010 (as amended).

During the operation phase, the other entrances from the Local Roads throughout the site will be used for operation and maintenance traffic, which will mainly be four wheel drive vehicles and vans. Site Entrance No.1 will be closed, except in the very occasional event of a replacement of a major component or for decommissioning the windfarm.

Relevant Figures (contained at the end of this Appendix 5.5)

Figure UWF 5: Site Entrance No. 1 (Graniera, R503)

A5.5 -5.2.3.4.3 Watercourse Crossing

The Upperchurch Windfarm site drains into streams that form the upper reaches of the Turraheen, Owenbeg, Clodiagh and Aughvana Rivers. One stream crossing will be required on the UWF site, to the north of Turbine No.4. Planning Permission has been received to construct a new permanent clear span bridge or bottomless culvert at this crossing point.

A5.5 -5.2.3.4.4 Drainage System

The Sediment and Erosion Plan, detailed in Appendix 15-I of the 2013 EIS, described the drainage measures which will be implemented during construction of UWF. The drainage plan will control erosion, minimise disturbance to the current hydrological regime and minimise suspended sediment loading to watercourses during construction.

Access tracks will be provided with drainage ditches to collect surface water runoff from the tracks and to ensure that road foundations are protected from standing water. Surface water drains will also be provided around hardstandings, foundations and the compound. Upslope drains will be constructed so as to keep clean water separate from runoff that may be contaminated by sediment. This is standard practice in the control of sediments in windfarm construction. Sediment traps will be used to ensure that all water discharged is clean.

A5.5 -5.2.3.4.5 UWF Site Compounds

Permission has been received to develop 2 No. site compounds, to be used during the construction phase of UWF. The location of these two site compounds is identified on **Figure UWF 1**.

Site Compound No. 1, will be the main site compound and is proposed for 170m inside of Site Entrance No. 1 (at Graniera). All construction and deliveries vehicles will access the site at Site Entrance No. 1. All vehicles will be fully clear of the public road before stopping at the compound. The compound will comprise sign-in hut; main site offices; parts storage area; employee/visitor parking; induction office; canteen (including self-contained fresh water tank and waste water tank); drying room; toilet cabin unit (including self-contained effluent tank and water storage tank); wheel wash area with siltation pond for wheel wash wastewater; concrete wash in a designated bunded and impermeable truck wash area with siltation pond for settling out of solids; and a bunded fuel storage area. Following construction, Site Compound No.1 and associated facilities will be removed and the area will be appropriately reinstated.

Site Compound No. 2 is proposed for an area around an unoccupied house, yard and outhouses, belonging to one of the windfarm landowners, in the centre of the site and 155m east of the windfarm sub-station compound. It is intended as a convenience area in the centre of the site. This smaller compound will comprise car parking and parts storage sheds. The unoccupied house will be converted to an office space, canteen and toilet facility for the windfarm construction personnel. This house already has water (ground water from a well) and sanitary facilities (septic tank).

A5.5 -5.2.3.4.6 UWF Site Office

Following construction, Site Compound No. 2 will be retained for use by the maintenance personnel for the operational phase of the Upperchurch Windfarm.

A5.5 -5.2.3.4.7 Borrow Pits

There are six borrow pits identified on the Upperchurch Windfarm site which will be used to quarry stone for the construction. Post construction, borrow pits will be backfilled and covered with topsoil and reseeded. The finished levels will follow the natural contours of the ground to prevent ponding and maintain the natural surface water flow. Depressions will be avoided to ensure surface water ponding does not occur.

A5.5 -5.2.3.4.8 Forestry Felling

Prior to construction, clear-felling of 4.4 hectares of conifer plantation will be required to facilitate the construction the proposed windfarm and associated infrastructure.

A5.5 -5.2.3.4.9 Hedgerow Removal

Approximately 980m of hedgerow along field boundaries will be removed as part of the construction of Upperchurch Windfarm infrastructure. 360m relates to suitable bat foraging habitat. To mitigate this loss of habitat, an equivalent amount of new hedgerow will be planted.

A5.5 -5.2.3.4.10 Fencing

The Consented UWF Substation will be fenced according to ESB regulation. There is no requirement for fencing of turbine areas as access can only be gained to the towers through a steel door which is locked at all times. There will be some agricultural fencing erected on the UWF site where required by the landowners and any existing fencing along farm boundaries will be restored.

During construction, buffer zones will be fenced off to protect environmental features, such as Recorded Monuments and watercourses. Sediment ponds will also require perimeter fencing and signage to ensure that there are no health and safety risks.

A5.5 -5.2.3.4.11 Storage of Excavated Material

Approximately 28,000m^3 of topsoil and peat will be excavated as part of the construction of UWF.

Temporary engineered deposition areas will be designated and designed to hold temporary stockpiles which will be located away from drains and watercourses. Soil will be formed into bunds along the access roads and around the crane hardstand areas. These bunds will be constructed to a maximum height of 1.0m with a width at base of 3.0m and side slopes of 2:1. Bunds and stockpiles at risk of erosion, will be protected by silt trapping apparatus such as a geo-textile silt fences to prevent contaminated runoff.

A5.5 - 5.2.4 Environmental Project Measures which are part of the Consented UWF

The consented Upperchurch Windfarm includes a number of mitigation and management measures which will prevent likely significant effects occur to the receiving environment. These measures will be implemented through two separate Environmental Management Plans for the UWF; one for the construction stage and one for the early operational stage. A copy of these Plans was submitted with the 2013 RFI documents.

The Construction Environmental Management Plan will include:

- Surface Water Management Plan
- Ecological Management Plan
- Waste Management Plan
- Traffic Management Plan
- Construction Phase Environmental Monitoring Schedule
- Environmental Management Procedures (EMP) for:
    - Site Environmental Training and Awareness Procedure
    - Environmental Emergency Response Plan
    - Wheel Wash and Dewatering Procedure
    - Concrete Control Procedure
    - Fuel and Oil Management Plan
    - Surface Water management Plan
    - Traffic Management Plan
    - Protection of Archaeological and Cultural Heritage
    - Management of Excavation and Spoil
    - Management of Borrow Pits
    - Waste Management Plan
    - Air, Dust and Noise Management Plan
    - Site Reinstatement Procedure (post construction)
    - Monitoring and Auditing Procedure
    - Environmental Accidents, Incidents and Corrective Actions Procedure
    - Environmental Complaints Procedure
    - Environmental Monitoring Committee Procedure

The Early Operational Phase Environmental Management Plan will include:

- Ecological Management (Post Construction)
- Operation Phase Environmental Monitoring Schedule
- Environmental Management Procedures (EMP) for:
    - UWF-EMP-OP-1: Monitoring and Auditing Procedure
    - UWF-EMP-OP-2: Site Reinstatement Procedure (post construction)
    - UWF-EMP-OP-3: Procedure for Ecological Management (Post Construction)

The following planning conditions, which formed part of the 2014 Grant of Permission will be included, as relevant, in the Environmental Management Plans:

- Condition-1: The development shall be carried out and completed in accordance with the plans and particulars lodged with the application.
- Condition-2: All environmental mitigation measures set out in the Environmental Impact Statement, Natura Impact Statement and associated documentation shall be implemented in full.
- Condition-6: Prior to commencement of construction, details of the phasing of the construction works shall be agreed with the National Parks and Wildlife Service.
- Condition-10: The construction works shall be carried out in accordance with construction details submitted to the planning authority, including the Construction Management Plan.
- Condition-11: Wind Turbine noise arising from the development shall not exceed stated levels.
- Condition-12: Wind Turbine shadow flicker arising from the development shall not exceed stated levels.
- Condition-13: In the event that the development causes interference with telecommunications signals, effective measures shall be introduced to minimise interference.
- Condition-15: The management of drainage and surface water during the construction stage shall be in accordance with the details submitted in the Construction Management Plan, the Ecological Management Plan and the Environmental Management Plan. Furthermore revised drawings shall be submitted to the planning authority prior to commencement showing compliance with condition 15 regarding fuel storage, designated refuelling areas, wheel wash areas and concrete wash areas.
- Condition-16: There shall be no new provision for discharge of foul effluent on site without a prior grant of planning permission.
- Condition-17: Prior to construction between mid-March and mid-August, a survey for breeding hen harriers shall be carried out. Taking account of the results of this survey, no construction works shall be carried out within the above period within 500m of a pre nesting breeding site, except with the written approval of the National Parks and Wildlife Service.
- Condition-18: The Ecological Management Plan submitted shall be implemented in full. A timescale of enhancement of foraging areas, rush management, hedgerows enclosures and trees and land management shall be agreed with the planning authority following consultation with the National Parks and Wildlife Service prior to commencement. A programme of ongoing surveys and monitoring in years 2 and 3 after commencement of the operation of the turbines shall be submitted and agreed in writing with the planning authority following consultation with the National Parks and Wildlife Service prior to commencement.
- Condition-19: Details as outlined in the Ecological Management Plan shall be implemented. A timescale for implementation shall be submitted and agreed in writing with the planning authority following consultation with the National Parks and Wildlife Service prior to commencement.
- Condition-20: The developer shall facilitate the archaeological appraisal of the site and shall provide for the preservation, recording and protection of archaeological materials or features. This will allow for an onsite archaeologist, in consultation with the National Monuments Service and the National Museum of Ireland, to monitor groundworks and stop works in the event of any archaeological features or objects being uncovered during excavation works, and will ensure that any features or objects uncovered will be correctly recorded and/or preserved, in consultation with the National Monuments Service and the National Museum of Ireland.

- Condition-21: Mitigations measures submitted for the protection of water quality shall be implemented in full and according to best practice guidelines. The works shall be supervised as set out in the Construction Management Plan. In the event of a water pollution incident or damage the relevant authorities shall be immediately notified and works cease until authorized to continue. A programme of hydrographic monitoring shall be carried out over a period commencing pre-construction and concluding in year 3 of the operational phase of the development.
- Condition-23: The developer shall lodge a cash deposit/bond to secure the reinstatement of public roads that may be damaged by the transport of materials to the site.

A5.5 - 5.3 Life Cycle Stages of Upperchurch Windfarm

A5.5 - 5.3.1 Construction Stage of Upperchurch Windfarm

A5.5 -5.3.1.1 Duration & Timing

The construction timetable is detailed in Table 1 below;

Table 1: Duration and timing of the construction of the Upperchurch Windfarm

Activities	Duration	Timing of Activities
• Civil works • Delivery and erection of wind turbines • Electrical works • Commissioning of the electrical works.	6 months	Projected Start Date: 2018/2019
• Electrical Works 1. (carried out in conjunction with the civil works)	4 months	
• Turbine Erection and commissioning 2. (turbines are normally installed when the majority of the civil works are completed)	16 weeks	

A5.5 -5.3.1.1.1 Construction Hours of Work

Normal construction times will be 07.00 to 19.00hrs Monday to Friday and 08.00 – 16.30hrs on Saturdays.

A5.5 -5.3.1.1.2 Scheduling of Works

To protect residential amenity, surface water quality and biodiversity, the following timing or scheduling of works will be implemented according to planning conditions No. 6 and No. 17 per;

Condition No. 6: Prior to commencement of construction, details of the phasing of the construction works shall be agreed in writing with the planning authority, following consultation with the National Parks and Wildlife Service. **Reason**: In the interest of the protection of the environment.

Condition No. 17: Prior to the carrying out of any construction works between mid-March and mid-August, a survey for breeding hen harriers shall be carried out by a competent, experienced ornithologist. The survey will cover the area within 500 metres of the works to be carried out during the above period. It will be the responsibility of the ornithologist to ensure that the survey methodology is sufficient to ensure that a hen harrier breeding site is not overlooked. Taking into account the results of this survey, no construction works shall be carried out within the above period within 500 metres of a pre nesting breeding site and/or nest, except with the written approval of the National Parks and Wildlife Service. **Reason:** In the interest of the protection of the environment and of the habitat of the hen harrier species.

A5.5 -5.3.1.2 Construction Personnel

During the construction stage, c.277 persons will be engaged in the civil, electrical, project management, legal and financial services, material supply and component deliveries for UWF, approximately 100 people will work on-site during construction.

A5.5 -5.3.1.2.1 Construction Personnel Welfare Facilities

Welfare facilities will be available at Site Compound No. 1 (adjacent to Site Entrance No. 1) and Site Compound No. 2 (in the centre of the site).

A5.5 -5.3.1.3 Construction Stage Activities

The Construction stage of the windfarm will include the following activities

- Clearance and construction of hard-core area for temporary compound and mobilisation of site offices including bunded area for fuel and diesel tanks.
- Construction of new access roads and hardstandings including installation of drainage per the Surface Water Management Plan.
- Installation of meteorological mast.
- Excavation of the turbine bases and storage of soil locally for backfilling and re-use.
- Place blinding concrete to turbine bases. Fix reinforcing steel and anchorage system for turbine tower section. Construct shuttering and fix any ducts to be cast in. Pour and cure concrete for turbine bases. Excavate cable trenches; lay cables and backfill.
- Erect towers, nacelles and blades.
- Complete earthings to towers and complete backfilling to foundations.
- Construction of substation compound, install the electrical and telecom plant, test and commission the plant.
- Provide any gates, landscaping and signage and complete any site works outstanding.
- Reinstate the site including removal of the two temporary compounds; reinstatement and landscaping of the two temporary compound hardstands; reinstatement of road verges (use of soil); reinstatement of any temporary construction hardstands; reinstatement of the site borrow pits and; replacement and renewal of hedgerows.
- Provision of the as-constructed tip heights and co-ordinates of the turbines and wind monitoring mast to the planning authority and the Irish Aviation Authority.

A5.5 -5.3.1.4 Use of Machinery and Equipment

The machinery, equipment and tools to be used during construction are listed on Table 2.

Table 2: Construction Machinery, equipment and tools

Construction Machinery	Equipment and Tools
30-50T Excavators; Low ground pressure excavators (Bogmaster); Mobile cranes for construction; Cranes (1 main, 1 assist) Erection 120t to 800t; Dump trucks; Tractors and trailers; 12t Rollers; Crushers; Screener;	Rebar/shuttering/ precast units/concrete pipe/box culverts Double contained fuel bowsers; Diesel powered generators; and Water bowsers Hand tools Silt traps, silt fences Spill Kits Fencing Materials – post and wire

A5.5 -5.3.1.5 Use of Hydrocarbons

The plant and equipment that will be used during the construction stage will be run on hydrocarbons. Mobile equipment will require regular refuelling from a fuelling station which will be located in a designated impermeable bunded area, drained through an oil interceptor at Site Compound No.1 (adjacent to Site Entrance No. 1).

A5.5 -5.3.1.6 Other Facilities - Fuel Storage

According to **Planning Condition No. 15**: The management of drainage and surface water during the construction stage of the development shall be in accordance with the details submitted in the Construction Management Plan, the Ecological Management Plan and Environmental Management Plan.

Furthermore:

(a) all oils and fuels shall be stored in an area bunded to 110% of the total volume of stored oils and fuels,

(b) Re-fuelling or machine servicing shall take place only within designated impermeable bunded areas, which shall be drained through an oil interceptor,

(c) a wheel wash shall be provided within the site, near the entrance to the public road, and

(d) an appropriately sized facility shall be provided on site for concrete washings.

Revised drawings showing compliance with these requirements shall be submitted to, and agreed in writing with, the planning authority prior to commencement of development.

Reason: In the interest of maintaining water quality.

Site Compound No. 1 will contain all the facilities listed from (a) to (d) above. Hydrocarbon use and storage during construction will be managed under a Fuel and Oil Management Plan.

A5.5 -5.3.1.7 Imported Construction Materials

The materials identified in Table 3 will be imported onto UWF site.

Table 3: Quantities, type and source of construction materials

Materials	Quantity	Likely Source of Materials
Aggregate (crushed stone)	4,010 No. loads.	Most expected to be won on-site with some capping stone grades imported from the local quarry at Shanballyedmond, Rear Cross
Reinforcing Steel (rebar)	15 No. loads	Various Irish Suppliers
Concrete	950 No. loads	Roadstone Killough, Co Tipperary
General building materials	5 No. loads	Various Irish Suppliers
Electrical plant and Switchgear	14 No. loads	EU Various Suppliers
Turbine towers	66 No. loads	Via Foynes Port
Turbine Nacelles	44 No. loads	Via Foynes Port
Turbine Blades	66 No. loads	Via Foynes Port
Generators, gearboxes and transformers	22 No. HGV loads	Via Foynes Port

Relevant Figures (contained at the end of this Appendix 5.5)

Figure UWF 6: Turbine Component Haul Route

A5.5 -5.3.1.8 Construction Stage: Traffic Management

The Appointed Contractor will prepare a detailed Traffic Management Plan prior to the works commencing. This Plan will be finalised in agreement with the Gardaí and the Local Authority.

A5.5 -5.3.1.8.1 Construction Stage: Material and Delivery Traffic Management

Aggregate and Concrete

HGV loads of aggregate, concrete and public road dressing will be delivered directly to construction works areas. These HGVs will travel to the works areas using both the regional and local road networks, on specified haul routes. These haul routes have been agreed with the Area Roads Engineer.

Other Construction Material

Other materials, such as ducting, geotextile and other construction materials, will be transported to the Upperchurch Windfarm Site Compound No.1. From this point the construction vehicles will access the full site using newly built windfarm roadways, upgraded farm and forestry tracks and site entrances from the Local Road network within the site area.

A5.5 - 5.3.2 Operational Stage of Upperchurch Windfarm

A5.5 -5.3.2.1 Duration and Timing of Operational Stage

The duration and timing of the operational stage of the Upperchurch Windfarm, as per Condition 4 of the Grant of Permission (PL.22.243040) is set out in Table 4;

Table 4: Duration of Operation Stage

Description	Duration & Timing
Operating Upperchurch Windfarm	25 years from the date of commissioning of the wind turbines (Condition 4)

A5.5 -5.3.2.2 Operational Personnel

There will be 8 permanent jobs created in operation and maintenance activities, legal, electricity sales and asset management relating to UWF. Four maintenance personnel will be employed at the windfarm site to service, maintain and monitor the turbines for operational safety and performance.

A5.5 -5.3.2.2.1 Welfare Facilities

Following construction, Site Compound No. 2 will be retained for use by the maintenance personnel for the operational phase of the Upperchurch Windfarm. The unoccupied house will be converted to an office space, canteen and toilet facility for the maintenance personnel. This house already has water (ground water from a well) and sanitary facilities (septic tank).

A5.5 -5.3.2.3 Operational Activities

UWF will be maintained in good working order throughout the operational stage. The operational stage will involve:

- Daily remote monitoring of wind turbine performance by the owner's operator,
- Visits by maintenance crews to carry out scheduled and unscheduled maintenance and repairs,
- Occasional replacement of major components,
- Monitoring and surveying of sensitive aspects of the local environment, and the establishment of the Upperchurch Hen Harrier Scheme, as set out in Appendix 5.6: Description of the UWF Other Activities.

A5.5 -5.3.2.4 Use of Machinery and Equipment

The machinery and equipment listed in Table 5 will be used during the operational stage.

Table 5: Use of Machinery and equipment during the Operation Phase

Machinery	Equipment	Materials
• Light 4-wheel drive vehicle • Cranes and hoists for major component replacement and repairs	• Specialist electrical and mechanical tools • Testing equipment	• Replacement turbine parts • Replacement electrical or communication parts

A5.5 -5.3.2.5 Use of Hydrocarbons

A small volume of hydrocarbons will be used on the windfarm during operational activities and is limited to the diesel or petrol fuel used by the site vehicles and machinery and any mobile generators used. Mechanical oils and grease will be used during maintenance of the turbine and electrical equipment. These will be brought on-site and receptacles removed by the O&M personnel.

A5.5 -5.3.2.6 Welfare & Other Facilities

Site Compound No. 2 with a car parking area, parts storage sheds and a refurbished house (which includes already existing provisions for sanitary facilities) will be retained for use as the Upperchurch Windfarm Site Office during the operational phase. There will be no requirement for fuel storage during the operational stage, with any fuels being brought onto site as required.

A5.5 - 5.3.3 Changes to the Upperchurch Windfarm

In the Grant of Permission (PL.22.243040), Condition 4 outlines the duration of operation of the windfarm, and potential for decommissioning at the end of the operational period, and Condition 22 outlines the requirements for decommissioning of the Upperchurch Windfarm:

Condition 4: The permission shall be for a period of 25 years from the date of the commissioning of the wind turbines. The wind turbines and related ancillary structures shall then be decommissioned and removed unless, prior to the end of the period, planning permission shall have been granted for their retention for a further period.

Condition 22: On full or partial decommissioning of the wind farm, or if the wind farm ceases operation for a period of more than one year, the wind monitoring mast, the turbines concerned and all decommissioned structures and equipment shall be removed, and foundations removed or covered with soil to facilitate re-vegetation, all to be completed to the written satisfaction of the planning authority within three months of decommissioning or cessation of operation.

A5.5 -5.3.3.1 Decommissioning Activities (if required)

Decommissioning will involve the removal of all the turbines, removal of the above ground turbine foundation elements and covering the hardstanding areas with topsoil and reseeding. Any roads or hardstands that are not required by the landowner for farm use, can be covered with topsoil and reseeded also. There is a significant amount of soil in the roadside bunds, excavated for road construction and drainage. This topsoil will be used to infill associated roadside drainage for elements being removed and the remaining soil will be used for hardstands and foundations. The topsoil will be replaced to re-establish the original depth and to match the original surface contours where possible. To minimise the environmental impact, the access roads of UWF were designed to use and upgrade suitable existing agricultural tracks. At the decommissioning stage the access roads can be removed, however it is expected that they will be retained in situ as an integral part of the infrastructure for use by the landowner as farm tracks. If it is decided at the time of decommissioning that tracks are to be removed, the underlying material will be treated to relieve compaction and / or to promote re-vegetation. This may include the careful manipulation of the soil or building up ground levels with additional topsoil.

Cabling will be isolated and left in-situ underground. The substation compound includes an ESB control room and a windfarm owned control room. It is most likely that the substation will remain after the wind farm site is reinstated. Any equipment associated with the wind farm side of the substation will be electrically isolated and removed off site and disposed of appropriately. If at the decommission stage the planning authority requests the substation is screened, a stand of conifer trees can be planted around the substation.

The wind farm infrastructure is predominantly located in areas of improved agricultural grassland. Any reseeding of lands will be agreed with the landowner to ensure consistency with the surrounding land uses. In areas of felled forestry, acid and wet grass land, heath and bog, these areas will be allowed to naturally revegetate and be managed for nature conservation purposes. Monitoring of the reinstated areas will be undertaken following the completion of decommissioning works to confirm the successful reinstatement of the vegetation, the turbine foundation and hardstand areas and possibly the access tracks. A monitoring period, of two years, will allow for the observation of the reestablishment of the flora. This will ensure remedial action is taken as necessary, which may include further reseeding as required.

A5.5 - 5.4 Use of Natural Resources Emissions and Waste

A5.5 - 5.4.1 Use of Natural Resources

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

To facilitate the evaluation of the use of natural resources for the whole UWF project, the information on the Use of Resources for the Upperchurch Windfarm is presented in the same format as the Use of Natural Resources for UWF Grid Connection, UWF Related Works, UWF Replacement Forestry and UWF Other Activities.

A5.5 -5.4.1.1 Use of Resources: Land

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

In total Upperchurch Windfarm works will take place on 56.3 hectares of land within construction works areas, as follows; 12.8ha of farm roads, 33.7ha of agricultural land, 9.8ha of forestry land. The use of the lands by the landowner will be controlled during construction for safety reasons.

Following construction, the lands within the construction works areas will be returned to the landowner for their own use with the exception of 6.4ha of lands at the hardstandings areas associated with the Consented UWF Turbines, the Consented UWF Substation and the meteorological masts, and the keyhole felled areas of forestry around the Consented UWF Turbines. Of these 6.4ha of lands; 2.6ha of agricultural lands and 3.5ha of forestry lands will change use to utility for the duration of the operation of the Upperchurch Windfarm; 0.3ha of agricultural land will permanently change use to utility at the Consented UWF Substation. Of the lands returned to use by the landowner; 2.3ha of these lands will change use from agricultural lands (1.5ha) or forestry lands (0.8ha) to access road.

6.1ha of lands associated with the hardstandings areas at the Consented UWF Turbines, the meteorological masts, and the keyhole felled areas of forestry around the Consented UWF Turbines will be returned to agricultural use (2.6ha) and forestry use (3.5ha).

A5.5 -5.4.1.2 Use of Resources: Biodiversity

A5.5 -5.4.1.2.1 Field Boundaries – Earthen Banks/Hedgerow/Trees

In total 980m of hedgerow/field boundaries will be removed to facilitate the construction of the UWF, of which 360m of hedgerow will be removed from works areas for the protection of bats. In order to provide alternative bat and bird habitat and **equivalent length of new hedgerow** will be planted, with native species, to mitigate this loss of habitat. Existing hedgerows in poor condition will be planted with native species to increase their ecological value.

A5.5 -5.4.1.2.2 Forestry Felling

In total 4.4 hectares of coniferous forestry will be permanently felled, under a felling license from the Forest Service. Forestry felling will be carried out prior to the construction works beginning and outside of the bird breeding season. No further forestry felling will be required during the operational stage.

A5.5 -5.4.1.3 Use of Resources: Water

A5.5 -5.4.1.3.1 Potable Water and Non-Potable Water

Bottled drinking water will be imported and stored in the canteen at Site Compound No.1. At Site Compound No.2, drinking water will be drawn from the existing well associated with the old house.

Non-potable water for hand washing or toilet flushing will be imported to Site Compound No.1 from a local municipal supply and stored in water holding tanks for the toilet and wash facilities. Non-potable water will be sourced from the existing well associated with the old house at Site Compound No.2.

Operational stage water requirements are limited to potable and non-potable water, both of which will be available at the Upperchurch Windfarm Site Office at Site Compound No.2, which is an existing dwelling which will be refurbished to accommodate the windfarm worker's welfare facilities. The decommissioning stage water requirements will be similar to the Operational Stage and will be provided at the Upperchurch Windfarm Site Office.

A5.5 -5.4.1.3.2 Dewatering of Excavations

It is likely that groundwater will need to be pumped from turbine excavations, mostly during very wet weather. De-watering, if required, will be carried out using mobile diesel generator water pumps. Water will be settled in a settlement pond and silt trap, before being released to the surrounding downslope vegetation. Dewatering will only be carried out at a flow rate that is within the capacity of the sediment pond.

A5.5 -5.4.1.4 Use of Resources: Soils

A5.5 -5.4.1.4.1 Excavated Soils

Construction of UWF will result in the removal of soil, subsoil, peat and rock in parts of the site in order to facilitate the construction of access roads, crane hard standings, substation compound and turbine bases. Approximately c.25,500m^3 of topsoil, c.79,600m^3 of subsoil and c.2,900m^3 of peat will be excavated from the works areas. It is estimated that up to 43,000m^3 of rock will be excavated from the on-site borrow pits to construct the Upperchurch Windfarm Roads and hardstanding areas.

A5.5 -5.4.1.4.2 Permanent Storage

It is estimated that up to 52,000m^3 of soils will be permanently stored in bunds along Consented UWF Roads and at Consented UWF Turbines hardstanding areas and around the met mast areas.

A5.5 -5.4.1.4.3 Temporary Storage

The remaining excavated material will be temporarily stored, within the construction works area. Topsoil, subsoil and rock will be stored separately, with as much surface vegetation left intact on the topsoil layer as possible. The excavated material will be used to backfill, reinstate and landscape the works areas.

A5.5 -5.4.1.4.4 Imported Rock

If additional rock to that won on the Upperchurch Windfarm site (higher grade for road capping for example) then this will be imported from the local Rear Cross Quarry.

A5.5 -5.4.1.4.5 Operational/Decommissioning Stage

No excavations of soils will be required during the routine operation of the Upperchurch Windfarm or during the decommissioning stage. The foundations will be left in situ to avoid disturbance of the lands. The soils stored in the bunds alongside Consented UWF Roads and at Consented UWF Turbines hardstands will be used to reinstate the turbine hardstanding areas, met mast areas.

A5.5 - 5.4.2 Upperchurch Windfarm: Emissions

The emissions associated with the Upperchurch Windfarm are described below.

To facilitate the evaluation of emissions associated with the whole UWF project, the information on Emissions for UWF is presented in the same format as the Emissions associated with UWF Grid Connection, UWF Related Works, UWF Replacement Forestry and UWF Other Activities.

A5.5 -5.4.2.1 Emissions

A5.5 -5.4.2.1.1 Dust

Dust may arise during the construction stage, due to the transportation of aggregate to the Upperchurch Windfarm site, the movement of excavated material within the site and from stored excavated materials at the works areas, particularly during dry and windy weather. The potential for dust emissions and the effect on Air Quality has already been assessed by the An Board Pleanála Inspector. In the Inspector's Report 2014 no significant impacts to Air quality were identified and any dust impacts considered 'temporary in nature and confined to the immediate area'.

Excavations on UWF, and therefore dust emissions, during the operation or decommissioning stages will be negligible and will be limited to the roads and turbine hardstanding areas.

A5.5 -5.4.2.1.2 Vehicle Exhausts

During construction**, o**perating machinery used during the construction stage will be run on hydrocarbons and will emit nitrogen dioxide and other greenhouse gas emissions during their operation. The potential for fugitive emissions from site machinery and increased traffic has already been assessed by the An Board Pleanála Inspector. In the Inspector's Report 2014 no significant impacts to Air quality are identified and any vehicle emission impacts are considered 'temporary in nature and confined to the immediate area'.

During operation, the presence of vehicles on UWF, and therefore nitrogen dioxide and other greenhouse gas emissions, during operation is negligible with a light four wheel drive vehicle used on site by maintenance crews, and occasionally the use of cranes and HGV's delivering replacement parts.

A5.5 -5.4.2.1.3 Noise

During construction, heavy machinery and vehicles which will be used at works areas during the construction stage will emit noise during their operation, noise will also be emitted from certain construction activities such as excavation or rock breaking or by mobile generators which may be used at work areas. The potential for noise emissions effects during the construction stage has already been assessed by the An Board Pleanála Inspector. The Inspector's Report 2014 states 'exceedance of permitted levels will occur during the construction phase … but I note that there is no house within 200m of the construction works'.

During operation, the Consented UWF Turbines will emit noise during their operation. An evaluation of the likely noise impact of the Consented UWF Turbines has already been carried out by a competent expert, in accordance with methodology described in ETSU-R-97, Assessment and Rating of Noise from Wind Farms. The potential for noise emissions effects during the operational stage has already been assessed by the An Board Pleanála Inspector. The Inspector's Report 2014 states that 'the development will impact in relation to noise as there will be a rise in noise levels from the current ambient noise levels associated with a rural area for many of the houses and sensitive receptors in the general and study area. The level of increase will however be within permitted levels for the most part even in a worst case scenario.'

During decommissioning: Very low levels from dismantling activities and reinstatement works, no effects expected to local residents due to the low levels combined with the distances to nearest residences.

A5.5 -5.4.2.1.4 Vibration

Construction works, including excavations and the use of heavy machinery will cause low levels of ground vibration. The potential for vibration effects has already been appraised in the Revised Vibration Impact Assessment, 2013 EIS, where it state: 'Once operational there will be no significant sources of vibration' from UWF.

Once operational there will be no significant sources of vibration from UWF. There will be no sources of vibration during the decommissioning works.

A5.5 -5.4.2.1.5 Light

Construction activities will only be conducted during daylight hours. Therefore no lights are required at construction works areas at the Upperchurch Windfarm.

During operation, the turbines will be fitted with red coloured intermittent lighting. The potential for disturbance and collision effects on bats has already been evaluated in the EIS 2013, and considered 'not significant'.

All decommissioning activities will take place during daylight hours, no requirement for lights.

A5.5 -5.4.2.1.6 Electromagnetic Radiation:

No emissions of electromagnetic radiation will occur during the construction or decommissioning stages.

Operational Stage; Low frequency electrical and magnetic fields (EMF) will be present anywhere electricity is generated, distributed or used and therefore these fields are a common occurrence in everyday life. The operational Consented UWF Turbines will be a source of very low frequency (50Hz) electromagnetic fields. Electromagnetic radiation emissions will not be at levels to cause significant effects at the turbine locations, and no effects will occur at local residences.

A5.5 - 5.4.3 Upperchurch Windfarm: Waste

The wastes which will arise at UWF are described below. The greatest potential for waste occurs during the Construction stage of the windfarm. Wastes which result from the construction, operation and decommissioning of UWF will be managed under a Waste Management Plan.

A5.5 -5.4.3.1 Waste Water

During construction, self-contained toilets, with integrated waste water storage tanks, will be provided for construction workers at Site Compound No.1, Waste from toilets will be taken from site on a regular basis by approved contractors and disposed of in an authorised facility in accordance with best practice. At Site Compound No 2. an existing septic tank will be used to treat waste water at Site Compound No.2. .

During operation, Toilet facilities for operational personnel will be provided at the permanent Site Office (identified as Site Compound No.2 during construction). Waste water will be treated in the existing septic tank associated with the building.

Toilet facilities for decommissioning personnel will be provided at UWF Site Office (identified as Site Compound No.2 during construction). Waste water will be treated in the existing septic tank associated with the building.

A5.5 -5.4.3.2 General Waste and Chemical Waste

Construction phase waste may consist of hard-core, stone, concrete, steel reinforcement, shuttering timber and unused oil and diesel. Wastes will be segregated and stored in the allocated tanks, bins, skips or areas at Site Compound No.1. The Appointed Contractor must finalise all storage areas and organise the relevant licensed contractors for the appropriate waste collections. The Appointed Contractor will ensure all permits and licences are in place and maintain relevant copies in the site office.

Very small quantities of chemical waste may be generated during the construction stage, this waste is limited to solid waste oil, such as oily rags. Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling. The Appointed Contractor will ensure all permits and licences are in place and maintain relevant copies in the site office.

Wastes arising during the operating phase include but are not limited to lubricating oils, cooling oils and packaging from spare parts. The containment and disposal of such oils will be carried out in a safe manner by an approved contractor. Such operations will be carried out in accordance with the Waste Management (Hazardous Waste) Regulations, 1998 (as amended). The remaining wastes will all be removed from UWF and reused, recycled or disposed of in an authorised facility in accordance with best practice.

Wastes arising during decommissioning will include packaging, turbine and transformer oils and some fiberglass. All waste generated during the decommissioning phase will be taken off the UWF site and disposed of appropriately.

A5.5 -5.4.3.3 Arisings

No arisings will occur, as the construction of UWF will not involve the excavation of the public road network.

A5.5 -5.4.3.4 Decommissioned Windfarm Components

The electrical components and the decommissioned turbines can be sold as second hand plant, because these components have a designed life in excess of the wind farm planning permission; i.e. greater than 25 years. If they are not sold as s/h working plant then all steel and electrical plant can be recycled.

The blades are mainly made up of composite materials, which can be incinerated for electricity generation/direct heat or disposed of in landfill. Production methods for the blades in modern turbines principally involves the use of epoxy composites. This method helps to reduce emissions from organic solvents, thus appreciably reducing impact on the environment at the production and disposal stage.

General and hydrocarbon wastes generated during the decommissioning phase will be taken off site and disposed of in an appropriately licenced facility.

Welfare facilities for decommissioning personnel will be available at the Windfarm Site Offices at formerly Construction Site Compound No. 2.

A5.5 - 5.5 The Vulnerability of UWF to Major Accidents and Natural Disasters

Major accidents or natural disasters which have the potential to affect the Upperchurch Windfarm are described hereunder. The vulnerability (exposure and resilience) of the UWF to major accidents and disasters and the risk of these accidents or disasters is classified according to the *Guide to Risk Assessment in Major Emergency Management* (DoEHLG, 2010).

A5.5 - 5.5.1 Vulnerability to Major Accidents

It is clear from the EIA Directive that 'major accident' mainly applies to notified Seveso establishments which operate under the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015, where Dangerous Substances are identified in Schedule 1.

The consented Upperchurch Windfarm **is not vulnerable to Major Accidents**, due to the minimal volumes of the Dangerous Substances which will be used, limited to small volumes of diesel fuel used by vehicles during the construction and operation of the windfarm, and small volumes of oils and grease used during turbine maintenance. Furthermore there are no Seveso sites in proximity to the UWF, the closest being Grassland Agro in Limerick and MSD (pharmaceutical) in Kilsheelan, near Clonmel, Co Tipperary.

A5.5 - 5.5.2 Vulnerability to Natural Disasters (High Winds, Land slippage, Flooding)

Natural disasters which could potentially affect the Upperchurch Windfarm include land slippage and flooding. The likelihood of these natural disasters occurring is discussed below, with likelihood of the natural disaster occurring rated according to the DoEHLG 2010 Guidelines. The risk classification tables are included in Appendix 2.2: EIAR Descriptive Terminology.

A5.5 -5.5.2.1 High Winds

In recent years, high wind events including hurricane force winds, have become more frequent in Ireland, and have resulted in major damage and loss of life. However, it is considered that the Upperchurch Windfarm is **not vulnerable to high wind events**, as the wind turbines which will be installed at the Upperchurch Windfarm will all be the highest specification turbine (IEC Class 1A turbines), and will easily tolerate hurricane force winds. Due to the design of the windfarm (Class 1A turbines), it is considered that windfarm the likelihood of an accident occurring due to high winds is **Extremely Unlikely**.

A5.5 -5.5.2.2 Land-Slippage

It is considered that the Upperchurch Windfarm is **not vulnerable to land slippage**. During site investigations for the 2013 EIS, geotechnical surveys undertaken at the windfarm site, all parts of the site were examined, no stress indicators were identified and there is no evidence of historical peat slides in the area. The conclusions of the 2013 EIS were that there is a very low risk of slippage or landslides on the Upperchurch Windfarm site because of the stable sub-surface ground conditions and the absence of any significant peat coverage. Furthermore, the windfarm infrastructure is not considered vulnerable to land slippage due to the construction of the infrastructure in competent ground. Therefore it is considered that the likelihood of land slippage disaster occurring on the windfarm site is **Extremely Unlikely**

A5.5 -5.5.2.3 Flooding

In recent years, high rainfall events and subsequent flooding have become more frequent in Ireland. Where complete the Catchment Flood Risk Assessment and Management (CFRAM)[1] OPW Flood Risk Assessment Maps are now the primary reference for flood risk planning in Ireland and supersede the Preliminary Flood Risk Assessment Maps (PFRA) maps. CFRAM mapping is not currently available for the area of the Upperchurch Windfarm site and therefore the PFRA maps have been examined and these show that all of the construction works areas and permanent infrastructure (roads, turbine hardstands, substation compound) are located in Flood Zone C (Low Risk) – where the probability of flooding is low (less than 0.1% or 1 in 1,000). Therefore it is considered that the likelihood of flooding disaster affecting the Upperchurch Windfarm site is **Unlikely.**

A5.5 - 5.5.3 Consequences of Natural Disasters Occurring

The consequence of the impact if the event occurs is described here.

Due to the low number of personnel working on-site at any one location, the consequence of any high wind, flooding or land slippage events, if they did occur, is considered to be **Limited**.

Due to the low number of people living or working locally, the consequence of any high wind, flooding or land slippage events, if they did occur, is also considered to be **Limited.**

The consequences to water quality due to land slippage or flooding could be **Serious** due to the widespread effects and extended duration of sedimentation effects in downstream watercourses.

A5.5 - 5.5.4 Overall Risk

When the likelihood and the consequence of a potential high wind, land slippage or flooding event occurring is applied to the risk matrix from the DoEHLG 2010 guidelines, a broad indication of the critical nature of each risk can be determined.

In relation to on-site personnel and other people in the locality, a high wind, land slippage or flooding event would be classed a 'normal emergency' - based on a likelihood rating of Extremely Unlikely and a consequence rating of Limited.

In relation to downstream water quality, due to the higher level of effect (Serious) on water quality a land slippage or flooding event could be a major emergency. According to the DoEHLG 2010 guidelines, both flooding and landslip events would be at the lowest extreme of 'major emergency'.

A5.5 -5.5.4.1 Mitigation Measures

The installation of the highest specification IEC Class 1A turbines at the Upperchurch Windfarm wite will ensure that high wind events do not cause turbine failure at the site.

No measures are required for land slippage risk. In relation to flooding, no instream works are required for the windfarm, with a clearspan bridge being constructed over the 1 no. stream onsite. In addition, flood

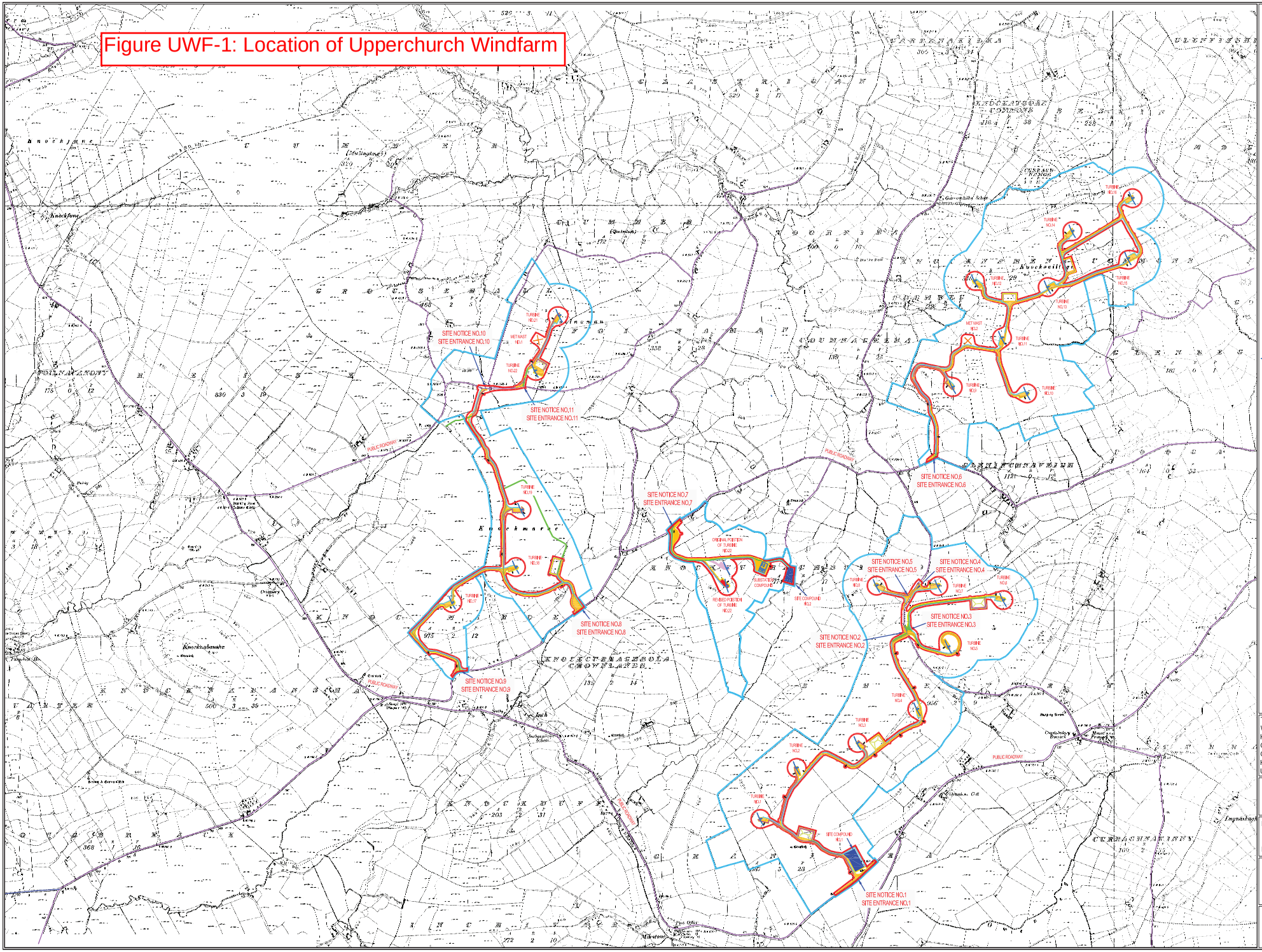
[1] *CFRAM is Catchment Flood Risk Assessment and Management. The national CFRAM programme commenced in Ireland in 2011, and is managed by the OPW. The CFRAM Programme is central to the medium to long-term strategy for the reduction and management of flood risk in Ireland.*

attenuation measures are built into the project through drainage system design, these measures will prevent any increase in discharge rates and associated flooding risk, downstream of the windfarm.

Should a disaster occur, unconnected to the project but in the locality – the above mitigation measures already designed into the project will ensure that the project will not make the consequences of the event worst. In addition the presence of the project will not increase the likelihood of such an event occurring.

A5.5 - 5.6 Figures and Mapping

Figure UWF-1: Location of Upperchurch Windfarm



N

LEGEND:

Public roadways shown in purple

Existing farm roadways in need of upgrading shown in green

Unchanged windfarm roadways shown in orange

Unchanged wind turbine location shown in blue and unchanged crane pad location shown in orange

Original layout and location of Turbine No.22, crane pad and approach road shown in pink

Revised layout and location of Turbine No.22, crane pad and approach road shown in red

Site Compounds shown in blue

Revised Site Boundary outlined in red

Revised Land Under Control of Applicant outlined in blue

Meteorological mast

TITLE:
Windfarm at Granlera / Shevry / Knockcurraghbola Commons / Knockmaroe / Grousehall / Cummer / Follnaman / Glenlinchnaveigh / Coumnageeha / Coumbeg / Knocknamena Commons / Glenbeg / Seskin, Upperchurch, Co.Tipperary

DRAWING: **SCALE: 1:10560**

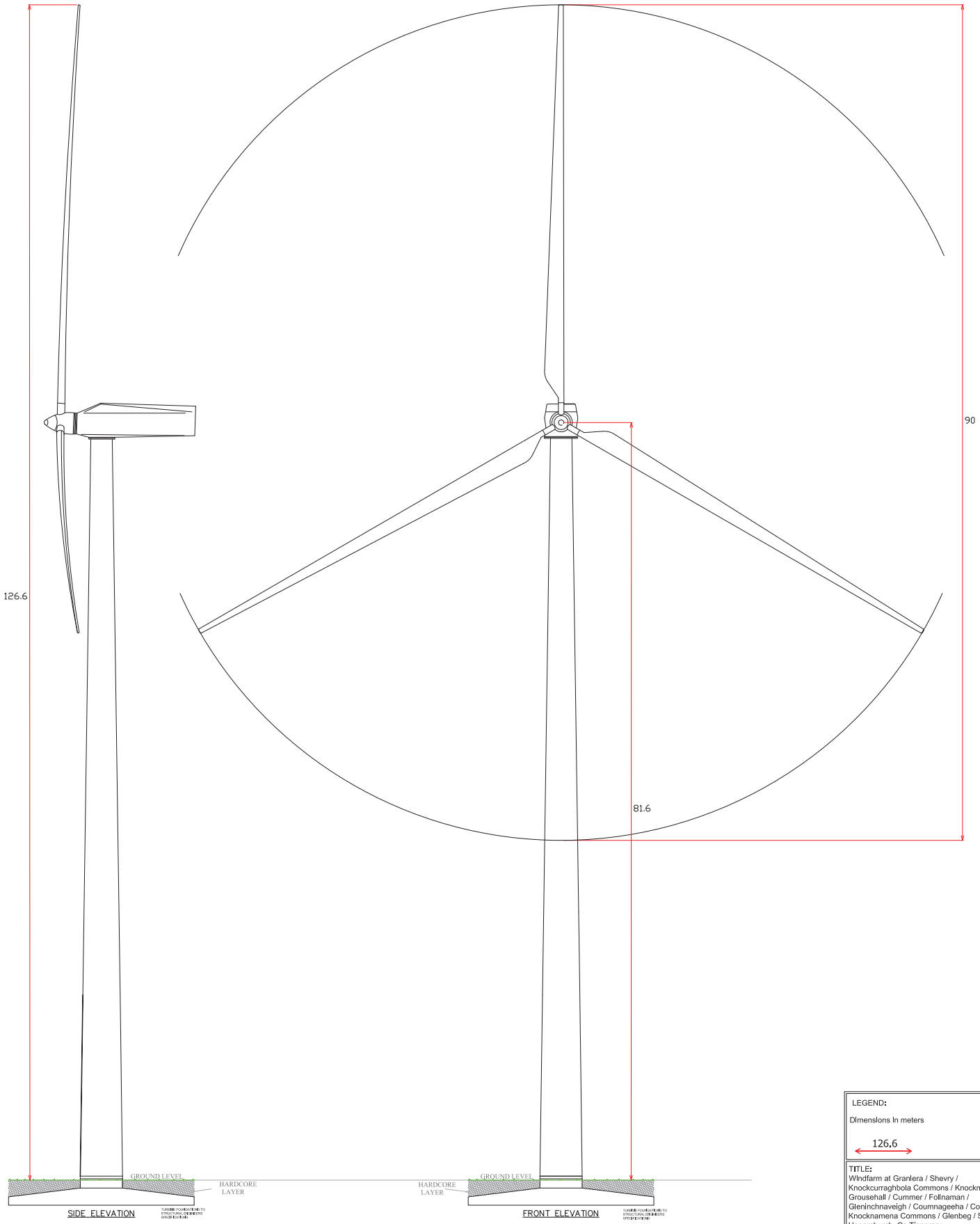
SITE LOCATION SHOWING REVISED LOCATION OF T22

DRAWING NUMBER:
UWF-PA1RFI-07

DATE: 24/11/2013

Drawn by:
Jack Brett
Ecopower Developments Ltd
Slon Road, Kilkenny
Telephone: 056 7750140

Figure UWF-2: Wind Turbine Elevation



LEGEND:

Dlmenslons ln meters

126.6

TITLE:
Wlndfarm at Granlera / Shevry / Knockcurraghbola Commons / Knockmaroe / Grousehall / Cummer / Follnaman / Gleninchnaveigh / Coumnageeha / Coumbeg / Knocknamena Commons / Glenbeg / Seskln, Upperchurch, Co.Tipperary

DRAWING:
WIND TURBINE ELEVATIONS

SCALE: 1:200

DRAWING NUMBER:
UWF-PA1-03

DATE: 19/12/12

Drawn by:
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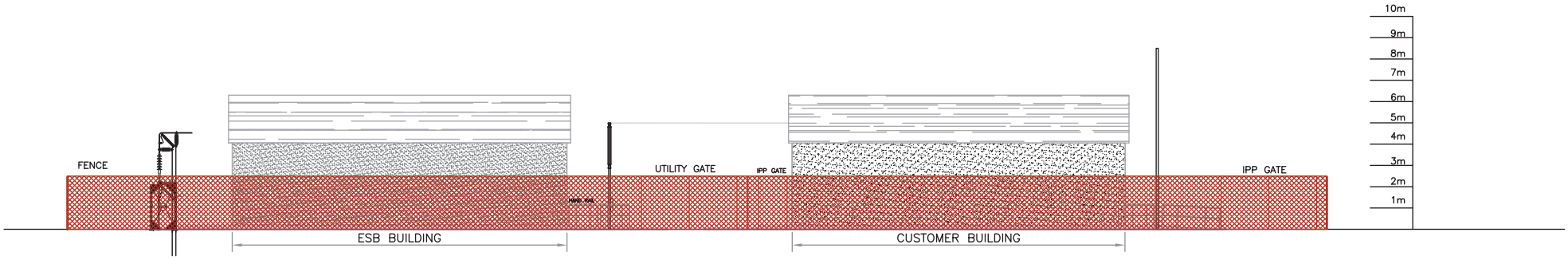
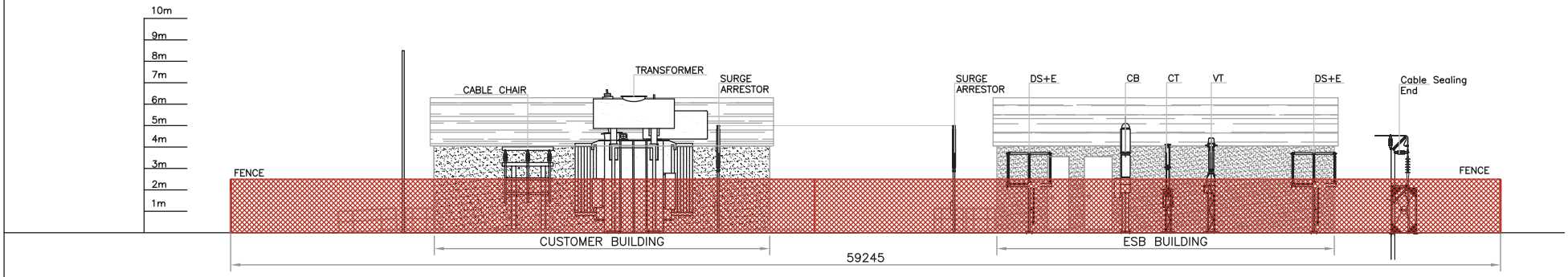
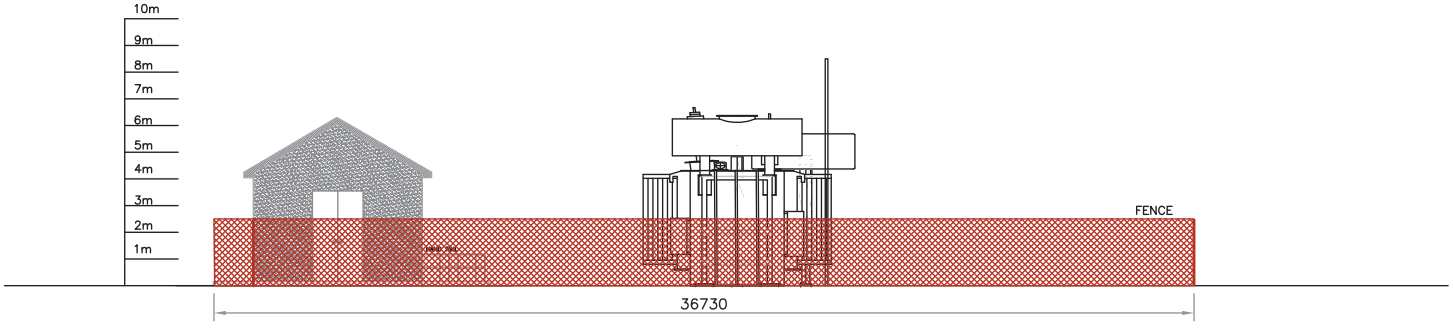


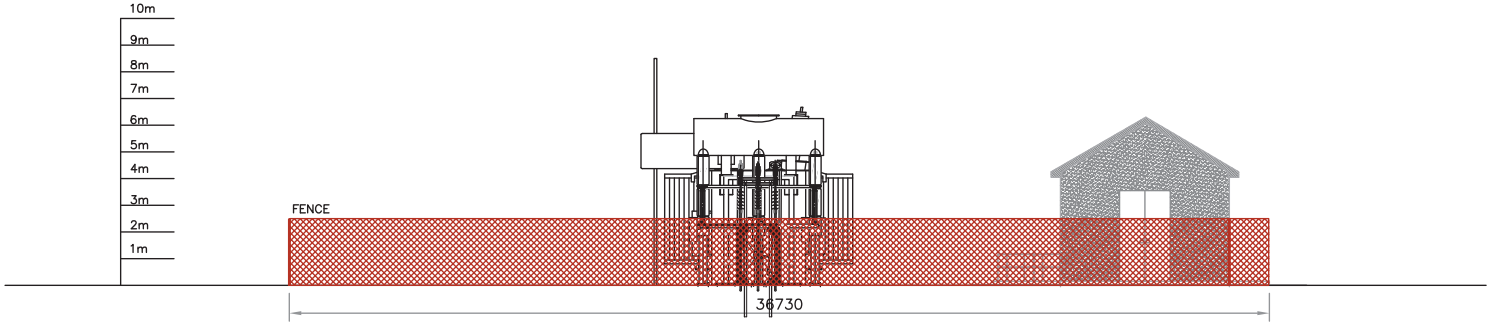
WEST ELEVATION



EAST ELEVATION



SOUTH ELEVATION



NORTH ELEVATION

Figure UWF-3: Electrical Substation Compound Elevation View

Dimensions are in millimeters

A	21.05.12	M.R.	P.K. FIRST ISSUE
REV	DATE	DRAWN BY	CHECKED BY / DETAILS

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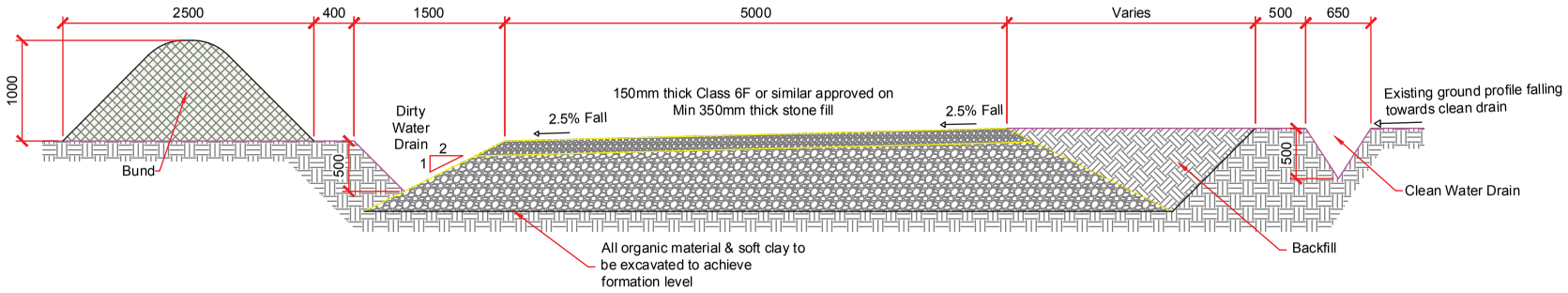
CLIENT

PROJECT
WINDFARM AT GRANIERA / SHEVRY / KNOCKCURRAGHBOLA COMMONS / KNOCKMAROE / GROUSEHALL / CUMMER / FOILNAMAN / GLENINCHNAVEIGH / COUMNAGEEHA / COUMBEG / KNOCKNAMENA COMMONS / GLENBEG / SESKIN, UPPERCHURCH, CO.TIPPERARY

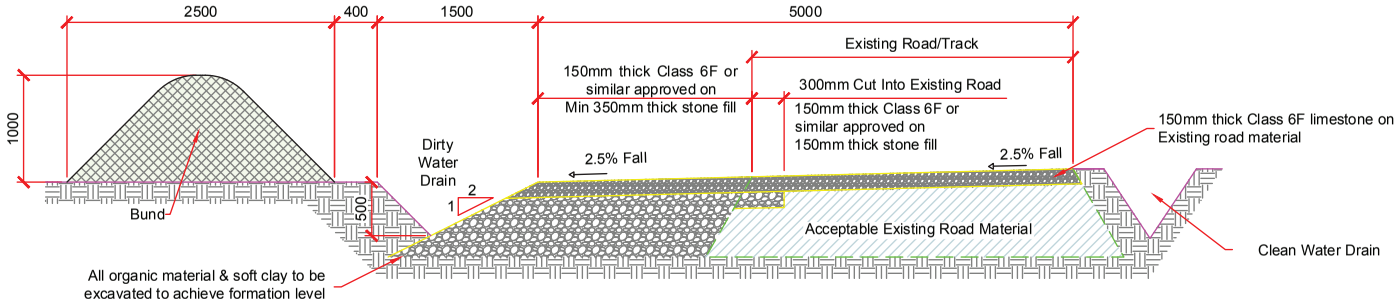
TITLE
ELECTRICAL SUBSTATION COMPOUND ELEVATION VIEW

SCALE: 1:100	STATUS:	
PAPER SIZE: A1	DRAWN BY: M.KRAS	CHECKED AND APPROVED: C.DONNELLY
PROJECT PHASE:	DATE: 21/05/2012	DATE: 21/05/2012
DRAWING NUMBER: CUNY d001.1.2		REVISION: A

FILE NAME



Typical Excavated Access Track Detail Scale 1:50



Typical Widening To Existing Access Track Detail Scale 1:50

Figure UWF-4: Proposed Internal Roads Details

Rev.	Date	Description	by	ch'd	app
A	13.06.12	Issued For Planning	PN	TB	JoL

Project: Upperchurch Wind Farm

Client: Ecopower Developments Ltd

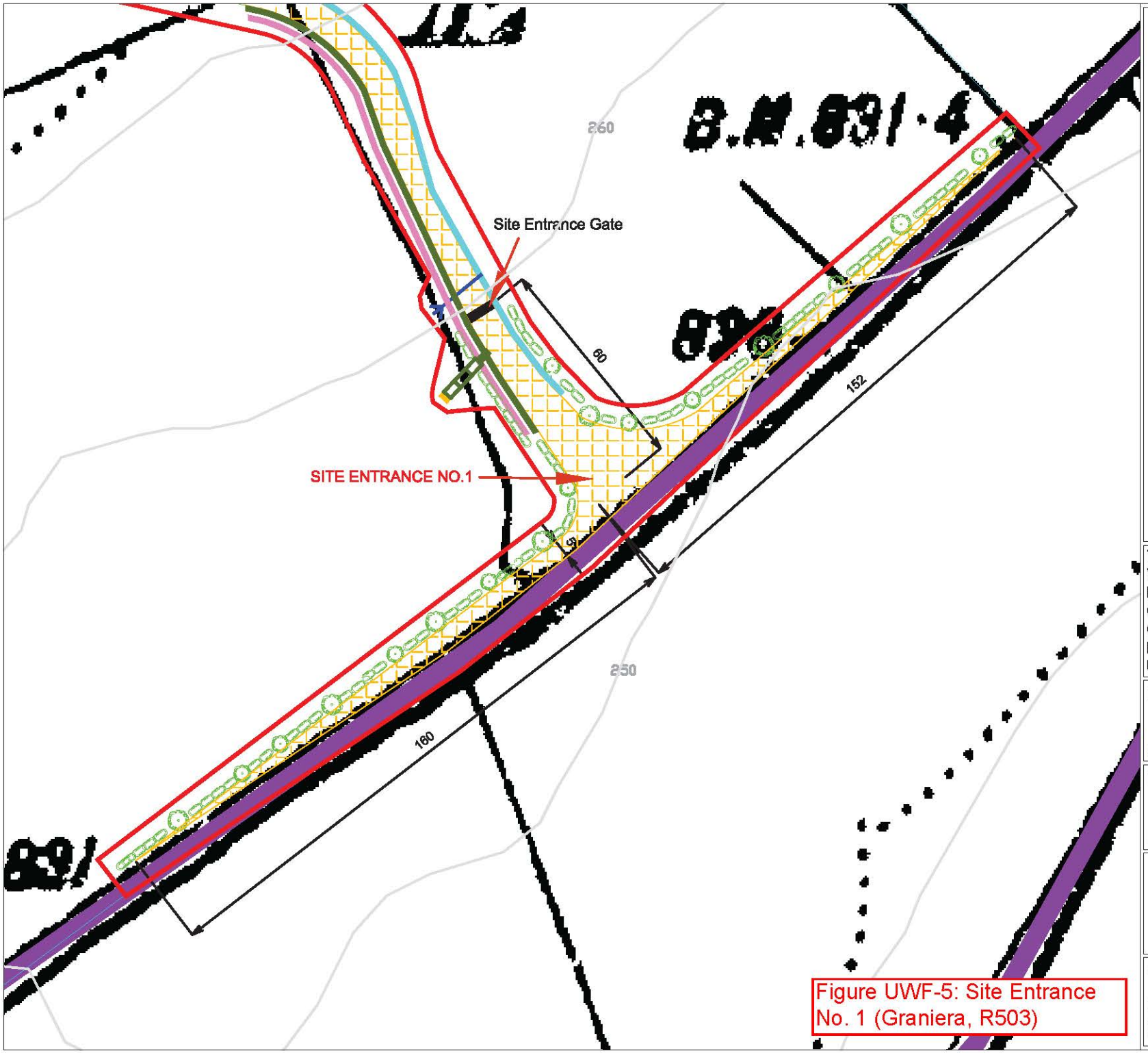
Title: Proposed Internal Road Details

Malachy Walsh and Partners
Consulting Engineers
Cork | Tralee | London | Limerick

Scales (A3)	1:50		
Drawn	PN	13.06.2012	
Checked	TB	13.06.2012	

Drg. No. 14708-5005

Rev. A



LEGEND:

Proposed new windfarm roadways hatched in orange

Site Boundary outlined in red

Public Roadway shown in purple

Dimensions in meters

55

Contour line with elevation in meters

180

Hedge and trees planted post construction phase

Clean water drain shown in light blue

Dirty water drain shown in dark green

Bund shown in pink

Clean water cross drain with outlet weir

Dirty water settling pond with outflow weir

N

TITLE:
Windfarm at Graniera / Shevry / Knockcurraghbola Commons / Knockmaroe / Grousehall / Cummer / Foilnaman / Gleninchnaveigh / Coumnageeha / Coumbeg / Knocknamena Commons / Glenbeg / Seskin, Upperchurch, Co.Tipperary

DRAWING:
Site Entrance No.1

SCALE: 1:1000

DRAWING NUMBER:
UWF-PA1-39

DATE: 19/12/2012

Drawn by:
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Telephone: 056 7750140

Figure UWF-5: Site Entrance No. 1 (Graniera, R503)

FIGURE 7-1: TURBINE COMPONENTS HAUL ROUTE

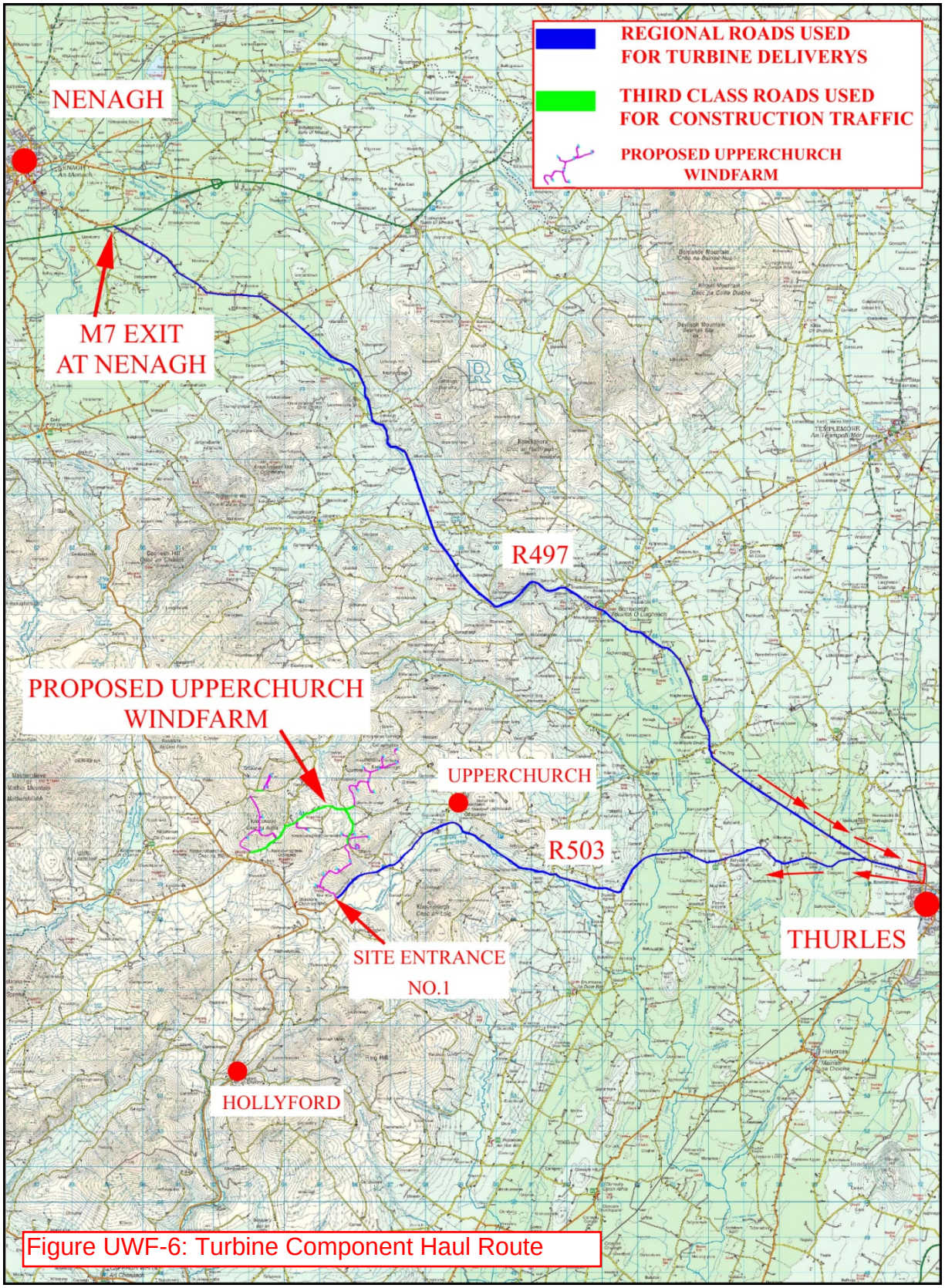

Figure UWF-6: Turbine Component Haul Route