KWF Grid Connection EIA Report

Volume C1: EIAR 2023 Non-Technical Summary

Non-Technical Summary of the EIAR 2023 Report for KWF (Knocknamona Windfarm) Grid Connection

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Glossary of Terms

Term	Definition
KWF Grid Connection (the proposed development)	Underground cabling, additional plant and apparatus in the existing Woodhouse Substation, the construction a new link road, the widening of an existing forestry road and the use of the existing entrance and windfarm road network at Woodhouse Windfarm.
Authorised Knocknamona Windfarm	Not Constructed - Knocknamona Windfarm authorised in 2016 (ABP-PL 93.244006); Amendments to Knocknamona Windfarm to provide for larger turbines authorised in September 2022 (ABP-309412-21) and Junction & Bend Widening Works to facilitate turbine blade access through the windfarm site entrance at Knocknaglogh Lower authorised in December 2022 (ABP-314219-22)
Whole Project	KWF Grid Connection with Authorised Knocknamona Windfarm

1 Introduction to the Non-Technical Summary for KWF Grid Connection

This is the **Non-Technical Summary** of the **Environmental Impact Assessment Report** (EIA Report) which has been submitted with the **Planning Application to Waterford City & County Council** for **KWF Grid Connection** (Knocknamona Windfarm Grid Connection).

The Non-Technical Summary has been compiled and written by Phil Kenealy, EIAR Coordinator. It is a summary document, written in non-technical language, avoiding technical terms, detailed data and scientific discussion. The aim is that the Non-Technical Summary is accessible and understandable to a member of the public, who does not have a background in the environment or in-depth knowledge of the development itself.

The Non-Technical Summary provides a description of the proposed development; the use of natural resources such as land, soil, water and nature during construction and operation; the emissions and wastes expected; a description of the different locations and designs that were examined for the development; a description of the environment surrounding the development; and a description of the likely effects during construction and operation of the development on population (local) and human health; biodiversity (nature); land and soils, water, air (air quality, noise, electromagnetic fields), climate (climate action), material assets (public roads and underground and overhead services), cultural heritage (archaeology and architectural heritage) and landscape.

1.1 The Applicant

Knocknamona Windfarm Limited is the Applicant and part of the Ecopower Group of wind energy development and windfarm operation companies, and has been involved in wind energy developments in Ireland since 1996. Visit the Ecopower Website at www.ecopower.ie Knocknamona Windfarm Limited is the promotor of KWF Grid Connection and Knocknamona Windfarm.

1.2 Introduction to the proposed Development

This application, KWF (Knocknamona Windfarm) Grid Connection is the grid connection element of the previously consented Knocknamona Windfarm.

Knocknamona Windfarm was consented by An Bord Pleanála in 2016 and comprises 8 No. wind turbines, overall height of up to 126.6m, electrical substation and ancillary works. Permission was then granted by An Bord Pleanála in 2022 to increase the height of the turbines to 155m. Permission was also granted in 2022 for some minor public road works near the windfarm site entrance in Knocknaglogh Lower. The windfarm is not yet constructed.

This 2023 application is the 2nd planning application for grid connection works for Knocknamona Windfarm. The previous KWF Grid Connection application was made in 2019 and although consented by Waterford City & County Council in 2019 and subsequently on appeal by An Bord Pleanála in 2021, the decision was quashed in 2023 on a technical matter of internal Bord Pleanála procedure.

Therefore, as a consequence Ecopower must now apply for the KWF Grid Connection anew. The proposed development KWF Grid Connection (2023) is the same as that proposed in 2019. A new EIA Report 2023 has been prepared in order to account for the passage of time in relation to legislation, guidelines, conditions on site and in the surrounding area and any other Environmental Impact Assessment related matters that ought to be considered under the EIA Directive at this point.

1.3 The Planning Application & Public Participation

This application is being made to Waterford City & County Council.

All residents within 500m of the development were contacted prior to the submission of the planning application. The wider public were informed before the application was lodged through public notices at the site entrances, in the local newspaper (Dungarvan Observer) and on the EIA Portal hosted by the Department of Housing, Planning and Local Government. The **EIA Portal ID for KWF Grid Connection is 2023153** and the web link is

https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1

Also, all of the planning application documents are available on the website of Waterford City and County Council. The web link is http://www.waterfordcouncil.ie/departments/planning/planning-enquiries/online-planning-enquiries.htm

The public can make their views known in writing to Waterford City & County Council, during the statutory consultation period of 5 weeks from the planning application validation date.

The planning application and accompanying documents can also be accessed and viewed through registering on the Local Government Ireland Portal https://planning.localgov.ie/ An online submission can be made through the Planning Portal.

The planning authority is obliged to take the public's views into account when deciding on the Application.

2 A Description of the Development

2.1 Location of KWF Grid Connection

The proposed development, KWF Grid Connection is a combination of;

Underground electrical cabling in Knocknamona and Keereen Upper townlands, 8km west of Dungarvan, County Waterford in the Drum Hills area. The cabling will link Knocknamona Windfarm Substation (to be constructed) with the Woodhouse Substation (operational),

Works within Woodhouse Substation compound in Keereen Upper townland including a new control building and installing new electrical apparatus,

New Link Road in Keereen Upper townland joining Knocknamona Windfarm roads and Woodhouse Windfarm roads,

Existing Forestry Road Widening is proposed for one of the forestry roads in Knocknamona townland.

See Figure at the end of this document:
Figure 1.1: Location of KWF Grid Connection

2.2 Features of KWF Grid Connection

The KWF Grid Connection development consists of underground cabling, additional electrical plant and apparatus in an existing substation, the construction a new link road and the widening of an existing forestry road.

The underground cabling (1940m in length) will be made up of cables, ducts and other apparatus installed in a trench. The cables will be routed mainly through windfarm roads and forestry roads. Part of the route also goes through some felled forestry, scrub and grass fields. The cable starts in Knocknamona Windfarm substation and ends in Woodhouse Substation. There is one cable joint along the forestry road route.

The additional electrical plant and apparatus in Woodhouse Substation is made up of a new control building; a new electrical transformer; a new transformer bay; two new lightening masts; and ancillary electrical equipment. Civil works within the Woodhouse Substation compound will include concrete plinths, a new access track and a new internal palisade fence and gateway and two new gateways in the existing perimeter fence of the substation compound and other ancillary works.

The primary purpose of KWF Grid Connection is to facilitate the export of electricity from the consented Knocknamona Windfarm (when constructed) to the national grid at Woodhouse Substation.

The development also includes the use of the existing main entrance and windfarm road network at Woodhouse Windfarm; the construction of a new 190m long Link Road joining the Woodhouse Windfarm road network to the Knocknamona Windfarm road network; and the widening of an existing forestry road at Knocknamona to provide access for the delivery of wind turbine components to Knocknamona Windfarm.

See Figure at the end of this document

Figure 5.2: Layout of the KWF Grid Connection

2.3 Related Projects

The location of the proposed KWF Grid Connection is within the footprint of two existing projects - Woodhouse Substation and Woodhouse Windfarm, and one planned (consented) project – Knocknamona Windfarm.

- Woodhouse Substation and Woodhouse Windfarm (including windfarm roads) are already constructed and operational since 2015.
- Knocknamona Windfarm was consented in 2016, with larger turbines at the windfarm consented in 2022, and is not yet constructed.

See Figure at the end of this document

Figure 1.2: Location of KWF Grid Connection in relation to Authorised Knocknamona Windfarm, existing Woodhouse Windfarm and existing Woodhouse Substation

2.4 KWF Grid Connection Construction Phase

2.4.1 Construction Works

Construction of the development will be carried out using standard construction methods. The works will be carried out in the following way;

Underground Cabling

- Construction areas will be set-out using GPS and other surveying equipment. 'Goal posts' will be erected under any adjacent overhead electricity lines. Silt fencing will be installed at construction works areas, ahead of groundworks, to filter any soil or rainfall runoff.
- Short sections of cable trench will be excavated (about 50m at a time) with the excavated material temporarily stored in berms beside the trench and used to backfill the trench once ducting is installed. Each section will be closed and graded before the next section is started. This method of constructing the trench will protect downhill water quality from sediment runoff because there is only a limited area open with exposed soil and stockpiled excavations at any one time.
- Ducting for the cables will be installed according to the required electrical specifications; the ducts will be surrounded with backfill which will be compacted in layers; a final layer of stone or backfill (depending on location) will then be placed in the trench to ground level. Each section of trenching will be reinstated before the next section is started.
- When the cabling trench reaches the public road and in order to cross under the road without affecting the road surface, two small pits will be excavated on either side of the road. A drilling rig will be set up in the 1st pit and will drill a bore hole under the road from one pit to the other. The ducts will be pulled through the bore hole. The pits will be filled in, graded and reseeded with grasses.
- The surface of the cable route along the forestry and Knocknamona Windfarm roads will be reinstated.
- The small amount of bare soils remaining after the works will reseeded with grasses and flower species common to the surrounding vegetation.
- Following the completion of ducting works for the underground cabling, cable pulling machines will be set up at either end of the route and at one jointing location along the forestry road and the machines will be used to pull the cables (electrical and communication) through the ducts.

- The cables will then be connected to the electrical equipment in the substations at both ends of the route. The cabling will be tested and energised ready for use.

Additional Works and Electrical Plant in Woodhouse Substation

- Two new pairs of palisade gates will be installed in the perimeter fence.
- The plinths and bund will be constructed using ready mix concrete.
- The new control building will be constructed.
- The electrical apparatus will be delivered, installed, tested and energised.
- Internal fencing and an internal gate will be installed within the existing compound.

New Link Road

- A Link Road will be constructed over part of the underground cabling route.
- Construction areas will be set-out using GPS and other surveying equipment.
- An excavator will remove the soil from the new Link Road location. The excavated soil will be placed beside the works area, graded and reseeded with grasses and flower species common to the surrounding vegetation.
- A stone sub-base will be laid and compacted. A surface layer of capping stone will then be laid and compacted.
- The surface of the new Link Road will be finished with a 1% gradient to allow for rain-water run-off.

Widening of the Existing Forestry Road

- The stretch of forestry road that requires widening (c 1km) will be marked out by the site engineer.
- An excavator will remove soils from the area to be widened. The excavated subsoil and topsoil will be graded along the verge of the road and reseeded with grasses and flower species common to the surrounding vegetation.
- A stone sub-base will be laid and compacted. A surface layer of capping stone will then be laid over and compacted.

See Figure at the end of this document

Figure 5.2: Layout of the KWF Grid Connection
Figure 5.5 Elevation of the additional plant and apparatus in the existing Woodhouse Substation

2.4.2 Construction Works Period, Personnel and Deliveries

Construction works for the **underground cabling, link road and widening of existing forestry road** will be completed within a period of approximately **2 months,** and will involve **two works crews**, each made up of **3 – 4 workers**.

The installation works and energising of the **electrical plant in Woodhouse Substation** will take approximately **4 months**, and will be carried out by **one work crew, made up of 8-10 workers and one specialist electrical commissioning team of 4-5 workers**.

For KWF Grid Connection, 4 loads of concrete and 39 loads of stone will be transported to the work sites by truck, from local suppliers. Twenty-two loads of general and specific building materials will also be imported to the site, from various suppliers.

Construction access will be through the existing **Woodhouse Substation entrance** on the L6074 at Keereen Upper (Site Entrance No. 1) and through the existing **Woodhouse Windfarm main entrance** (Site Entrance No. 2), on the L60741 Local Road at Woodhouse or Tinakilly.

Large Deliveries: Woodhouse Windfarm Main Entrance will be used for deliveries of the larger electrical equipment to Woodhouse Substation and turbine components to Knocknamona Windfarm. The delivery vehicles will use the Woodhouse Windfarm roads and then cross to the Knocknamona Windfarm side over the new Link Road.

See Figure at the end of this document

Figure 12.2 Public Road - Construction Materials Haul Route
Figure 12.3 Public Road - Turbine Components and Electrical Apparatus Haul Route

2.4.3 Construction Works: Use of Natural Resources

Land use: In total the works areas will be located on **3.6 hectares of land,** most of which is already under hard surfaces like forestry roads, windfarm roads and substation compound. **In total 230 loads of soils, subsoil and rock will arise from the excavations** from the cable trench, footprint of the new Link Road, and along the existing forestry road widening. Up to 39 loads **of graded crushed stone** will be imported from Keereen Aglish Quarry and Roadstone Cappagh Quarry, mainly for the construction of the Link Road.

One 15m section of earthen bank field boundary will be temporarily removed on one side of a farm track crossing, to facilitate the installation of underground cabling and the new Link Road. The field boundary will be reinstated, following the delivery of turbine components to Knocknamona Windfarm, and any exposed soils will be re-seeded with grasses and flower species common to the surrounding vegetation.

No forestry will be **felled** and **no water** is required for construction.

2.4.4 Construction Works: Emissions & Wastes

Insignificant dust, construction machinery exhaust, noise and vibration will be emitted during the **Construction Stage**.

A portaloo will be used to provide welfare facilities to construction personnel. General and chemical waste will be brought off site by the contractor.

2.5 KWF Grid Connection Operational Phase

2.5.1 Operation Activities

Very little maintenance is required to operate the KWF Grid Connection. It is expected that scheduled inspection and maintenance activities will be carried out by a 2 person crew over a total of 4 days per year. Access will be gained through the existing Woodhouse Substation entrance and through Knocknamona Windfarm entrance. Occasionally if a larger turbine component needs to be delivered to Knocknamona Windfarm it can be delivered through the Woodhouse Windfarm entrance.

2.5.2 Operation Phase Use of Natural Resources; Emissions and Wastes

Land Use: KWF Grid Connection is located on modified lands, which for the most part consist of stone access roads and hard-core substation compound. No land is required once the development is constructed, the cabling lands will be fully reinstated and revert to their original use, except for the new Link Road. The new Link Road will turn a small area of scrub to hard surface.

No Water, Felling, Soils or Rock are required for the operation of KWF Grid Connection.

The operational **apparatus at Woodhouse Substation will emit very low levels of noise**, however this noise will **not be audible at the nearest dwelling**, 330m distant.

As with all electrical equipment, the **operating electrical cable and additional electrical plant in Woodhouse Substation will be a source of electromagnetic fields (EMF).** These emissions will be less than one-tenth of the relevant International Commission on Non-Ionizing Radiation Protection (ICNIRP) exposure limit, when measured directly above the operating cable, and less than one-hundredth when measured at Woodhouse Substation fence.

Waste during the operation stage will be minimal and will be limited to the maintenance activities at Woodhouse Substation. Such waste will be managed as part of the overall Woodhouse Substation waste management system.

2.6 KWF Grid Connection Decommissioning Phase

At the end of the Knocknamona Windfarm operating life and if permission is not granted to continue to operate or to repower the windfarm with more up to date technology, then Knocknamona Windfarm will be decommissioned. In that eventuality, the KWF Grid Connection cabling will be decommissioned and removed from the ducting and can be reused or recycled as part of the circular economy. The cable ducts will be left in place underground. The new link road and widened sections of the existing forestry road will be left in place for use by the landowners. The additional control building and the electrical equipment to be located within the already operational Woodhouse Substation will be operated as a permanent feature of the Irish national grid infrastructure and as such, will not be decommissioned.

2.7 Vulnerability of KWF Grid Connection to Major Accidents and/or Disasters

KWF Grid Connection **is not vulnerable to Major Accidents or Disasters**, due to the minimal volumes of the Dangerous Substances (fuel and oils) which will be used during construction and operation.

KWF Grid Connection is **not vulnerable to land slippage**, due to the absence of deep peat and inherent stability of the subsoils on the site. KWF Grid Connection is **not vulnerable to flooding**, due to location in a Low Risk Flood Zone; the location of most of the development underground; and the absence of watercourses and watercourse crossings on site.

Extreme weather is now considered to be a result of **climate change**; the **development is not vulnerable to extreme weather events**. The development is not vulnerable to wildfires because the gird connection cabling is to be placed underground and therefore not susceptible to fire. The electrical apparatus to be located within Woodhouse Substation is not at risk from fire because Woodhouse Substation is a hard cored area surrounded by grassland and adjacent to other hardcore areas (public road and Woodhouse Windfarm roads) which effectively act as a fire break and therefore there is minimal fuel to support the spread of wildfire to the substation compound.

3 Alternative Locations and Designs Examined

The consideration of alternative ways of designing and developing a project is carried out in order to avoid or minimise environmental effects associated with the project.

3.1 Alternative Grid Connection Route

The grid connection method and route for Knocknamona Windfarm, which was examined in Knocknamona Windfarm planning documents in 2015, was a connection point to Dungarvan Substation, 8.5km to the northeast of Knocknamona Windfarm Substation which would require a grid connection route of at least 11.5km mainly along the public road network. However, since the Knocknamona Windfarm planning was granted, a possible new grid connection point (Woodhouse Substation) was commissioned by the national grid system operator, Eirgrid, for Woodhouse Windfarm. The grid connection point at Woodhouse Substation is just c.2km west of Knocknamona Windfarm Substation. This presented a new possible alternative grid connection location option for Knocknamona Windfarm.

Ecopower requested that studies be carried out by Eirgrid, to see if Knocknamona Windfarm could be connected to the new substation at Woodhouse. The results show that there was spare electrical capacity at the newly commissioned Woodhouse Substation that could accommodate the electricity from Knocknamona Windfarm and also that there was room at the substation to accommodate the extra equipment required.

Therefore, Ecopower carried out technical and environmental investigations on a possible grid connection method and route from Knocknamona Windfarm to Woodhouse Substation.

3.1.1 Alternative Grid Connection Routes for Knocknamona Windfarm capacity

The two alternative grid connection routes considered were

- **Grid Connection to Dungarvan Substation**; Underground cable between the Knocknamona Windfarm Substation and the ESB Networks Substation at Killadangan on the Dungarvan/Cappoquin Road (N72), 8.5km to the northeast of Knocknamona Substation.
- **Grid Connection to Woodhouse Substation**; Underground cable between the Knocknamona Windfarm Substation and the newly built Eirgrid (Woodhouse) Substation at Keereen Upper 2km to the northwest of Knocknamona Substation.

3.1.2 Comparison of Environmental Effects of the Different Routes

The results of the analysis of the environmental effects of the Grid Connection to Dungarvan Substation is Slight to Moderate negative Impact because of scale of works along the public road; number of houses in proximity to the works; close distance to European Sites; requirement for watercourse crossing works; works in close proximity to roadside hedgerows and field boundaries with some habitat loss occurring; and the close distance to archaeology.

The Grid Connection to Woodhouse Substation is predicted as having No Impact to Imperceptible negative Impact because of the smaller scale of works, no works on the public road, no houses in close proximity, no watercourses onsite, further away from European Sites, location of works in an already modified environment and absence of archaeology along the cable route.

There are **less environmental effects from the grid connection to Woodhouse Substation than the grid connection to Killadangan** and therefore **'Grid Connection to Woodhouse Substation' is the better alternative when a comparison of environmental effects is considered.**

3.2 Alternative Grid Connection Technologies (underground v. overhead line)

Once the connection option to Woodhouse Substation was chosen, the use of an overhead line versus an underground cable for the grid connection cable was then considered. Both these options would require excavations (either for trenching or pole sets) and both would be constructed in a relatively short length of time of one to two months.

The primary difference between overhead line v. underground cable is visibility on the Landscape. The visual effects on Landscape were compared and the conclusion of the comparison was that underground cabling will have no permanent above ground features and therefore **No Impact on the Landscape** and therefore **underground cabling was chosen as the preferred technology for the grid connection cable.**

3.3 Alternative Component Haul Route

The underground cable to connect Knocknamona Windfarm to Woodhouse Substation can be laid predominately in forestry roadway on the Knocknamona Windfarm side and in Woodhouse Windfarm roadway on the Woodhouse Substation side. Where the cable crosses under scrubland for circa.200m between the forestry road network and the Woodhouse Windfarm road network, the cable must be covered by a roadway, so that the cabling location is easily identified and protected from forestry activities. This will indirectly result in the two road networks being connected and presents an opportunity to consider an alternative transport route for the large turbine components to Knocknamona Windfarm.

In the Knocknamona Windfarm planning documents, a turbine component haul route utilising the proposed Knocknamona Windfarm main entrance gate and public roads from Pulla Crossroads, to the east and southeast of the windfarm, was examined for environmental effects. Since the construction of Woodhouse Windfarm to the northwest of Knocknamona Windfarm, an alternative route through Woodhouse Windfarm main entrance gate and across the new roadway between Woodhouse Windfarm roads and the forestry road network at Knocknamona Windfarm, has become available for consideration.

Therefore the alternative Haul Routes for Knocknamona Windfarm turbine components were;

1. **Haul Route through Knocknamona Windfarm Site Entrance on the L6077** travelling from the N25 to a point (Spring roundabout) outside Dungarvan Town. The turbine component vehicles would continue south on the N25 for 4530m, as far as Pulla Crossroads. Turning right at Pulla, the vehicles would travel along the Local Roads in a northwest direction to Knocknamona Windfarm site entrance. Remedial works would be required to the public road networks, with the works limited to the local road sections.

2. **Haul Route through Woodhouse Windfarm Main Entrance on the L60741** travelling along the N25 to the junction with the N72, north of Dungarvan at Knockboy. The vehicles can then travel west along the N72 as far as the junction with the R671, turning left (south) onto the R671 and travelling on the R671 as far as the junction with the L6074 at Clogh Crossroads, turning east onto the Local Roads to Woodhouse Windfarm main entrance gate. No remedial works are required to the public road network to transport oversized loads using this route. This is because required works have already taken place (2015) in order to facilitate the delivery of Woodhouse Windfarm turbine components.

The conclusion of the comparison of environmental effects of the alternative haul routes is;

Although the **Haul Route through Knocknamona Windfarm Site Entrance** is not predicted to have significant effects, it does require road works with **Slight Negative** impacts on the environment in order to deliver the turbine blades, whereas the **Haul Route through Woodhouse Windfarm Main Entrance Gate** requires no road works for such deliveries and therefore will have **No Impact**.

The Haul Route through Knocknamona Windfarm site entrance will remain the route for construction materials and some turbine component deliveries for Knocknamona Windfarm. The Haul Route through Woodhouse Windfarm Main Entrance Gate was chosen as the preferred turbine component haul route when a comparison of environmental effect was carried out.

4 The Area around the Development

4.1 Sources of information on the surrounding area

Information on the area surrounding the development came from site visits and surveys including – **household and private well survey, local business and tourism surveys, background noise measurements, bird, mammal and bat surveys, habitat surveys, water sampling and soil testing pits (trial holes).** Information was also gathered through consultation with local landowners and on-line from **government and environmental organisations websites** such as the Environmental Protection Agency, National Parks & Wildlife Services, Inland Fisheries Ireland, Ordnance Survey Ireland, Office of Public Works and the Central Statistics Office. Publications consulted included **Waterford City & County Development Plan, the Record of Monuments & Places and the GeoDirectory address database**. **Previous planning documents** for Knocknamona Windfarm and Junction & Bend Widening Works were also consulted.

No difficulties were encountered during the collection of information on the area surrounding the site.

4.2 The description of the surrounding area

KWF Grid Connection is proposed for the **Drum Hills area of West Waterford**. The nearest settlement is the village of Aglish, c.3.5km to the west. Dungarvan is 8km to the east. Youghal is located 14km to the south in neighbouring County Cork.

The immediate area of the KWF Grid Connection is **rural and sparsely populated** with individual properties and farmsteads widely dispersed throughout. There are 17 houses within 1km of KWF Grid Connection, the **nearest dwelling house being c.330m** from the KWF Grid Connection construction work boundary (Woodhouse Substation). The next nearest house is adjacent and is 460m from the construction works boundary. These 2 houses are landowners involved in the development. The nearest non-landowner dwelling house is c.550m from the construction works boundary at the nearest point (the grid cabling as it enters Woodhouse Substation).

The development is located in the **electoral division (ED) of Keereen**.

The population of Keereen ED has more or less stayed the same between the last two Census. **92% of the population of Keereen reported 'Very Good' or 'Good' health, which is slightly higher than the National average** of 87%. (Census 2016).

The public road network around the site is made up of **narrow country roads**, which are very little used, serving mostly houses and farms along these roads. There are **no public water mains or private wells** in the immediate vicinity of the site.

Because the site is in a rural location, it is **away from sources of pollution** and as a result the **quality of the air is very good** with little dust and pollution like vehicle fumes or factory fumes. In relation to **noise**, there are both natural and man-made sources in the area, and these include noise from the weather, farm animals, noise from operating farm machinery and traffic and from the operating Woodhouse Windfarm and to a lesser extent Woodhouse Substation. The Woodhouse Windfarm, Woodhouse Substation, along with all electrical equipment and machinery in farms and homes and the existing electrical and telephone overhead lines and mobile phone signals are all sources of **electromagnetic fields** in the air, and levels would be at **typical levels** for a rural area in Ireland.

The surrounding land cover is made up of **grass fields and forestry plantations**, **Woodhouse Windfarm, high voltage overhead electricity lines, County and Regional public roads, farm roads and forestry roads**.

The area is considered to be a highly modified landscape and **not particularly naturalistic**, the results of on-site surveys show that it **does not have good quality habitat to support large populations of birds or animals**. The low numbers of animals and birds found during the site surveys were as expected and were **typical of Irish countryside species**.

The soils at the site are well draining with some thin layers of peat. The site is located in the water catchment areas for the **Brickey River** and the **Blackwater River**. There are **no streams or drains at the proposed works site**. The nearest stream to the Brickey is the Mountodell Stream, which is 280m from the nearest proposed works. The nearest stream to the Blackwater is the Monageela Stream, which is 350m from the nearest proposed works.

In relation to **archaeology**, the nearest feature to the proposed works is a **ringfort which is 190m** away. The nearest tourism amenity is the long distance walking route, **Saint Declan's Way**, part of which is along the public road **1.5km from the site**. Walkers also use the forestry roads in the vicinity of the site. In **Waterford County Development Plan** there are landscape designations like sensitive areas and visually vulnerable ridgelines around the site. Part of the cabling will be under a **visually vulnerable ridgeline**.

All the parts of **the environment** described above **depend on the world's climate** and changes to that climate are having an increasing noticeable effect on the environment, and the people and nature that depend on it. **Man-made emissions of greenhouse gases are the main cause of climate change**. The burning of fossil fuels such as oil or coal, to make electricity, causes approximately one-third of Ireland's greenhouse gas emissions. **Climate Change is threatening the survival of many species of plants and animals, and the livelihoods of human populations around the world**. In recognition of the seriousness of climate change, the Oireachtas declared a **climate and biodiversity emergency** as far back as May 2019.

Ireland has been part of European efforts to reduce greenhouse gas emissions, and under EU agreements Ireland as a Country, is obliged to meet certain **greenhouse gas emission reduction targets** by 2030.

See Figure at the end of this document

Figure 6.1 Location of houses within 1km of KWF Grid Connection works
Figure 7.2 Study Area for Terrestrial Habitats
Figure 9.4.1 Study Area for River Waterbodies (Zoomed in)

5 The Effects of the Development on the Area

5.1 How the assessment of the effects was carried out

Environmental consultants who are experts in their field were engaged to study the various topics defined in the environmental impact assessment process (EIA process). These topics are population and human health, biodiversity, land and soils, water, air, climate, material assets, cultural heritage and landscape.

The experts used the **latest guidelines from their own speciality** and **general best practice** from Irish government and environmental organisations and European and International sources, to assess the effects of the proposed development on their specialist environmental topic.

5.2 The Results of the Assessments of Effects

5.2.1 Potential Negative Effects of the KWF Grid Connection

No significant negative effects are predicted to occur due from the construction or the operation of KWF Grid Connection.

This is because of the small size of the development, the location of the development in an area that has been already changed from a natural area, the limited amount of works that are required for the development; the distance of the works away from people's homes and valuable features of environment that could be affected; and the limited interaction of the development with the construction phase of Knocknamona Windfarm because there is only a small overlap along forestry and windfarm roads; and the limited interaction with any operational activities at the existing Woodhouse Windfarm and Woodhouse Substation.

In summary:

- The proposal involves laying an underground electricity cable, adding new electrical plant and a small building within an existing substation compound, building a short link road, widening one forestry road and use of the existing Woodhouse Windfarm and Woodhouse Substation entrances for access for construction materials and turbine components.
- **The development is small in scale** because the trench for the cabling is shallow and narrow, and will be constructed in sections and reinstated as works progress; the new electrical plant and building in Woodhouse Substation are similar to the plant and buildings already there; the new link road and the widening of the forestry road will be the same as other forestry and windfarm roads in the area; no works are required along the public road to either construct the development or for deliveries to the development during construction or operation. There will be very little construction traffic; emissions of noise, vehicle fumes and dust during construction and operation will be extremely low. Emissions of electromagnetic fields during operation will also be very low and no increases in EMF will occur beyond 100m from the operating cabling or electrical plant.
- **The development does not involve interference with a natural area** because it is proposed for an area that is already modified by agriculture, forestry and windfarming. The cable will be laid mostly under forestry and windfarm roads, and the new electrical plant and small building will be located within the existing Woodhouse Substation compound. Surveys at the site show that there are low numbers of birds and animals present due to the modified nature of the existing environment. Landuse during the operation phase will largely be the same as before.

- **The separation distances from people and features of the environment** – the nearest house is 330 meters away, the nearest waymarked trail is 1.5 kilometers away, there are no wells or public water mains on site; there are no road works required (the Public Road will be crossed by drilling under the cross; the nearest watercourse is 280m away, the nearest European Site is 3 kilometers away, the nearest archaeology is an unclassified Ringfort 190m away, and while the underground cabling is traversing a visually vulnerable ridgeline there will be no above ground features of the cable visible at that point.
- **Human Health will not be affected by the development because**; there will be no impact on water supplies; insignificant impact on the good quality of the air locally and little risk of road accidents due to very little construction traffic needed and temporary duration of the construction works; very low increase in noise locally during construction and operation with no noise expected at the nearest house and in very low increase in electromagnetic fields (EMF) levels during the operation of the cable and electrical plant, with EMF levels in the area remaining very low and typical of rural Ireland.
- The only time that KWF Grid Connection could have additional (**cumulative**) effects with projects nearby is during the construction phase. The nearby **Woodhouse Windfarm and Woodhouse Substation are already constructed** and therefore will not cause any additional noticeable effects during KWF Grid Connection construction works. **Knocknamona Windfarm will probably be built at the same as KWF Grid Connection**. The cumulative effects from both being built at the same time, **will not be significant** because: KWF Grid Connection **only overlaps with the Knocknamona Windfarm construction site in the vicinity of the Knocknamona Windfarm Substation and along the forestry and windfarm access roads on site** and will not hugely increase works in those areas; the **temporary (less than one year) duration of construction period for both the windfarm and grid connection**; the **separation distances to people and valuable features of the environment** from both sites; and generally the **use of different public roads to deliver materials to the construction sites**.

5.2.2 Mitigation Measures & Monitoring Arrangements

Mitigation measures: Mitigation measures are measures which will avoid, reduce or offset adverse effects to the environment.

The focus of mitigation measures during construction is on the protection of water quality. As part of the standard construction methodology the underground cable will be constructed in 50m sections. As a section of the trenching and cabling is completed, this section will be reinstated before the next section is commenced. This measure will reduce the potential for sediment laden runoff overland to downstream waters, through reducing the source of sediment available at any particular point in time from soil excavations storage and open trenches along works areas. Other measures for the protection of water quality include

- Single silt fences will be installed at construction works areas down-gradient of the proposed works. Temporary silt fencing / silt trap arrangements will also be placed along potential runoff drainage routes (i.e. between forestry mounds/ribbons). The roadside drain at the Knocknamona Windfarm Substation will be temporarily blocked during trenching works upslope of this drain.
- Temporary spoil heaps will be covered with polyethylene sheets during heavy rainfall events, and the excavation of cable trench, substation works and link road works will not be undertaken during periods of intense or prolonged rainfall.
- All fuels required for construction activities will be stored at the Woodhouse Substation Compound. All fuel will be stored in bunded, locked storage containers.

- No large volumes of cement will be needed on-site at any time, concrete requirements for the development are limited to 4 loads of ready-mix concrete to construct the control building foundation, and the plinths and bunds in the Woodhouse Substation Compound.

The spread of invasive plant species will be prevented through the steam cleaning of all site machinery before entering the site.

Monitoring of the construction works by a full time Environmental Clerk of Works will ensure that the development conforms to the planning permission and conditions and to the environmental commitments made in the Environmental Impact Assessment Report (EIAR).

The Environmental Clerk of Works will be engaged by the project promotor and will be independent of the civil contractor.

The Environmental Clerk of Works will conduct regular audits of the KWF Grid Connection construction works and compare the environmental requirements to the actual works on the ground. They will have a 'stop-works' authority to temporarily stop works at the site to correct any deviation or to react to an unforeseen negative environmental event.

5.2.3 Positive Effects of KWF Grid Connection

The development of KWF Grid Connection will facilitate the development of Knocknamona Windfarm and in that case **a substantial community benefit fund of €192,000 per annum will be distributed locally and commercial rates of c.€450,000 per annum will be paid to Waterford City & County Council** for the lifetime of the windfarm. This will have a **positive effect** on the local and county economy.

There will however be only one significant effect resulting from KWF Grid Connection and this is a positive effect, due to the operation of the development. The development is the necessary grid connection element of the Knocknamona Windfarm project, therefore a secondary impact of the development is the export of renewable energy generated electricity from the Knocknamona Windfarm to the National Grid.

The KWF Grid Connection will export **96 million kilowatt hours of renewable electricity** from the Knocknamona Windfarm. This amount of electricity is equivalent to the electricity use by nearly 23,000 houses (or half of all households in Waterford City & County). The generation of this substantial amount of electricity from the wind, will avoid the generation of electricity using coal, gas and oil, which will **avoid the emission of 36,000 tonnes of greenhouse gases every year** into the atmosphere. 36,000 tonnes of greenhouse gas is the same amount of greenhouse gases that 15,126 cars or 7,200 cows would emit each year.

KWF Grid Connection together with Knocknamona Windfarm, **will help Ireland's efforts to reduce greenhouse gas emissions in order to halt or slow down climate change and meet our National, European and International targets and commitments**. Due to the substantial amount of electricity that can be supplied and the substantial amount of greenhouse gas emissions that can be avoided and given the **very high and critical importance of climate action**, the **export of clean, renewable electricity** from Knocknamona Windfarm will be a **significant positive impact** of the proposed KWF Grid Connection development.

6 Further Information on the Development

See **Volume B Drawings**, for detailed technical drawings of the development.

See **Volume C2: EIAR Main Report** for comprehensive details about the development and the area in which it will be location. The main report also includes scientific analysis of the effects of the development over nine environmental topic chapters. The main report includes illustrative figures and scientific and technical appendices.

See **Volume D: Environmental Management Plan (EMP)** which has been prepared for the KWF Grid Connection and describes the approach to environmental management during the construction stage of the development.

See **Volume E: Appropriate Assessment Report (Stage 2: Natura Impact Statement)** for the assessment of the effects on European Sites (Natura 2000 sites such as Special Areas of Conservations (SACs) and Special Protection Areas (SPAs)).

See **Volume F: Reference Documents** for the other EIA Reports previously submitted for the Whole Knocknamona Windfarm Project

- Knocknamona Windfarm Revised EIS 2015
- Amendment to Knocknamona Windfarm (Larger Turbines & Met Mast) Revised EIAR 2021
- Junction & Bend Widening Works Screening for EIA 2022.

Figures for this Non-technical Summary of the EIA Main Repot overleaf

Figure No.	**Figure Title**
Figure 1.1	Location of KWF Grid Connection
Figure 1.2	Location of KWF Grid Connection in relation to Authorised Knocknamona Windfarm, existing Woodhouse Windfarm and existing Woodhouse Substation
Figure 5.2	Layout of the KWF Grid Connection
Figure 5.5	Elevation of the additional plant and apparatus in the existing Woodhouse Substation
Figure 6.1	Location of houses within 1km of KWF Grid Connection works
Figure 7.2	Study Area for Terrestrial Habitats
Figure 9.4.1	Study Area for River Waterbodies (Zoomed in)
Figure 12.2	Public Road - Construction Materials Haul Route
Figure 12.3	Public Road - Turbine Components and Electrical Apparatus Haul Route

Figure 1.1 - Location of KWF Grid Connection

Legend:

KWF Grid Connection:

- KWF Grid Connection Constructions Works Area
- Access Road through Woodhouse Windfarm Entrance

Cappoquin

Dungarvan

Villierstown

Aglish

Existing Woodhouse Substation

Existing Woodhouse Windfarm Site Entrance

KWF Grid Connection

N

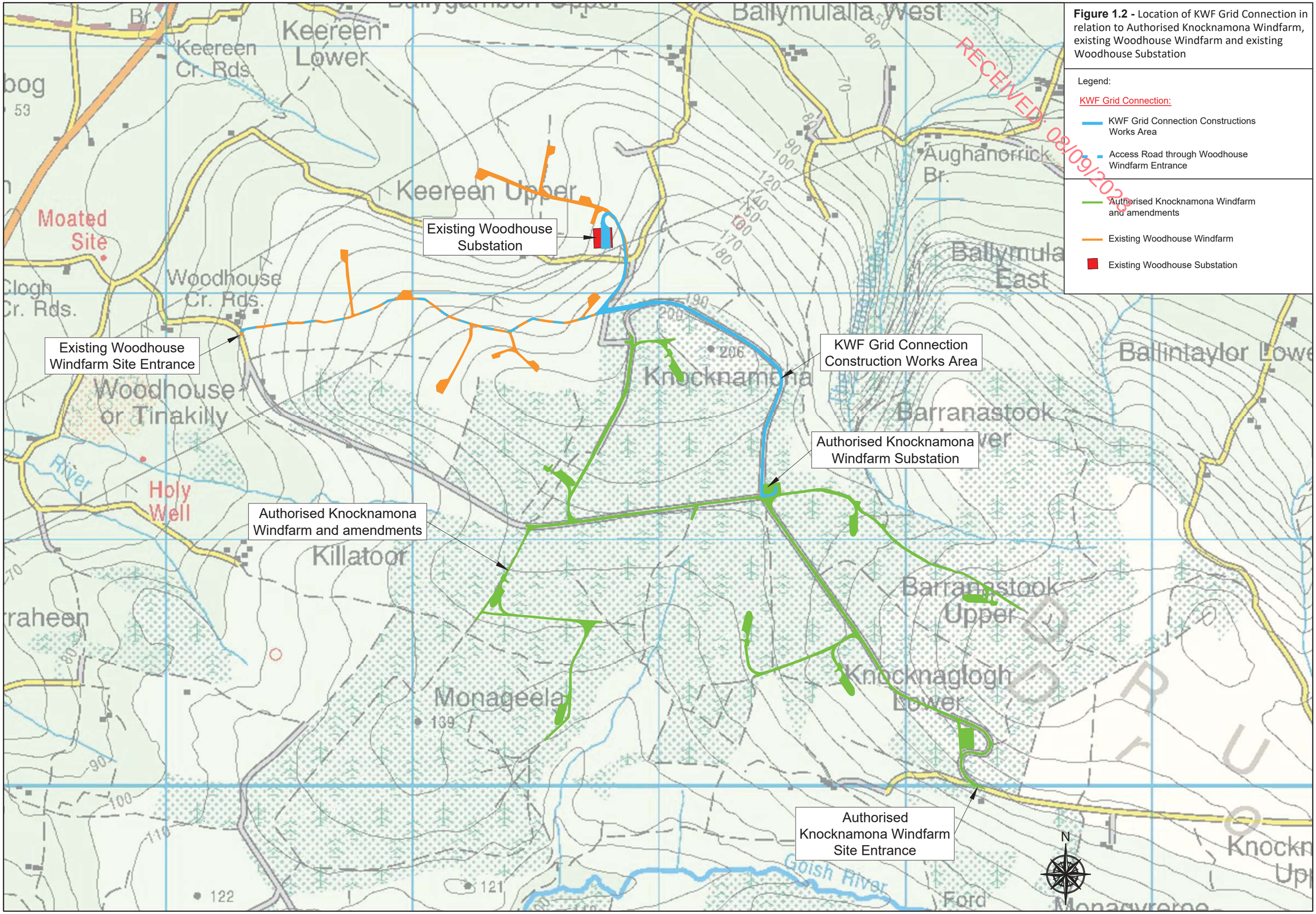


Figure 1.2 - Location of KWF Grid Connection in relation to Authorised Knocknamona Windfarm, existing Woodhouse Windfarm and existing Woodhouse Substation

Legend:

KWF Grid Connection:

- KWF Grid Connection Constructions Works Area
- Access Road through Woodhouse Windfarm Entrance

- Authorised Knocknamona Windfarm and amendments
- Existing Woodhouse Windfarm
- Existing Woodhouse Substation

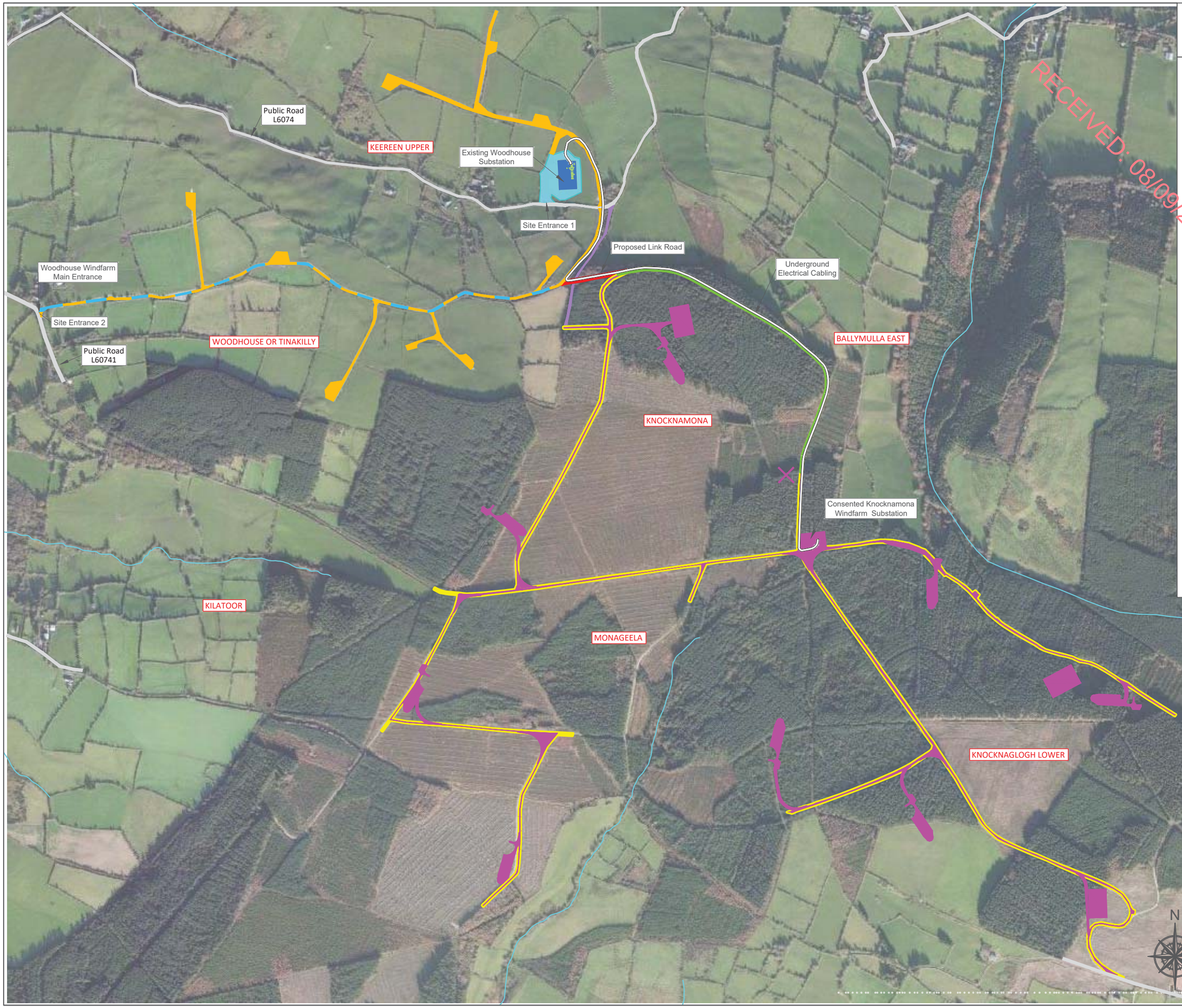


Figure 5.2 - Layout of the KWF Grid Connection

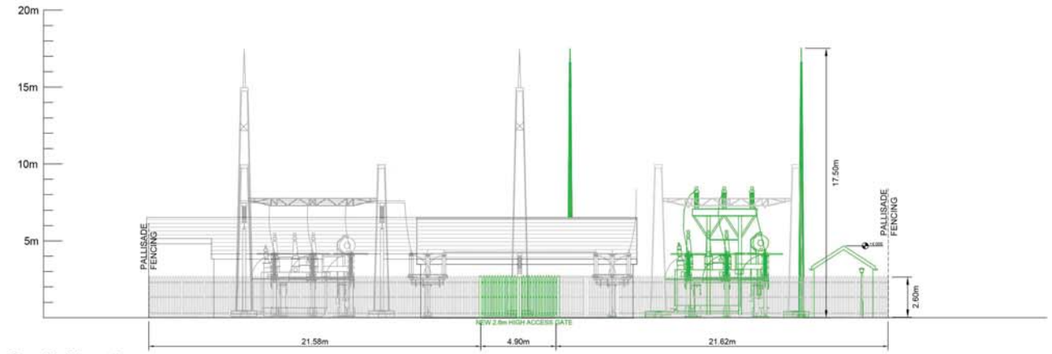
Legend:

PROPOSED

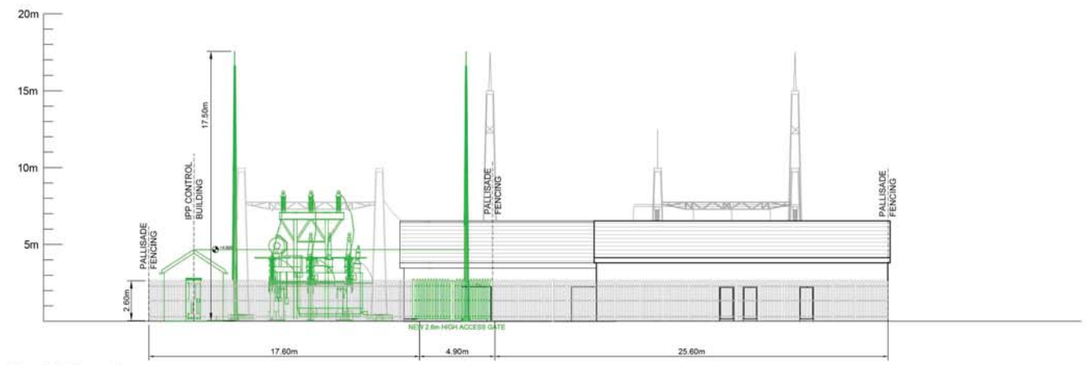
- Underground Electrical Cabling
- Access Road through Woodhouse Windfarm Entrance
- Proposed Link Road
- Proposed Woodhouse Substation Additional Plant
- Existing Forestry road to be widened

EXISTING / AUTHORISED

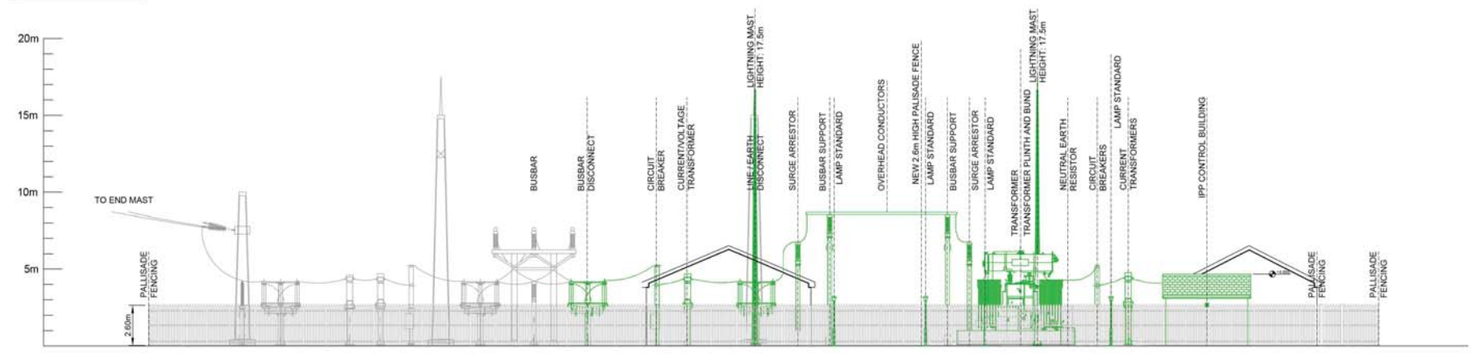
- Authorised Knocknamona Windfarm and amendments
- Existing Woodhouse Windfarm
- Existing Woodhouse Substation
- Existing hardcore area
- Existing Farm Track
- Public Road
- Existing Forestry Road
- Watercourse
- KILATOOR Townlands



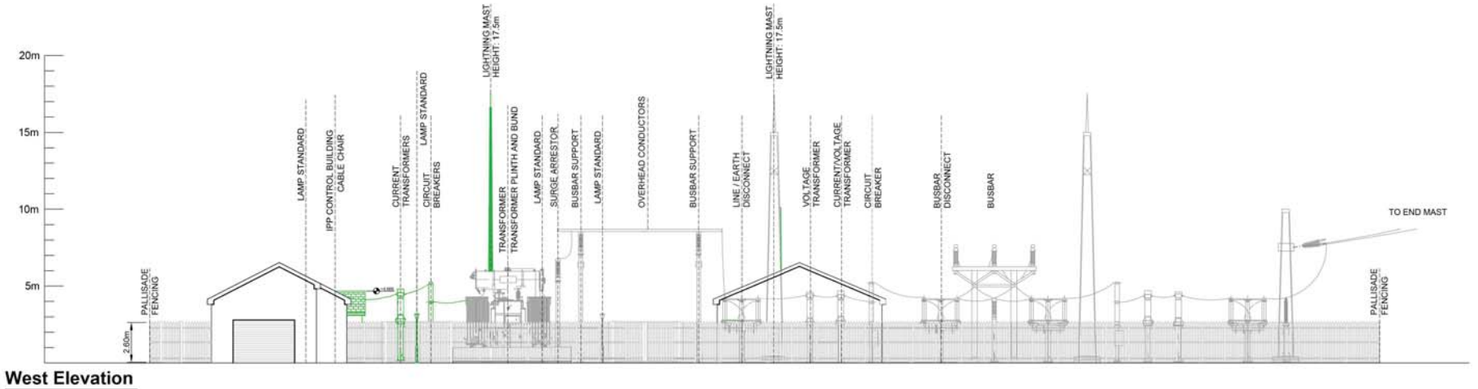
South Elevation



North Elevation



East Elevation



West Elevation

tii GROUP

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Beenreigh,
Abbeydorney,
Tralee, Co. Kerry
Ireland
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Regional Office
Basepoint Business Centre
Strouddy Road, Basingstoke,
Hampshire,
RG24 8UP, UK
Tel: 00 44 1256 406 464

Figure 5.5 - Elevation of the additional plant and apparatus in the existing Woodhouse Substation

Legend:

Additional Plant to be Installed in Woodhouse Substation

Existing Woodhouse Substation Equipment

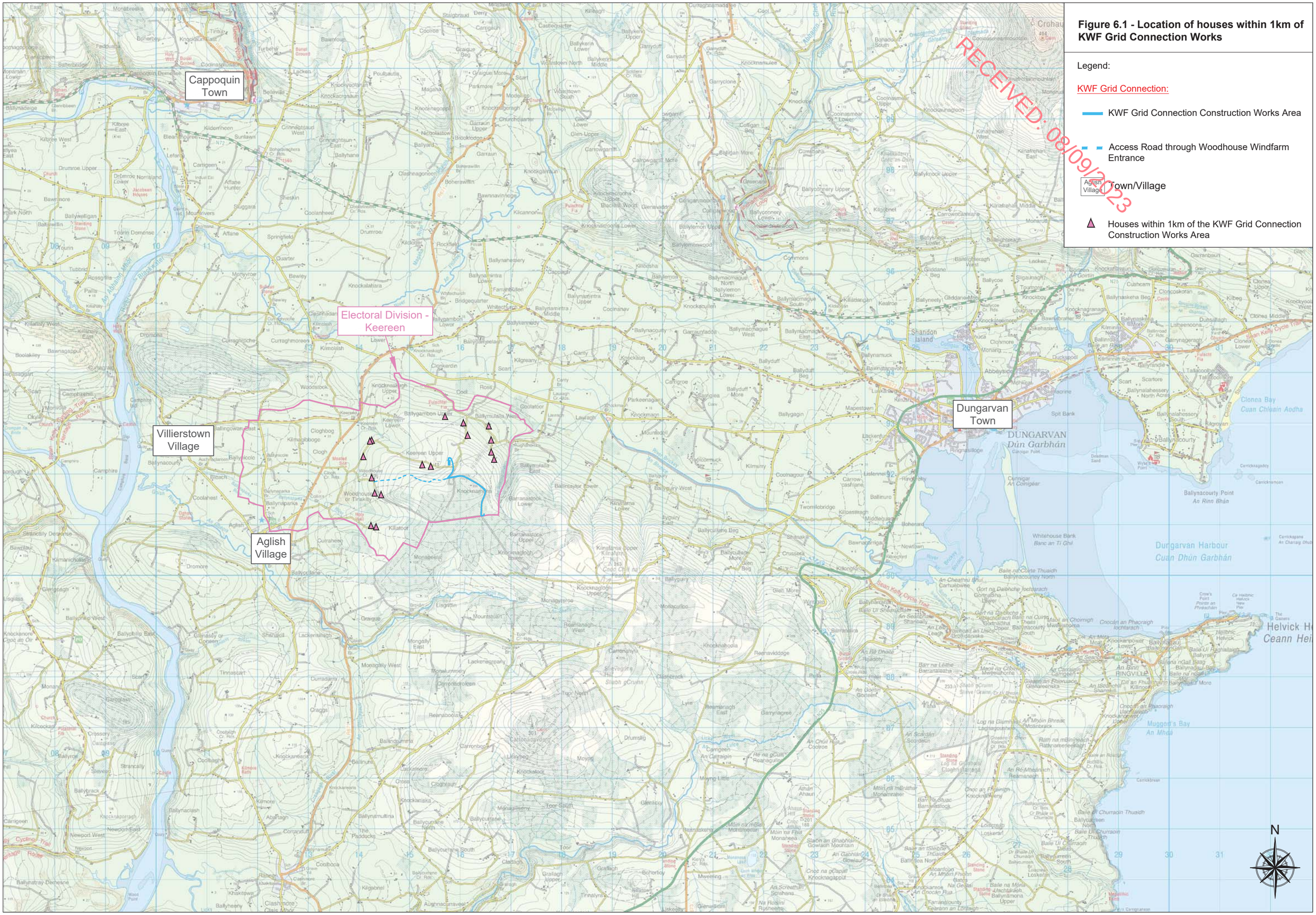

Figure 6.1 - Location of houses within 1km of KWF Grid Connection Works

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Area
- Access Road through Woodhouse Windfarm Entrance
- Aglish Village — Town/Village
- Houses within 1km of the KWF Grid Connection Construction Works Area

Figure 7.2 - Study Area for Terrestrial Habitats

Existing Woodhouse Substation

100m Cumulative Study Area

50 from KWF Grid Connection

Existing Woodhouse Windfarm

Authorised Knocknamona Windfarm and amendments

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Boundary (not visible)
- Access Road through Woodhouse Windfarm Entrance (not visible)

Study Area Extents:

- 50m KWF Grid Connection Study Area
- 100m Cumulative Study Area

Whole Project:

- Authorised Knocknamona Windfarm and amendments

Other Projects:

- Existing Woodhouse Substation (not visible)
- Existing Woodhouse Windfarm

Survey Results:

- BL3 - Buildings and Artificial Surfaces
- GA1 - Improved Agricultural Grassland
- GS4 - Wet Grassland
- WD4 - Conifer Plantation
- WD4/WS1 - Conifer Plantation/Scrub
- WD4/WS2 - Conifer Plantation / Immature Woodland
- WN - Semi Natural Woodland
- WS1 - Scrub
- WS5/WS1/WS2 - Recently-felled Woodland / Scrub / Immature Woodland
- WL1 - Hedgerows
- WL2 - Treelines

N

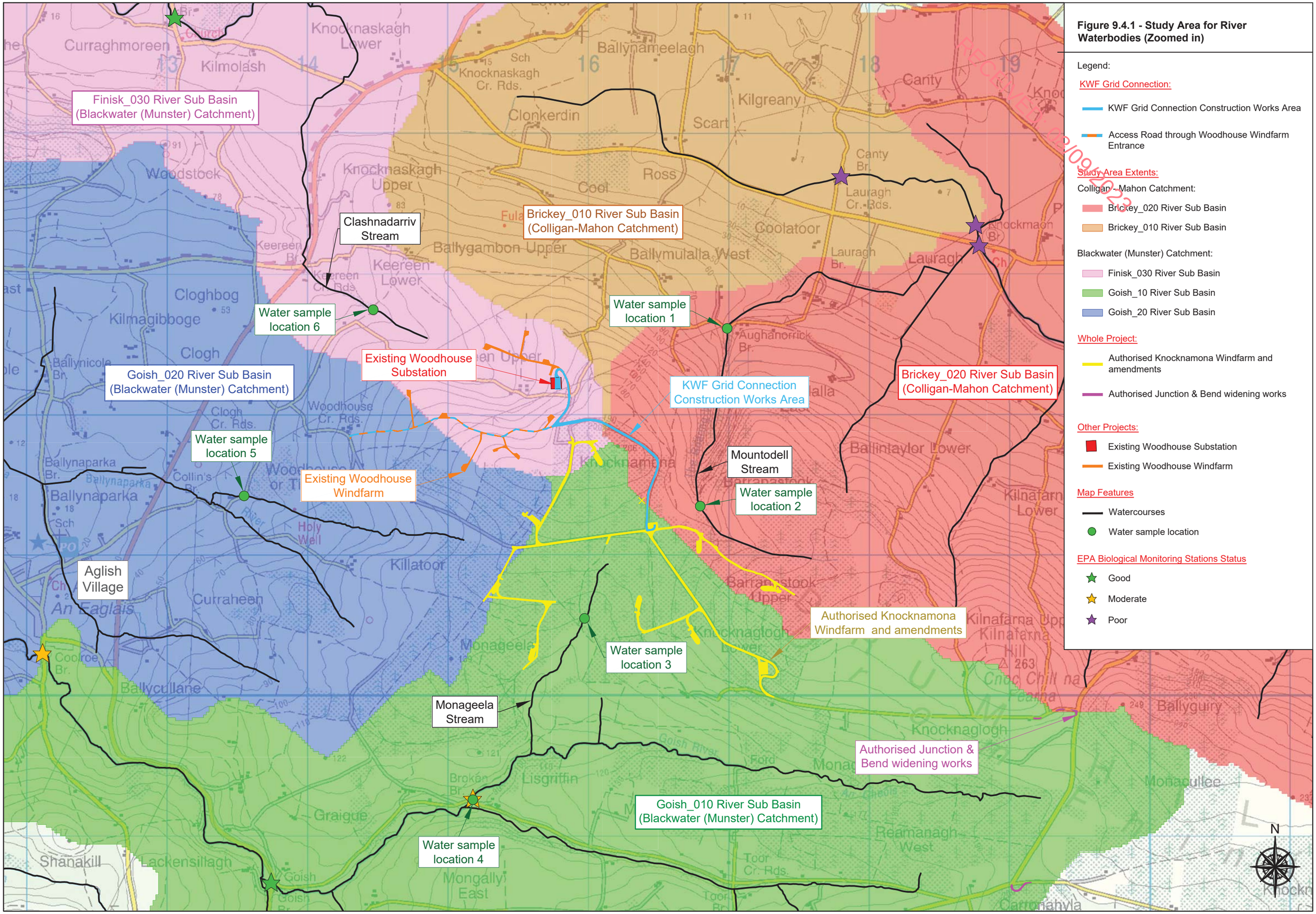

Figure 9.4.1 - Study Area for River Waterbodies (Zoomed in)

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Area
- Access Road through Woodhouse Windfarm Entrance

Study Area Extents:

Colligan - Mahon Catchment:

- Brickey_020 River Sub Basin
- Brickey_010 River Sub Basin

Blackwater (Munster) Catchment:

- Finisk_030 River Sub Basin
- Goish_10 River Sub Basin
- Goish_20 River Sub Basin

Whole Project:

- Authorised Knocknamona Windfarm and amendments
- Authorised Junction & Bend widening works

Other Projects:

- Existing Woodhouse Substation
- Existing Woodhouse Windfarm

Map Features

- Watercourses
- Water sample location

EPA Biological Monitoring Stations Status

- Good
- Moderate
- Poor

Figure 12.2 - Public Road - Construction Materials Haul Route

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Area
- Access Road through Woodhouse Windfarm Entrance

Haul Route:

- KWF Grid Connection Construction Materials Haul Route

Whole Project:

- Authorised Knocknamona Windfarm and amendments

Other Projects:

- Existing Woodhouse Substation
- Existing Woodhouse Windfarm

Map Features:

- BS — Buried Structure along the Local Road
- L6074 — Road Identification Number
- Quarry Location

BS1
BS2
BS3
BS4
BS5
BS6
BS7
BS8
R671
N72
L2019
L2018
L6074
L60741
Roadstone Cappagh Quarry
Kereen Quarry
Existing Woodhouse Substation
Site Entrance 1 at Woodhouse Substation
Site Entrance 2 at Woodhouse Windfarm Main Entrance
Existing Woodhouse Windfarm
KWF Grid Connection Construction Works Area
Authorised Knocknamona Windfarm and amendments
Clogh Croassroads
Aglish Village
Springfield
Quarter
Bewley
Bullaun Stone
Knockalahara
Clashnadarriv
Curraghmoreen
Kilmolash
Drumroe
Kildoher
Rockfield
Ballynahemery
Ballynamintra Lower
Farrantbullen
Bridgequarter
Whitechurch
Ballygambon Lower
Knocknaskagh Lower
Ballynameelagh
Clonkerdin
Scart
Ballykennedy
Ballynamintra Middle
Ballynamintra Upper
Cappagh
Dismantled Railway
Knocknacrooha
Coolnana
Canty
Kilgreany
Woodstock
Knocknaskagh Upper
Cool
Ross
Fulachtai Fia
Ballygambon Upper
Keereen Lower
Ballymulalla West
Coolatoor
Lauragh
Parkeenagarra
Knockmaon
Mountodell
Carrigroe
Cloghbog
Kilmagibboge
Clogh
Woodhouse Cr. Rds.
Augharnorrick
Ballymulalla East
Knocknamona
Ballintaylor Lower
Barranastook
Kilnafarna Lower
Ballyguiry West
Ballyguiry East
Ballynaparka
Collin's Br.
Holy Well
Killatoor
River Brickey
An Bhroice
Finisk
Magaha
An Fhinse
Kildoher Br.
Finisk Br.
Whitechurch Br.
Bewley Br.
Kilmolash Br.
Curraghroche Cr. Rds.
Knocknaskagh Cr. Rds.
Keereen Cr. Rds.
Lauragh Br.
Lauragh Cr. Rds.
Canty Br.
Knockmaon Br.
Aughanorrick Br.
Ballynicole Br.
Ballyguiry Br.
Ballynaparka Br.
Church
Ch
Sch
Holy Well
N

Figure 12.3 - Public Roads - Turbine Components and Electrical Apparatus Haul Route

Legend:

KWF Grid Connection:

- KWF Grid Connection Construction Works Area
- Access Road through Woodhouse Windfarm Entrance

Haul Route:

- Turbine Component Haul Route through Woodhouse Windfarm Main Entrance

Whole Project:

- Authorised Knocknamona Windfarm and amendments

Other Projects:

- Existing Woodhouse Substation
- Existing Woodhouse Windfarm

Map Features:

- L6074 Road Identification Number

Kilcloher Junction

N72

R671

Turbine Components and Electrical Apparatus Haul Route

N72

R671

R671

Existing Woodhouse Windfarm

Existing Woodhouse Substation

Clogh Croassroads

L6074

L60741

KWF Grid Connection Construction Works Area

Authorised Knocknamona Windfarm and amendments

Site Entrance 2 at Woodhouse Windfarm Main Entrance

Authorised Knocknamona Windfarm Main Entrance at Knocknaglogh Lower

Dungarvan Town

N