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# Environmental Impact Assessment Report

Gannow Renewable Energy  
Development, Co. Galway

Chapter 4 – Description of the  
Proposed Project



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## 4. DESCRIPTION OF THE PROPOSED PROJECT

### 4.1 Introduction

This section of the Environmental Impact Assessment Report (EIAR) describes the Proposed Project and all its component parts. The planning application for the Proposed Project will be made to Galway County Council. Construction methodologies for the main infrastructural components of the Proposed Project are also included in this chapter (or its associated appendices) of the EIAR.

The development description for the current planning application as appears in the public notices is as follows:

*The development will consist of the provision of the following:*

- i. 8 no. wind turbines with an overall turbine total tip height range of 178m - 185m, a rotor diameter range of 149m - 163m, and turbine hub height range of 101m - 104m, and associated foundations and hardstanding areas;*
- ii. A permanent 38kV substation compound (including a control building (157.6 sq. m) with welfare facilities, all associated electrical plant and apparatus, security fencing, underground cabling, storage containers, wastewater holding tank, site drainage and all ancillary works);*
- iii. Permanent underground electrical (38kV) and communications cabling to the existing Cashla Substation in the townland of Barrettspark (including joint bays, communication and earth sheath link chambers and all ancillary works along the route). This cabling route is primarily located within the public road corridor which includes protected structures (RPS No. 3747, RPS No. 146).*
- iv. Underground electrical (20/33kV) and communications cabling connecting the wind turbines and meteorological mast to the proposed on-site substation;*
- v. 2 no. temporary construction compounds (including site offices and welfare facilities (with a combined floor area of 202.5 sq.m));*
- vi. A meteorological mast with a height of 30 metres, security fencing and associated foundation and hard-standing area;*
- vii. Upgrade of existing site tracks/ roads and provision of new site access roads, junctions and hardstand areas, including a new site entrance off the L3115;*
- viii. Peat and Spoil Management Areas;*
- ix. Tree felling and vegetation removal;*
- x. Biodiversity enhancement measures (including peatland habitat enhancement, Marsh Fritillary habitat enhancement and management, establishment of hedgerows and native woodland planting);*
- xi. Site drainage;*
- xii. Operational stage site signage; and*
- xiii. All ancillary works and apparatus.*

This application seeks a ten-year planning permission and a 35-year operational life from the date of commissioning of the entire wind farm.

Section 1.1.1 of Chapter 1 Introduction of this EIAR provides a definition of the various project references used throughout the document. The 'Proposed Project', which encompasses the 'Proposed Wind Farm' and 'Proposed Grid Connection' has been assessed within this EIAR. The Proposed Project is located within the EIAR Site Boundary or the 'Site' which measures approximately 884 hectares (ha). The 'Proposed Wind Farm site' refers to the area containing the proposed turbines and ancillary infrastructure but excluding the portion of the Site surrounding the Proposed Grid Connection underground cabling route. The 'Proposed Grid Connection' refers to the part of the Site containing

the 38kV underground cabling connection from the proposed onsite 38kV substation to the existing Cashla 220kV substation. The Proposed Project layout is illustrated on Figure 4-1.

All elements of the Proposed Project are provided in the list above, and described in this chapter, have been assessed as part of this EIAR.

## 4.1 Site Location

The Proposed Wind Farm site is located within a rural, agricultural setting in eastern Galway, approximately 9.7km east of Athenry, Co. Galway and 13km north of Loughrea, Co. Galway. The village of Attymon, Co. Galway is located approximately 1km northwest of the nearest proposed turbine (T01) and the village of New Inn is located approximately 4.6km southeast of the nearest proposed turbine (T07). The nearest Natura 2000 site to the Proposed Wind Farm, i.e., Special Area of Conservation (SAC) or Special Protection Area (SPA) is the Lough Corrib SAC located approximately 4.3km north of the nearest proposed turbine (T03). Elevations within the Proposed Wind Farm site range from ~65mOD (metres above Ordnance Datum) in the west to ~80m in the east.

The Proposed Grid Connection includes for 38kV underground cabling from the proposed onsite 38kV substation, in the townland of Attimonmore South, Co. Galway to the existing Cashla 220kV substation in the townland of Barrettspark, Co. Galway. The Proposed Grid Connection is primarily located along the public road corridor, with three short sections located across private land/tracks. The Proposed Grid Connection follows the L3115, L7152, L3111, L3107, L7126, L7122, L31030, L7108, L7109, and the R347 to the existing Cashla 220kV substation. The townlands in which the Proposed Grid Connection will pass through are detailed in Table 1-1 of Chapter 1. Please see Section 4.3.2.1 for further detail on the Proposed Grid Connection.

Current land-use on the Proposed Wind Farm site is predominantly comprised of peat cutting activities, commercial forestry, and pastoral agriculture land. Current land-use along the Proposed Grid Connection comprises of public road corridor, public open space, coniferous forestry, private track, and private land principally used by agriculture. Land-use on the wider landscape comprises a mix of pastoral agriculture, peatlands, low-density residential, and small-scale commercial properties.

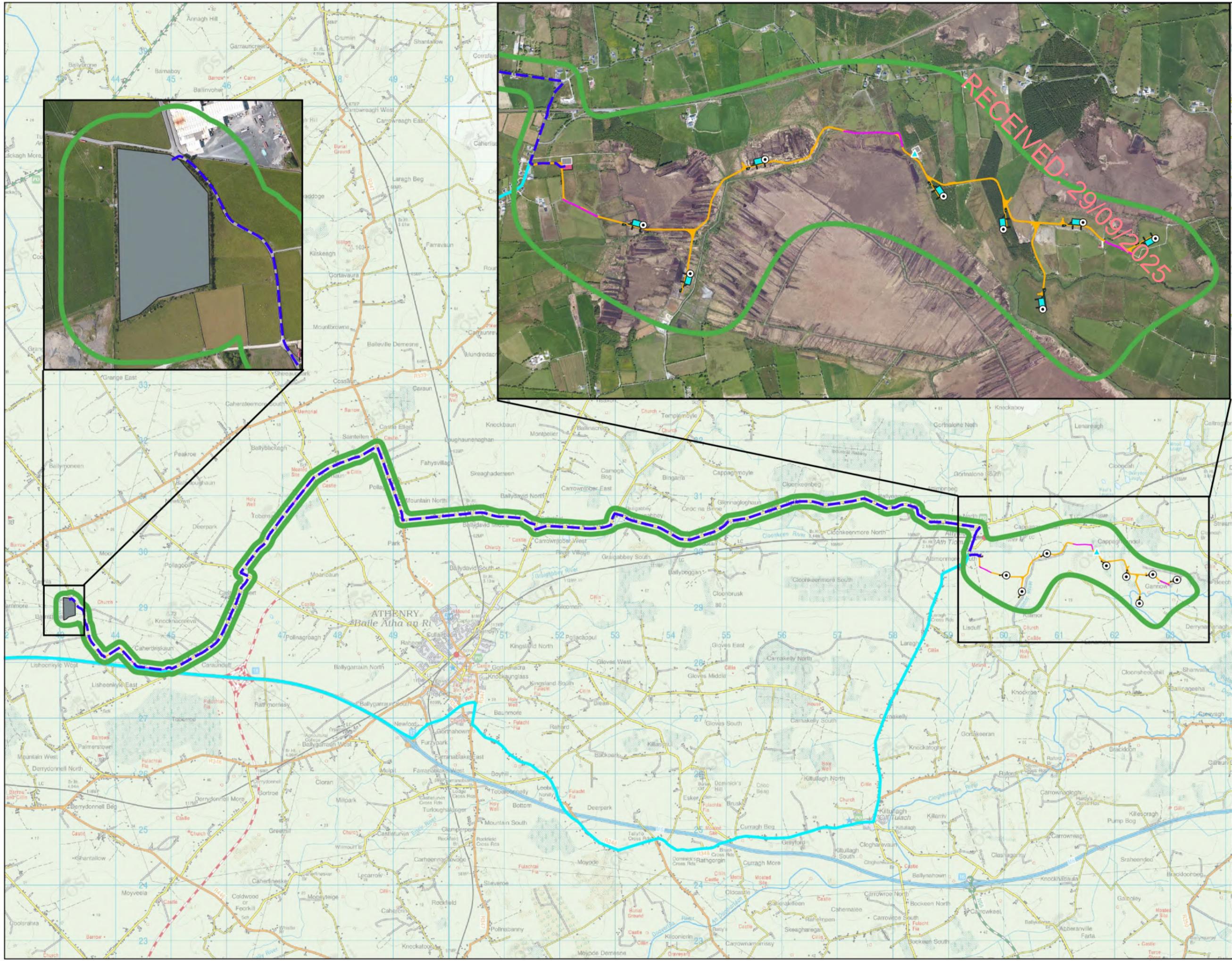
The Site location is described in detail in Chapters 1 to 16 of the EIAR.

## 4.2 Proposed Project Layout

The overall layout of the Proposed Project is shown on Figure 4-1, this illustrates the Proposed Wind Farm and the Proposed Grid Connection.

The Proposed Project has been designed to minimise potential environmental effects, while at the same time maximising the energy yield from the Proposed Wind Farm. A constraints study, as described in Section 3.2.5.2.1 of this EIAR, has been carried out to ensure that turbines and ancillary infrastructure are located in the most appropriate areas of the Site and makes use of the existing access tracks within the Site where appropriate thereby minimising the extent of proposed new roads required. Similarly, as described in Section 3.2.6 of this EIAR, a route selection constraints study was undertaken to ensure that the most appropriate route for the Proposed Grid Connection underground cabling was selected. The Proposed Wind Farm layout is shown in Figure 4-2. The Proposed Grid Connection layout is shown in Figure 4-3.

The overall layout of the Proposed Project is shown on Figure 4-1. This drawing shows the proposed locations of the wind turbines, met mast, onsite 38kV substation, the underground electrical cabling route to the Cashla 220kV substation, peat and spoil management areas, temporary construction compounds, internal access roads and hardstand areas, and the proposed site entrance, which includes turbine delivery temporary accommodation works. Detailed site layout drawings of the Proposed Project are included in Appendix 4-1 to this EIAR.



- Map Legend**
- EIAR Site Boundary
  - Proposed Turbine Layout
  - Proposed Turbine Foundations
  - Proposed Hardstands
  - Proposed Met Mast
  - Proposed Upgrades to Existing Roads
  - Proposed New Roads
  - Proposed Temporary Construction Compounds
  - Proposed Grid Connection
  - Proposed Onsite 38kV Substation
  - Cashla 220kV Substation
  - Proposed Turbine Delivery Route

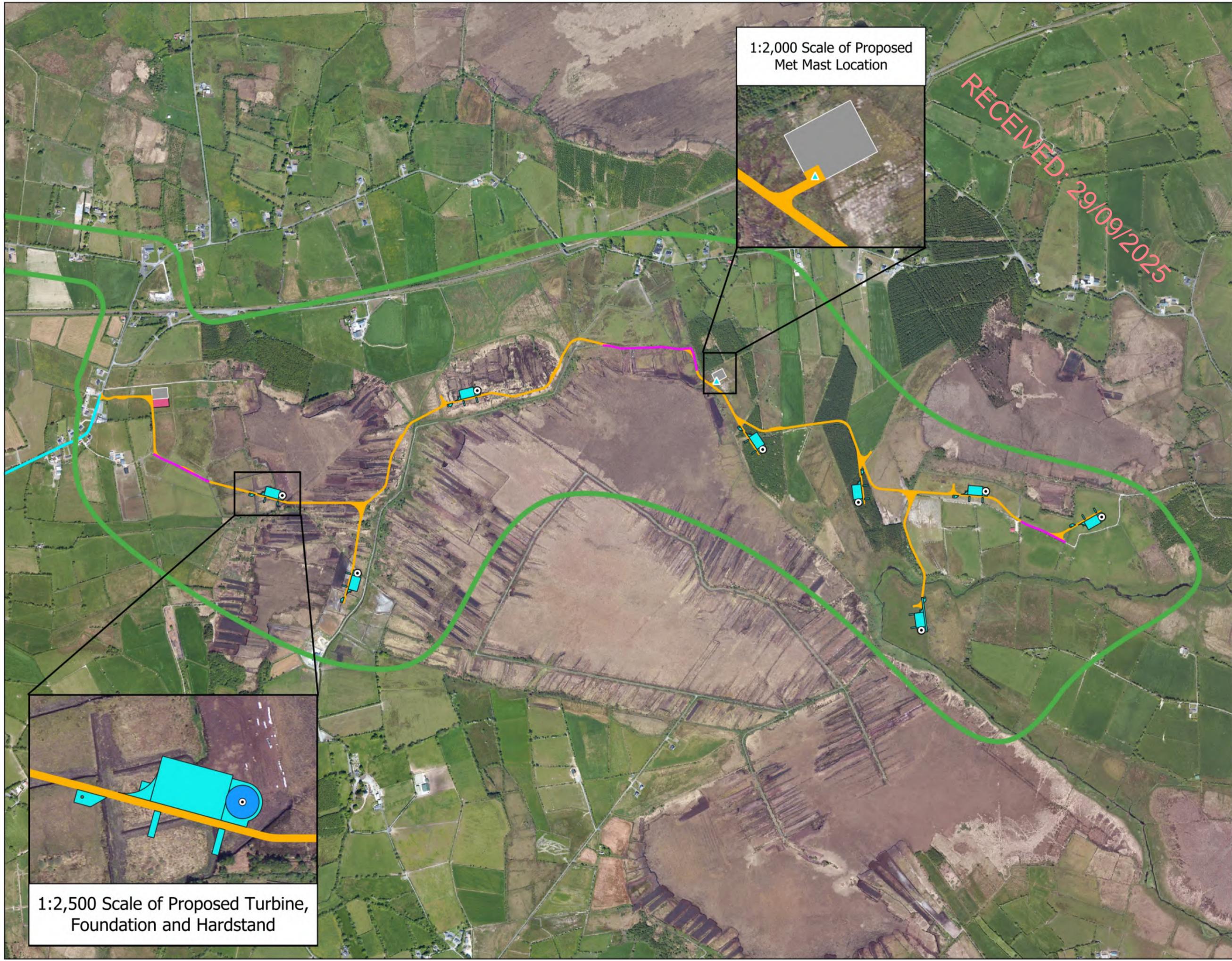
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**Proposed Project Layout**

Project Title  
**Gannow Renewable Energy Development**

Drawn By <b>CJ</b>	Checked By <b>EC</b>
Project No. <b>240323</b>	Drawing No. <b>Figure 4-1</b>
Scale <b>1:60,000</b>	Date <b>2025-09-15</b>

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- Map Legend**
- EIA Site Boundary
  - Proposed Turbine Layout
  - Proposed Turbine Foundations
  - Proposed Hardstands
  - Proposed Met Mast
  - Proposed Upgrades to Existing Roads
  - Proposed New Roads
  - Proposed Temporary Construction Compounds
  - Proposed Onsite 38kV Substation
  - Proposed Turbine Delivery Route

1:2,000 Scale of Proposed Met Mast Location

1:2,500 Scale of Proposed Turbine, Foundation and Hardstand

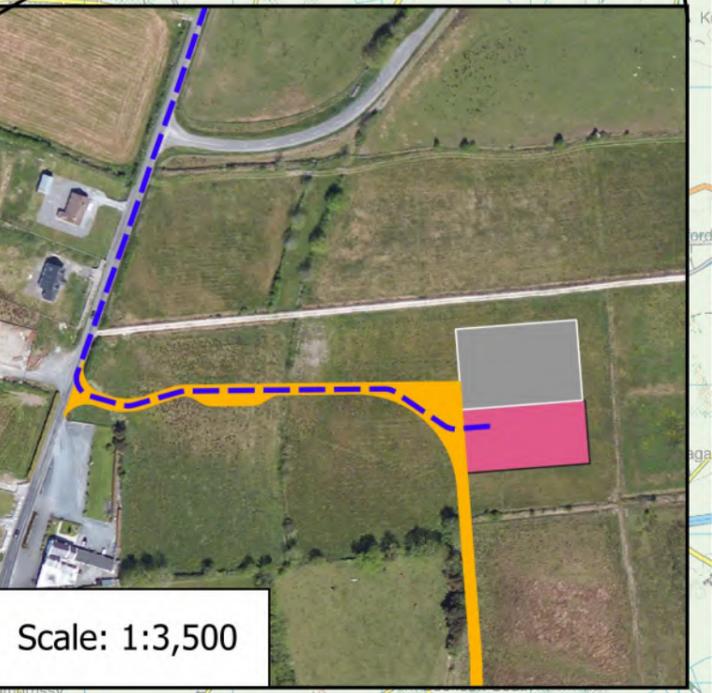
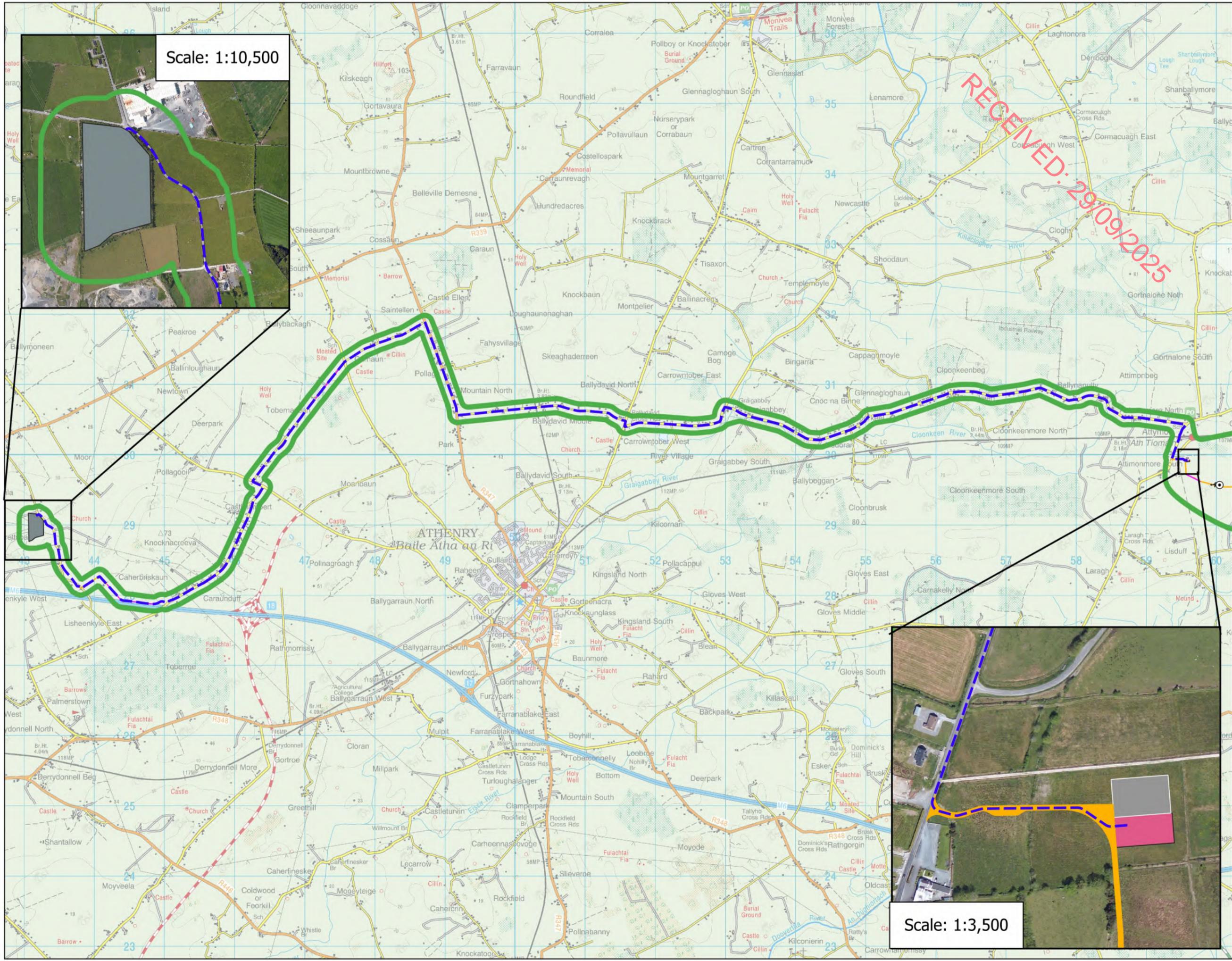
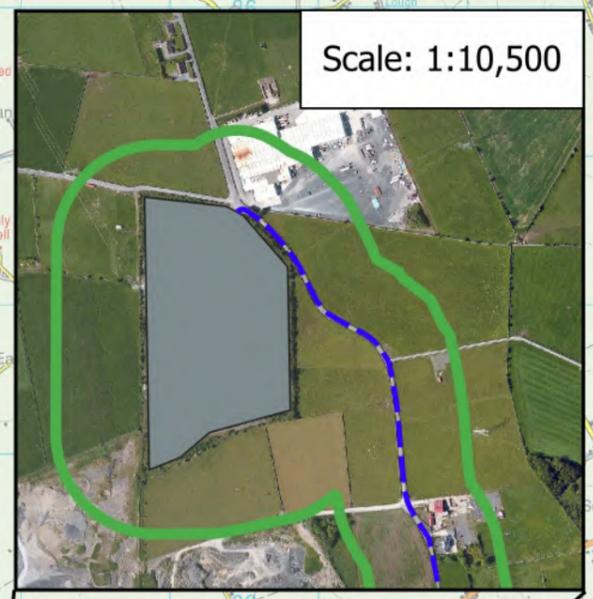
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<b>Proposed Wind Farm Layout</b>	
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Project No. <b>240323</b>	Drawing No. <b>Figure 4-2</b>
Scale <b>1:12,500</b>	Date <b>2025-09-08</b>
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Scale: 1:10,500



Scale: 1:3,500

- Map Legend**
- EIAR Site Boundary
  - Proposed Grid Connection
  - Cashla 220kV Substation
  - Proposed Temporary Construction Compounds
  - Proposed New Roads
  - Proposed Onsite 38kV Substation

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Drawing Title <b>Proposed Grid Connection Layout</b>	
Project Title <b>Gannow Renewable Energy Development</b>	
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Project No. <b>240323</b>	Drawing No. <b>Figure 4-3</b>
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## 4.3 Proposed Project Components

This section of the EIAR describes the components of the Proposed Project. Further details regarding Site Activities (Section 4.4), Access and Transportation (Section 4.5), Site Drainage (Section 4.6), Construction Management (Section 4.7) and Construction Methodologies (Section 4.8) are provided subsequently in this chapter.

### 4.3.1 Proposed Wind Farm

#### 4.3.1.1 Wind Turbines

##### 4.3.1.1.1 Turbine Locations

The proposed turbine layout has been optimised using wind farm design software (WindPro) to maximise the energy yield from the Proposed Project, while maintaining sufficient distances between the proposed turbines to ensure turbulence and wake effects do not compromise turbine performance. The ITM Grid Reference coordinates of the proposed turbine locations are listed in Table 4-1 below. The final finished top of foundation level of the turbine foundations will be determined by the actual ground conditions at each proposed turbine location and may differ slightly from those levels listed in Table 4-1.

Table 4-1 Proposed Wind Turbine Locations and top of foundation level

Turbine	ITM X	ITM Y	Top of Foundation Levels (metre OD)
1	560006	729599	71.5
2	560288	729308	69.5
3	560737	729992	72.5
4	561808	729771	74.5
5	562167	729573	76
6	562645	729614	76
7	563080	729518	73.5
8	562403	729093	70.6

##### 4.3.1.1.2 Site Investigation

As part of the design process for the Proposed Project, numerous intrusive site investigations were undertaken across the Proposed Wind Farm site, to provide detail and clarity on the nature and extent of sublayers and bedrock as a means of characterising the Proposed Wind Farm site. This assisted in providing additional information on the most suitable location for turbines and associated infrastructure.

Geotechnical ground investigations (i.e. trial pitting) were undertaken on the 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>, and 10<sup>th</sup> of October 2024, under the supervision of Fehily Timoney & Company Ltd. (FTC) and the MKO Ecology team. The combined geological and hydrological dataset collected from the geotechnical ground investigations and from ground truthing site walkovers completed by FTC, Hydro-Environmental Services (HES) and MKO have been used in the preparation of this EIAR Chapter.

The objectives of the intrusive site investigations included mapping the subsoil lithology for all proposed turbines and other identified locations and assessing the underlying bedrock. This data was used to inform the final layout of the Site.

In summary, a total of 12 no. trial pits, supervised by FTC, were carried out at all proposed turbine locations and at other identified locations to investigate the underlying mineral soil lithology and subsoil/bedrock interface. Full detail of the 12 no. trial pits conducted on site can be viewed in Appendix 8-1 Peat Stability Risk Assessment.

The complete geotechnical ground investigations were carried out in accordance with IS EN 1997-2 and BS5930:2015+A1:2020 Code of Practice for Ground Investigations with precedence given to IS EN 1997-2 where applicable.

#### 4.3.1.1.3 Turbine Type

Wind turbines use the energy from the wind to generate electricity. A wind turbine, as shown in Plate 4-1 below, consists of four main components:

- > Foundation unit
- > Tower
- > Nacelle (turbine housing)
- > Rotor



Plate 4-1 Wind Turbine Components

The proposed wind turbines to be installed on the Proposed Wind Farm will have the following dimensions:

- > Turbine Total Tip Height – 178m to 185m
- > Hub Height – 101m to 104m
- > Rotor Diameter – 149m to 163m

Modern wind turbines from the main turbine manufacturers have evolved to share a common appearance and other major characteristics, with only minor cosmetic differences differentiating one from another. The wind turbines that will be installed on the Proposed Wind Farm will be conventional three-blade turbines, that will be geared to ensure the rotors of all turbines rotate in the same direction at all times.

The turbines will be multi-ply coated to protect against corrosion. It is proposed that the turbines would be of a light grey colour to blend into the sky background to minimise visual impact as recommended in the Guidelines and ‘*The Influence of Colour on the Aesthetics of Wind Turbine Generators*’ (ETSU, 1999).

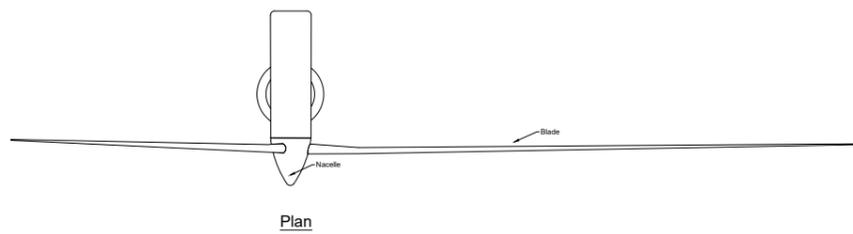
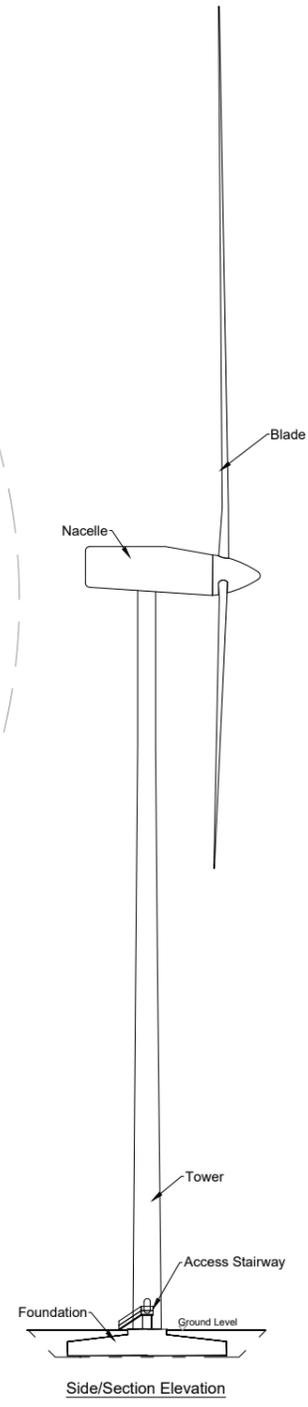
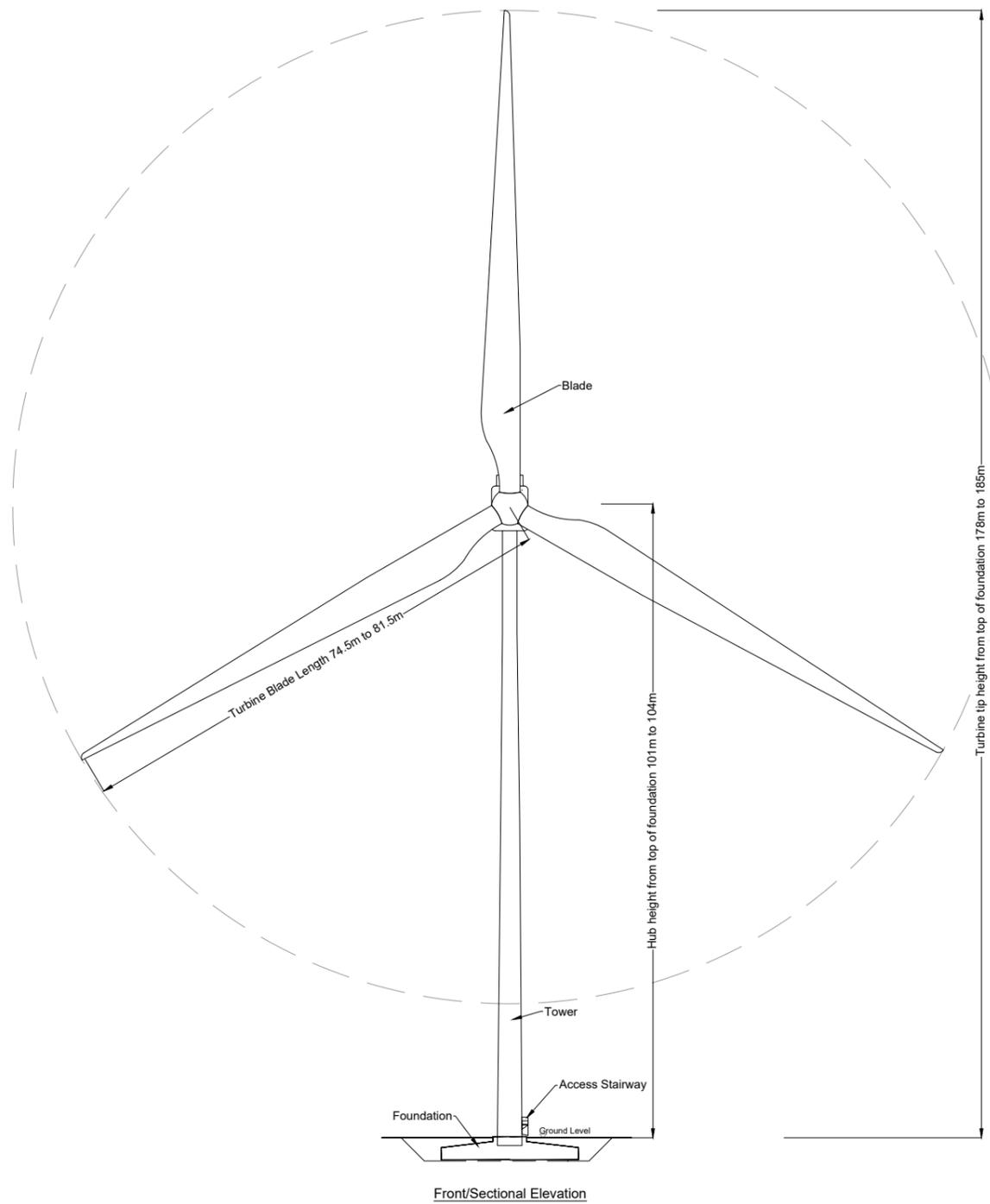
As detailed in Section 1.7.3, for the purposes of this EIAR and in compliance with the design flexibility opinion issued by Galway County Council and further detailed in Chapter 2 Background of the Proposed Project, Section 2.7.3.1.1, various types and sizes of wind turbines, within the proposed ranges outlined above, have been selected for the purpose of assessing the likely environmental effects of the turbines throughout this EIAR. This allows for a robust assessment of the likely environmental effects of wind turbines within the proposed dimension range. Turbine design parameters have a bearing on the assessment of shadow flicker, noise, visual impact, traffic and transport and ecology (specifically birds), as addressed elsewhere in this EIAR.

It should also be noted that the assessment of the development footprint of the Proposed Project, within this EIAR, is based on the maximum potential footprint for all infrastructural elements. This precautionary approach is taken as the assessment of the maximum development footprint will, in the absence of mitigation measures, give rise to the greatest potential for significant effects. Should the development footprint be less than the maximum, this in itself will further mitigate the assessed effects.

A drawing of the proposed wind turbine is shown in Figure 4-4.

The individual components of a geared wind turbine nacelle and hub are shown in Figure 4-5 below.

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**Drawing Notes**

1. Proposed wind turbines to have a maximum ground to blade tip height of 185m, blade length of 81.5m and hub height of 103.5m

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DRAWING TITLE: <b>Wind Turbine Elevations and Plan</b>			
PROJECT No.: <b>240323</b>	DRAWING No.: Figure 4.4	SCALE: <b>1:500 @ A1</b>	
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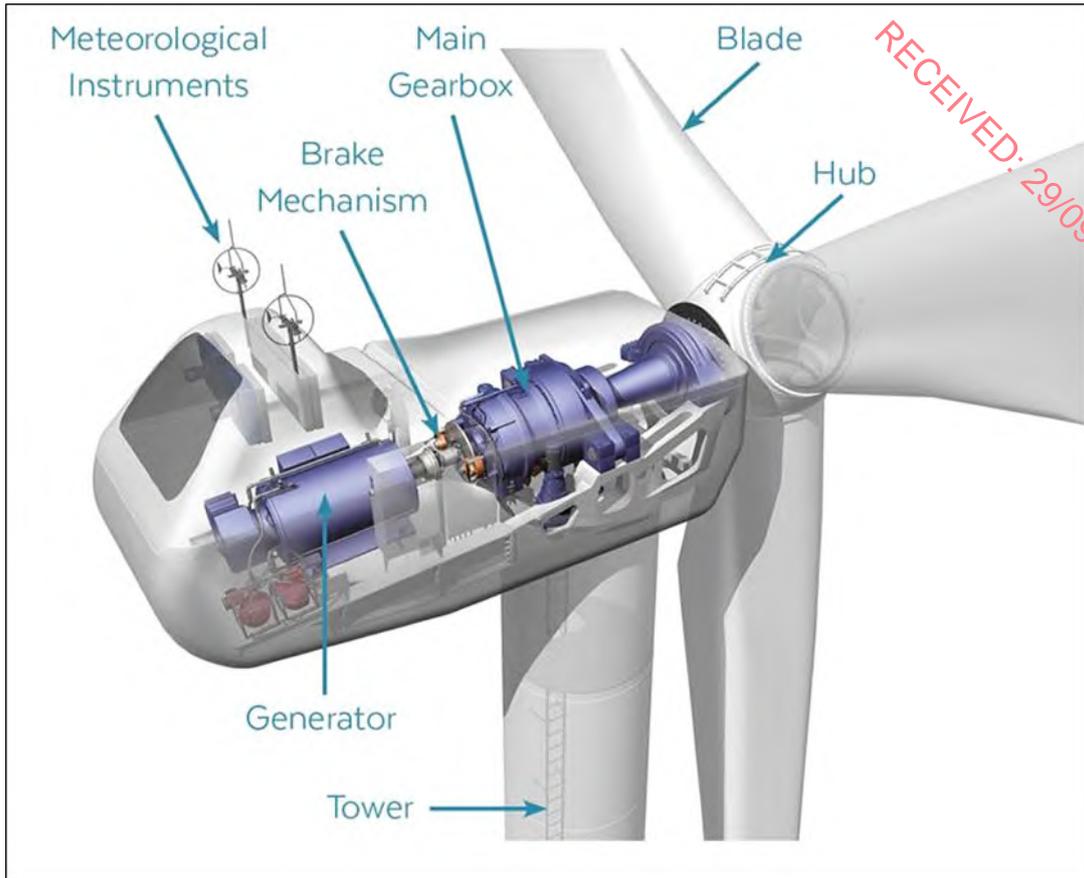


Figure 4-5 Turbine nacelle and hub components

#### 4.3.1.1.4 Turbine Foundations

Each wind turbine is secured to a reinforced concrete foundation that is installed below the finished ground level. The size of the foundation will be dictated by the turbine manufacturer, and the final turbine selection will be the subject of a competitive tender process. Different turbine manufacturers use circular turbine foundations with some variation, depending on the requirements of the final turbine supplier, however, a foundation area large enough to accommodate modern turbine models has been assessed in this EIAR adopting a precautionary approach. The turbine foundation transmits any load on the wind turbine into the ground. The maximum horizontal and vertical extent of the turbine foundation will be 25m and 3.5m respectively. Where ground conditions are unfavourable to excavate and replace, piles will be installed to formation level. Both foundation options have been assessed in this EIAR and are shown in Figure 4-6 and Figure 4-7.

After the foundation level of each turbine has been formed using piling methods or on competent strata (i.e., bedrock or sublayer of sufficient load bearing capacity), the “Anchor Cage” (anchors the first section of the turbine tower to the foundation) is levelled and reinforcing steel is then built up around and through the anchor cage. The outside of the foundation is shuttered with demountable formwork to allow the pouring of concrete and is backfilled accordingly with appropriate granular fill to finished surface level (Plate 4-2 and Plate 4-3 below).



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Plate 4-2 Turbine Foundation Anchor Cage surrounded by reinforcing steel.



Plate 4-3 Finished Turbine Foundation

#### 4.3.1.1.5 **Hard Standing Areas**

Hard standing areas consisting of levelled and compacted hardcore are required around each turbine base to facilitate access, turbine assembly and turbine erection. The hard-standing areas are used to accommodate cranes used in the assembly and erection of the turbine, offloading and storage of turbine components, and provide a safe, level working area around each turbine position. The hard-standing areas are extended to cover the turbine foundations once the turbine foundation is in place. All crane hardstand areas will be designed taking account of the loadings provided by the turbine manufacturer and will consist of a compacted stone structure. The main body of the crane hardstands (i.e not including the blade fingers and turbine foundation) will be constructed in a similar manner to the excavated site roads. The main body of the crane hardstand area will measure approximately 35m x 55m.

The precise sizes, arrangement and positioning of hard standing areas are informed by the turbine manufacturers. The extent of the required areas at each turbine location may be optimised on-site depending on topography, position of the Proposed Wind Farm access road, the proposed turbine position and the turbine supplier's exact requirements.

Figure 4-6 and Figure 4-7 shows a turbine base layout (Turbine No. 1), including turbine foundation, hard standing area, blade lay-down area, access road and surrounding works area. The proposed hard standing areas for each individual turbine are shown as part of the detailed layout drawings included in Appendix 4-1 and using the precautionary principle, represent the maximum sizes required.

A temporary works area has been identified around each of the proposed turbines hardstand areas; these areas will be utilised during the construction phase to facilitate all works with the construction of the proposed turbines and associated infrastructure. These temporary works areas are shown within the planning drawings included as Appendix 4-1 to this EIAR.

#### 4.3.1.1.6 **Generating Capacity**

Modern wind turbine generators currently have a typical generating capacity in the 4 to 7 MW range, with the generating capacity continuing to evolve upwards as technology improvements are achieved by the turbine manufacturers. Turbines of the exact same make, model and dimensions can have different generating potential depending on the capacity of the electrical generator installed in the turbine nacelle. The exact generating capacity of the installed turbine will be designed to match the wind regime on the Proposed Wind Farm site and will be determined by the selected manufacturer.

Please note, the MW output of the Proposed Wind Farm is considered to be a consequence of turbine design and not a physical attribute on which it is possible to measure or assess the impact of. For the purposes of this EIAR, a rated output of 6.1MW has been chosen to calculate the potential generating capacity of the proposed 8-turbine renewable energy development, which would result in an estimated installed capacity of 48.8MW.

Assuming an installed capacity of 48.8MW, the Proposed Wind Farm therefore has the potential to produce up to 149,620MWh (megawatt hours) of electricity per year, based on the following calculation:

$$A \times B \times C = \text{Megawatt Hours of electricity produced per year}$$

where:

A = The number of hours in a year: 8,760 hours

B = The capacity factor, which takes into account the intermittent nature of the wind, the availability of wind turbines and array losses etc. A capacity factor of 35%<sup>1</sup> is used here.

C = Rated output of the wind farm: 48.8MW

The 149,620MWh of electricity produced by the Proposed Wind Farm would be sufficient to supply approximately 35,624 Irish households with electricity per year, based on the average Irish household using 4.2 MWh of electricity<sup>2</sup> (this latest figure is available from the March 2017 CER Review of Typical Consumption Figures Decision Paper).

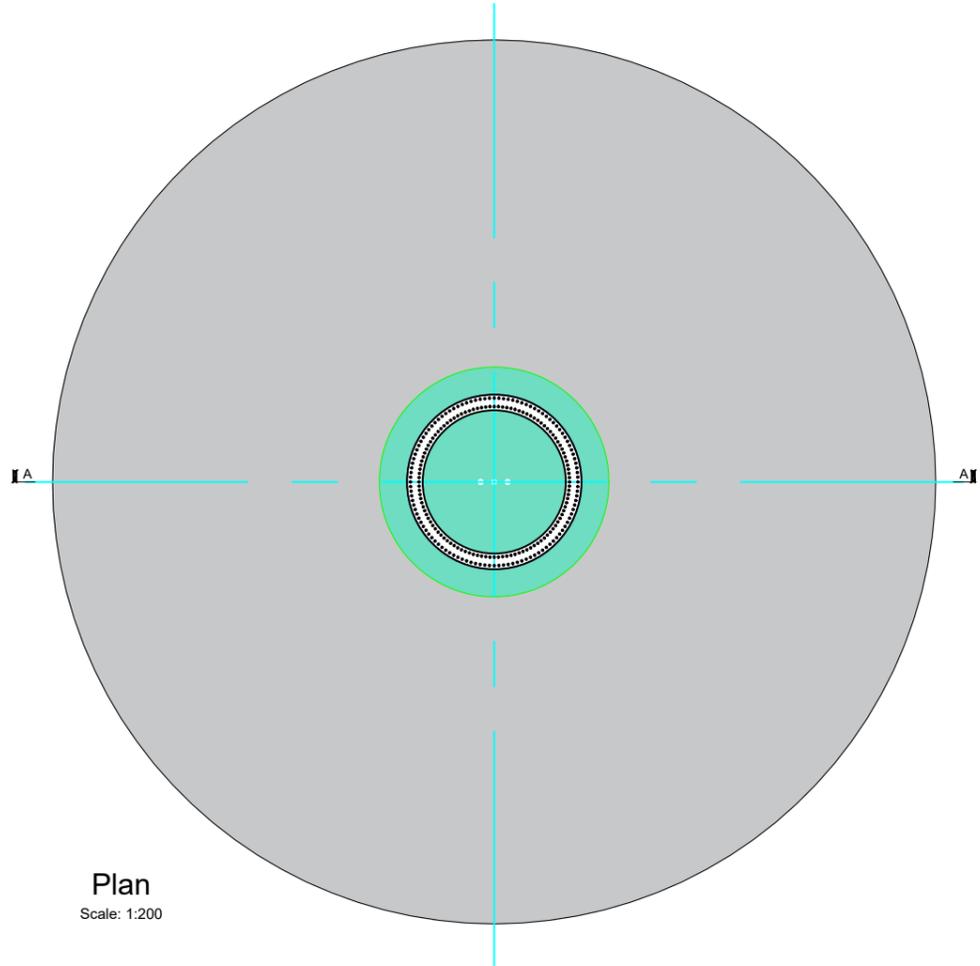
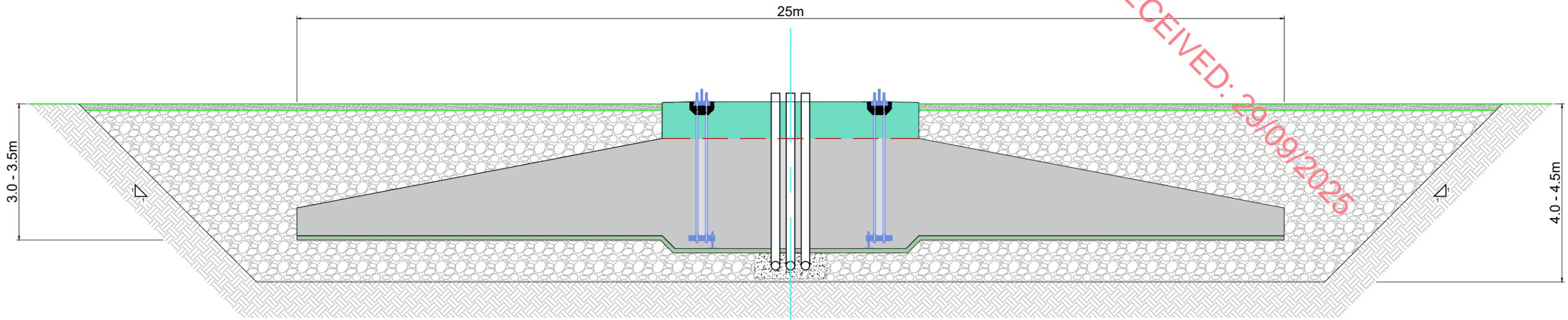
<sup>1</sup> *Enduring Connection Policy 2.3 Solar and Wind Constraints Report: Assumptions and Methodology* <<https://cms.eirgrid.ie/sites/default/files/publications/ECP-2.3-Solar-and-Wind-Constraints-Report-Assumptions-and-Methodology-v1.1.pdf>> The Proposed Project is located within the B wind region for Ireland with an associated capacity factor of 35%.

<sup>2</sup> *March 2017 CER (CRU) Review of Typical Consumption Figures Decision Paper* <[https://www.cru.ie/document\\_group/review-of-typical-consumption-figures-decision-paper](https://www.cru.ie/document_group/review-of-typical-consumption-figures-decision-paper)>

The 2022 Census of Ireland recorded a total of 68,021 occupied households in Co. Galway. Per annum, based on a capacity factor of 35%, the Proposed Project would therefore produce sufficient electricity for the equivalent of 52% of the households in Co. Galway.

With regards to the modern turbine range, i.e., those available on the market at the time of writing, of 4 – 7MW, the resulting electricity produced would range from 98,112MWh to 171,696MWh per annum. The lower end of this range (98,112MWh) would be sufficient to supply approximately 23,360 Irish households with electricity per year, based on the average Irish household using 4.2MWh of electricity. The higher end of this range (171,696MWh) would be sufficient to supply approximately 40,880 Irish households with electricity per year, based on the average Irish household using 4.2MWh of electricity. Based on the 2022 Census of Ireland results for Co. Galway, the output range would produce sufficient electricity for the equivalent of 34% and 60% respectively.

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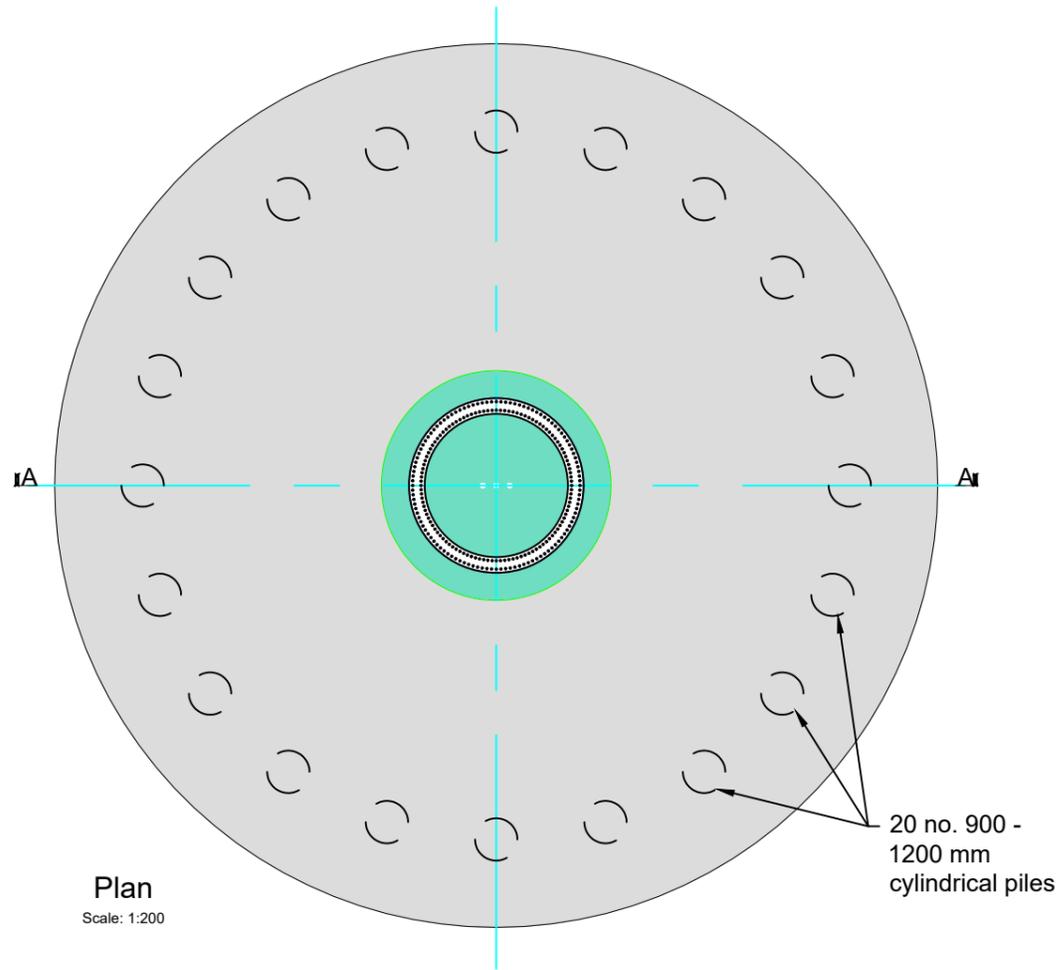
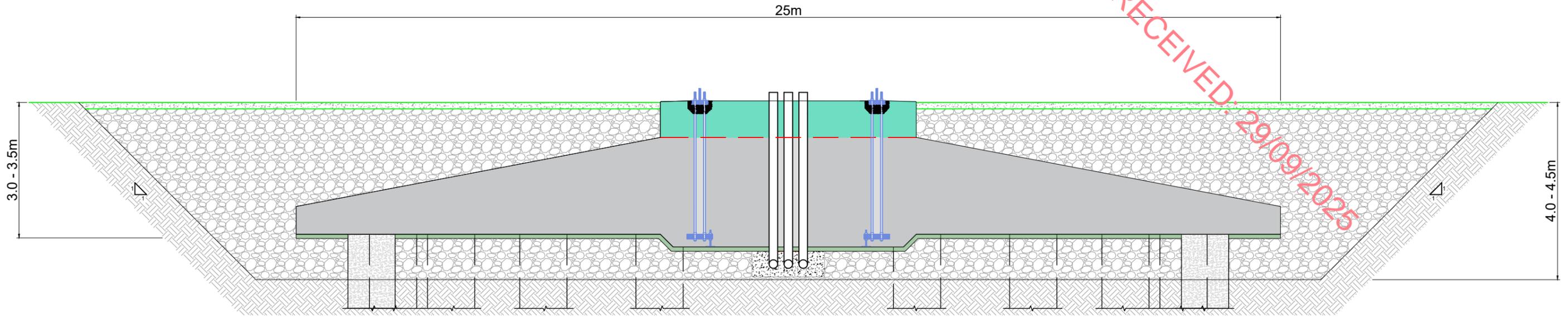


PROJECT TITLE: <b>Gannow Renewable Energy Development, Co. Galway</b>			
DRAWING TITLE: <b>Gravity Foundation Details</b>			
PROJECT No.: <b>240323</b>	DRAWING No.: Figure 4.6	SCALE: <b>As shown @ A3</b>	
DRAWN BY: <b>GO</b>	CHECKED BY: <b>AC</b>	DATE: <b>22.09.2025</b>	REVISION: P01



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PROJECT TITLE: <b>Gannow Renewable Energy Development, Co. Galway</b>			
DRAWING TITLE: <b>Bored Pile Foundation Details</b>			
PROJECT No.: <b>240323</b>	DRAWING No.: <b>Figure 4.7</b>	SCALE: <b>As shown @ A3</b>	
DRAWN BY: <b>GO</b>	CHECKED BY: <b>AC</b>	DATE: <b>22.09.2025</b>	REVISION: P01



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## 4.3.1.2 Site Roads

### 4.3.1.2.1 Road Construction Types

To provide access within the Proposed Wind Farm and along the Proposed Grid Connection to connect the wind turbines and associated infrastructure and to provide access to ESB in private land along the Proposed Grid Connection, existing roads and tracks will need to be upgraded, and new access roads will need to be constructed. The construction methodology and specifications outlined in the FTC Peat and Spoil Management Plan will be the applied to all road works proposed.

FTC were appointed to assess the existing ground conditions and specify the type of road required to access all locations onsite. The road construction design has taken into account the following key factors as stated in the FTC Peat and Spoil Management Plan in Appendix 4-2:

1. *Buildability considerations*
2. *Maximising use of existing infrastructure*
3. *Minimising excavation arisings*
4. *Serviceability requirements for construction and wind turbine delivery and maintenance vehicles*
5. *Requirement to minimise disruption to peat hydrology*

Whilst the above key factors are used to determine the road design, the actual construction technique employed for a particular length of road will be determined on the prevailing ground conditions encountered along that length of road.

The Proposed Project makes use of the existing road network insofar as possible. It is proposed to upgrade approximately 2.4km of existing roads and tracks, and to construct approximately 6.6km of new access road as part of the Proposed Project. It is proposed to construct passing bays along the proposed access road network in order to allow construction traffic to safely pass each other while travelling in opposite directions. Areas such as wide junctions and proposed hardstands will also be used as passing bays throughout the construction phase of the Proposed Wind Farm.

The road construction techniques to be considered are as follows:

- > Upgrades of Existing Access Roads or Tracks
- > Construction of New Floating Roads
- > Construction of New Excavated Roads

#### Upgrade of Existing Access Roads or Tracks

As noted above, approximately 2.4km of existing roads and access tracks will be upgraded as part of the Proposed Project construction phase. The general construction methodology for upgrading of existing sections of access roads or tracks, as presented in FTC's *Peat & Spoil Management Plan* in Appendix 4-2 of this EIAR, is summarised in Section 4.8.1.2.1 below. Sections of road undergoing upgrades are shown in Figure 4-8 below.

#### Construction of New Floating Roads

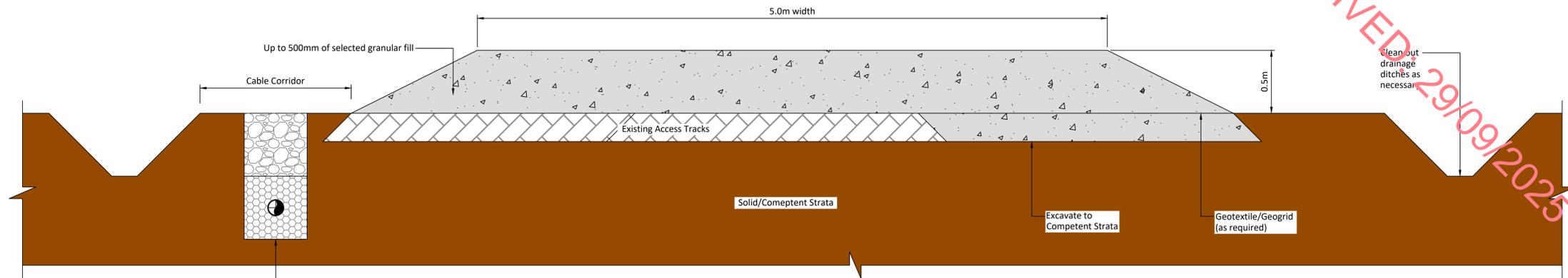
As noted above, approximately 6.6km of new roads will be constructed in order to facilitate the Proposed Wind Farm; approximately 1.8km being new floating roads. The general construction methodology for the construction of new floating access roads or tracks, as presented in FTC's *Peat & Spoil Management Plan* in Appendix 4-2 of this EIAR, is summarised in Section 4.8.1.2.2 below. Sections of New Floating Roads are shown in Figure 4-9 below.

## Construction of New Excavated Roads

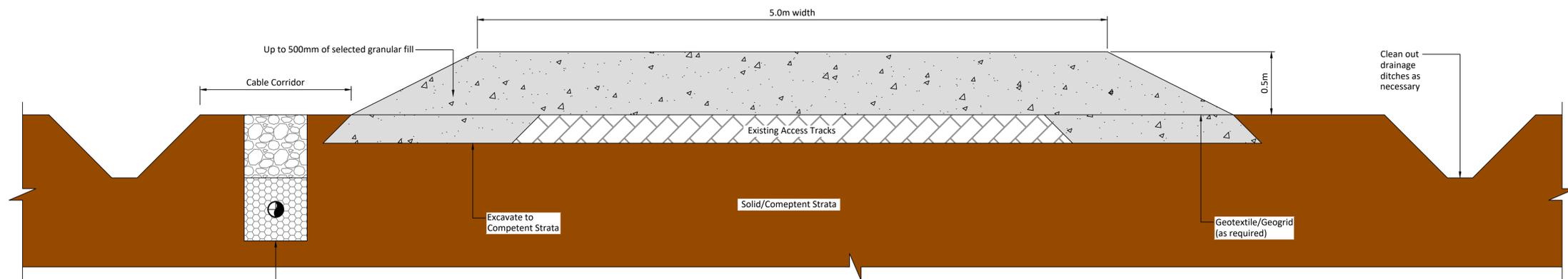
As noted above, approximately 6.6km of new roads will be constructed in order to facilitate the Proposed Project; approximately 4.8km being new excavated roads. The general construction methodology for the construction of new floating access roads or tracks, as presented in FTC's *Peat & Spoil Management Plan* in Appendix 4-2 of this EIAR, is summarised in Section 4.8.1.2.2 below. Sections of New Excavated Roads are shown in Figure 4-10 below.

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Indicative cable duct trench (only located on one side of roadway across majority of the site). Cable trench can be located on either side of the road surface or below the road but where possible it should be located on the upslope side of the road surface.



Indicative cable duct trench (only located on one side of roadway across majority of the site). Cable trench can be located on either side of the road surface or below the road but where possible it should be located on the upslope side of the road surface.

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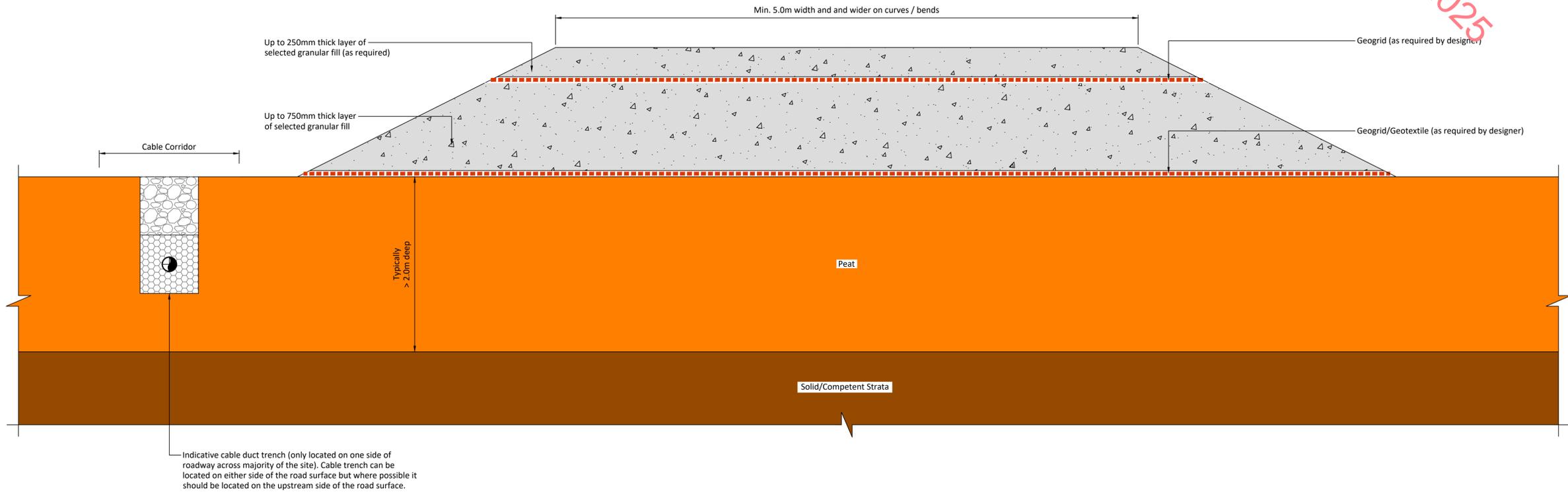
Rev.	Description	App By	Date
A	FOR INFORMATION	BDH	17.04.25
B	FOR INFORMATION	BDH	25.05.25

PROJECT	CLIENT		
GANNOW RENEWABLE ENERGY DEVELOPMENT	MKO		
SHEET <b>PEAT AND SPOIL MANAGEMENT AREAS - TYPE A - UPGRADE OF EXISTING EXCAVATED ACCESS ROAD</b>	Date	25.06.25	Project number 240323
	Drawn by	POR	Drawing Number <b>Figure 4-8</b>
	Checked by	EA	Scale (@ A1) 1:20
			Rev <b>B</b>

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25 June 2025

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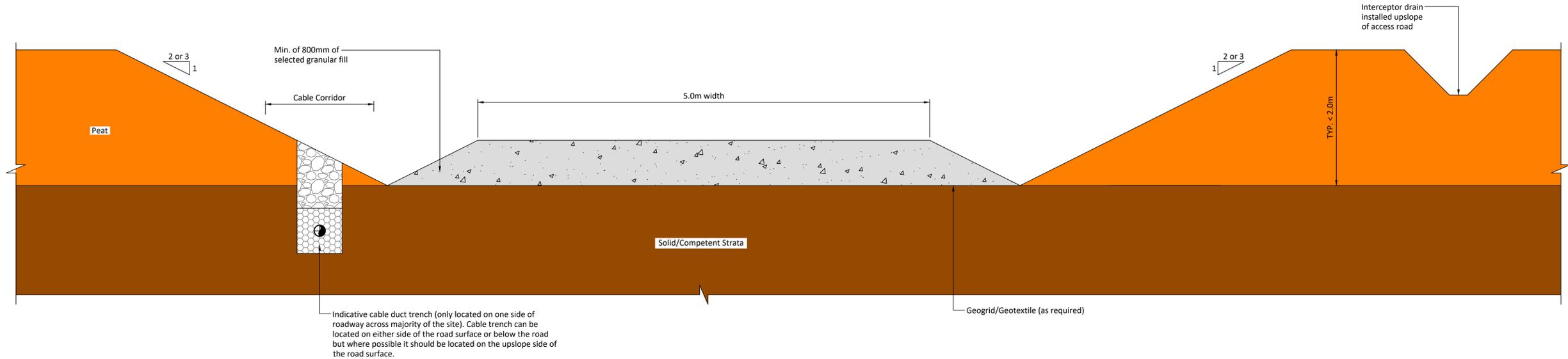
Rev.	Description	App By	Date
A	FOR INFORMATION	BDH	17.04.25
B	FOR INFORMATION	BDH	25.05.25

PROJECT		CLIENT		
GANNOW RENEWABLE ENERGY DEVELOPMENT		MKO		
SHEET		Date	Project number	Scale (@ A1)
PEAT AND SPOIL MANAGEMENT AREAS - TYPE C - NEW FLOATED ACCESS TRACK		25.06.25	240323	1:20
		Drawn by	Drawing Number	Rev
		POR	Figure 4-9	B
		Checked by	EA	

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Rev.	Description	App By	Date
A	FOR INFORMATION	BDH	17.04.25
B	FOR INFORMATION	BDH	25.05.25

PROJECT	CLIENT		
GANNOW RENEWABLE ENERGY DEVELOPMENT	MKO		
SHEET	Date	Project number	Scale (@ A1)
PEAT AND SPOIL MANAGEMENT AREAS - TYPE B - NEW EXCAVATE AND REPLACE ACCESS TRACK	25.06.25	240323	1:25
	Drawn by	Drawing Number	Rev
	POR	Figure 4-10	B
	Checked by	EA	

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25 June 2025

#### 4.3.1.3 **Underground Electrical (20/33kV) and Communications Cabling**

Each turbine and the meteorological mast (refer to Section 4.3.1.4 below) will be connected to the on-site 38kV substation via underground 20/33kV electricity cabling. Fibre-optic cables will also connect each wind turbine and the met mast to the proposed onsite 38kV substation. The electricity and fibre-optic cabling connecting to the proposed onsite 38kV substation compound will be run in cable ducts approximately 1.2 metres beneath ground level, along the sides of roadways and/or under the roadways. The route of the cable ducts will follow the access tracks and are illustrated on the site layout drawings included as Appendix 4-1; the exact number and configuration of cable ducting may vary within the cabling route. Figure 4-11 below shows two variations of a standard cable trench within the road. The cabling may be placed on either side of the roads, on both sides of the road and/or within the road. The exact configuration of the underground cabling will be set by the requirements of the electrical designers at detailed design stage.

Clay plugs (water flow barrier) will be installed at regular intervals of not greater than 50 metres along the length of the trenches where required to prevent the trenches becoming conduits for runoff water. Backfill material will be compacted in layers with approved engineer's specified material, which may be imported onto the Proposed Wind Farm site should sufficient volumes of suitable material not be encountered during the excavation phase of the proposed infrastructure.

#### 4.3.1.4 **Meteorological Mast**

One meteorological (met) mast is proposed as part of the Proposed Wind Farm. The met mast will be equipped with wind monitoring equipment at various heights. The proposed met mast will be located at E561635, N730029 (ITM) as shown on the Proposed Wind Farm layout drawing in Figure 4-1 above and the detailed site layout drawings included as Appendix 4-1. The met mast will be a free-standing slender lattice structure 30m in height. It will be constructed on a hard-standing area sufficiently large to accommodate the equipment that will be used to erect the mast. A standard detail of a meteorological mast is shown in Figure 4-12.

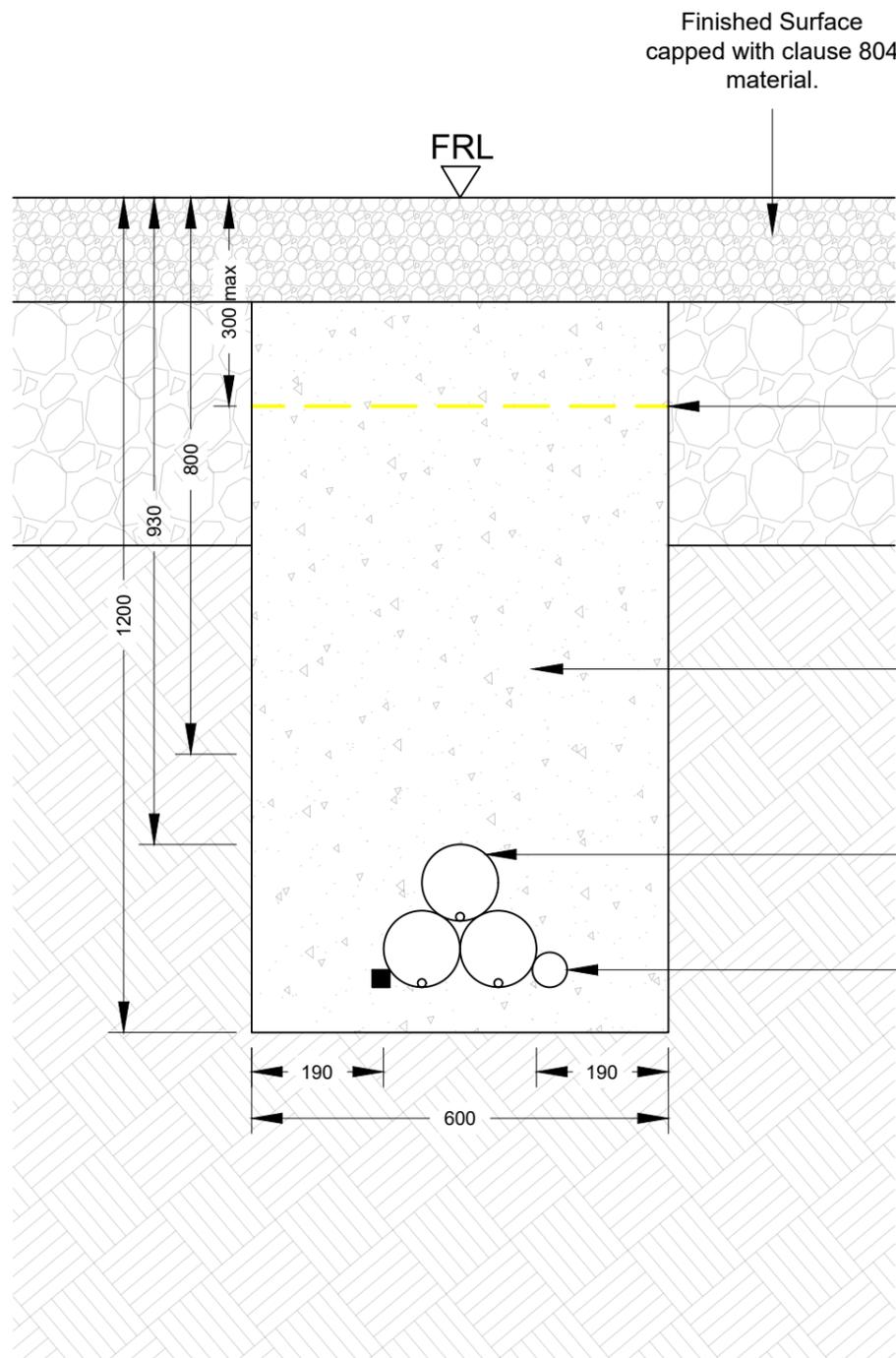
#### 4.3.1.5 **Temporary Construction Compounds**

There are 2 no. temporary construction compounds proposed as part of the Proposed Wind Farm. The primary construction compound will be located adjacent of the proposed onsite 38kV substation and measures approximately 2,400m<sup>2</sup> in area. The secondary construction compound will be located north of T04 and measures approximately 1,575m<sup>2</sup> in area.

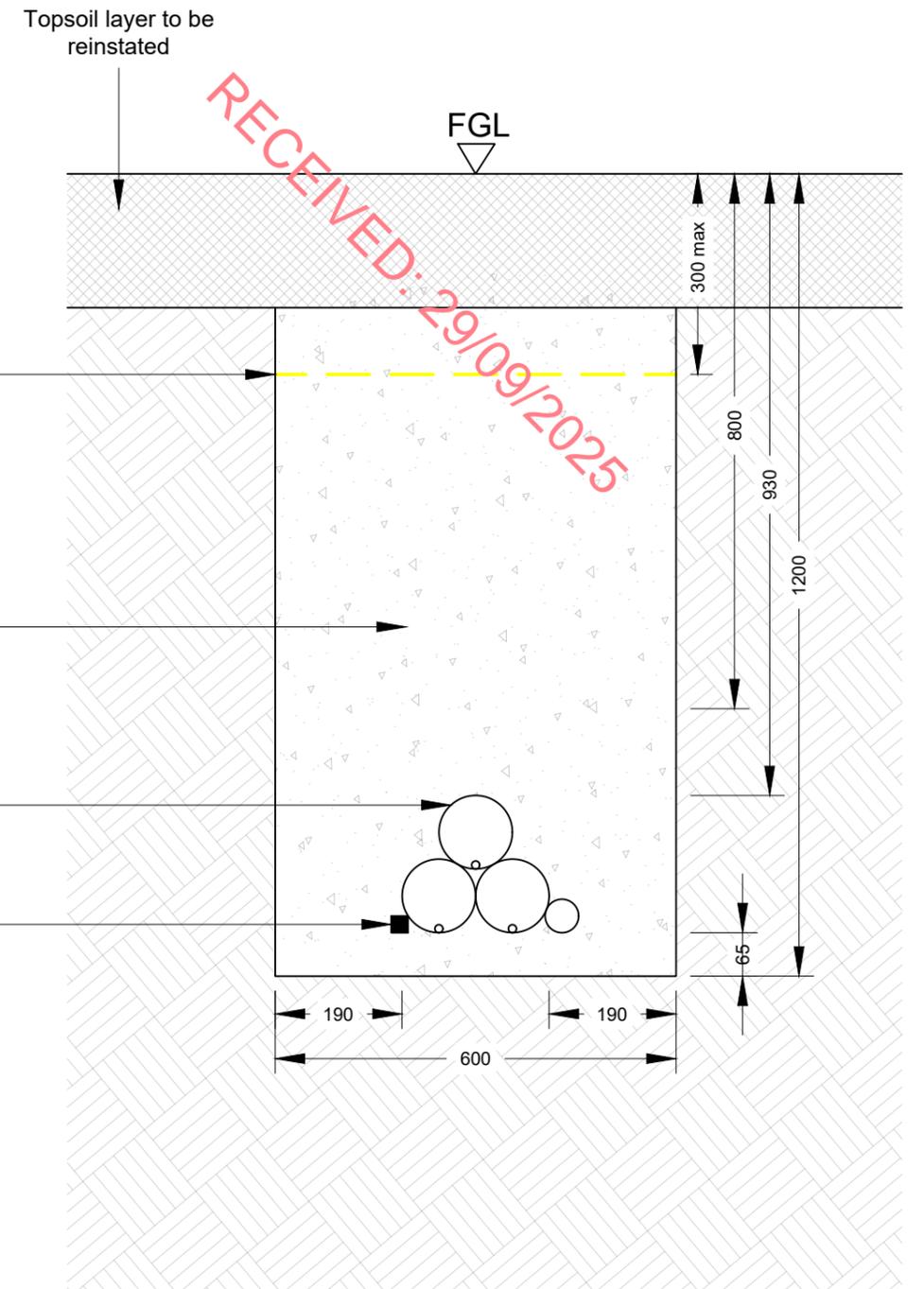
The locations of the proposed construction compounds are shown on the Proposed Wind Farm layout drawing in Figure 4-1 above. The layouts of these construction compounds are shown on Figure 4-13 and Figure 4-14 below.

The temporary construction compounds will consist of temporary site offices, staff facilities and car-parking areas for staff and visitors. Temporary port-a-loo toilets and toilets located within a staff portacabin will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. There will also be a water supply onsite for hygiene purposes, by way of a temporary storage tank. The construction compound will also include a bunded refuelling and containment area for the storage of oil, lubricants and site generators etc, and full retention oil interceptor.

Both temporary construction compounds will be removed as part of the post-construction reinstatement works of the Proposed Wind Farm. The concrete foundation of these compounds will be left in situ and will be left to revegetate naturally.



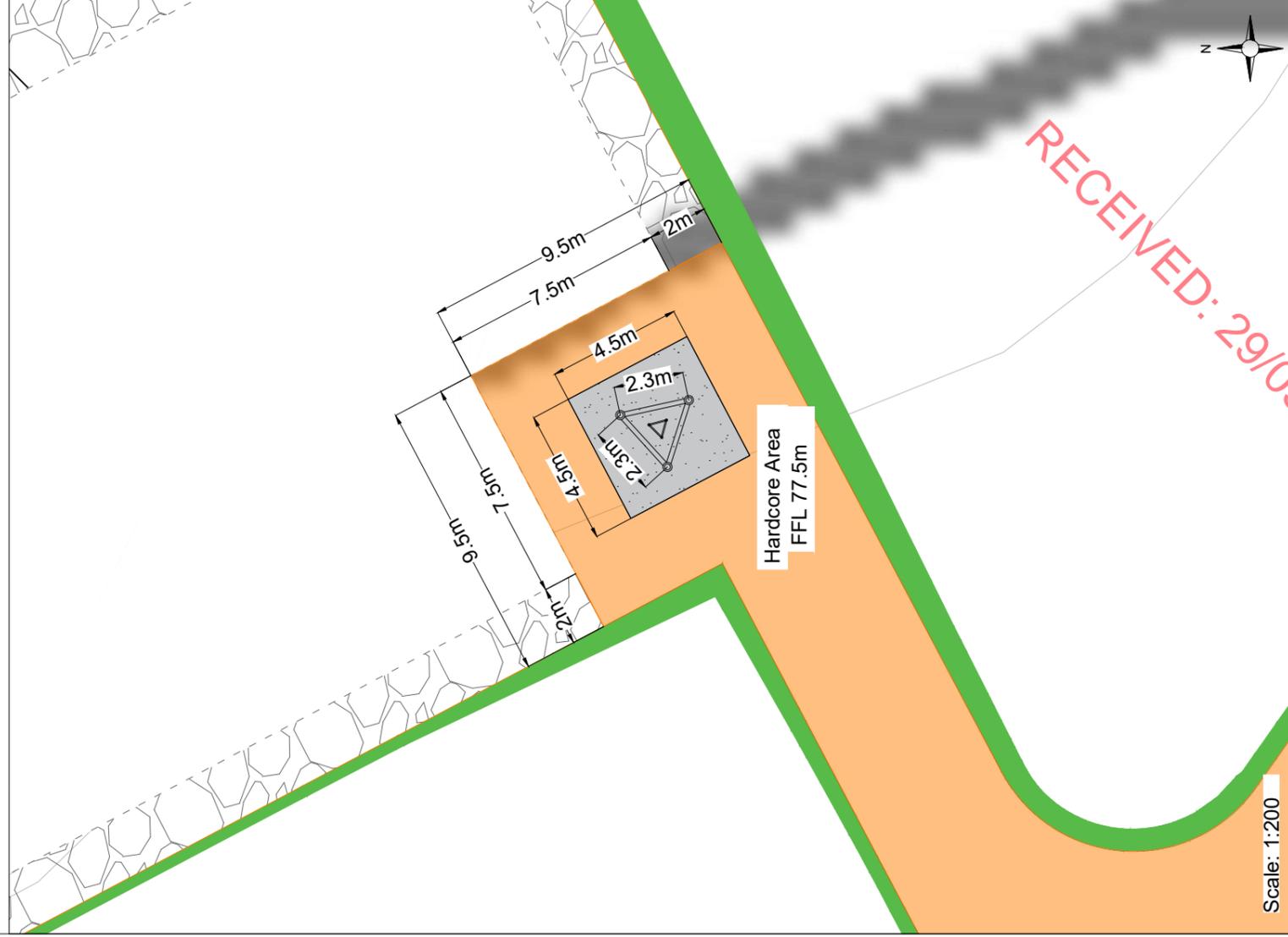
**20/33kV Cable - On Road Trench Detail - Cross Section**



**20/33kV Cable - Off Road Trench Detail - Cross Section**

PROJECT TITLE: <b>Gannow Renewable Energy Development, Co. Galway</b>			
DRAWING TITLE: <b>20/33kV Cable Trench Sections</b>			
PROJECT No.: <b>240323</b>	DRAWING No.: <b>Figure 4-11</b>	SCALE: <b>1: 10 @ A3</b>	
DRAWN BY: <b>GO</b>	CHECKED BY: <b>AC</b>	DATE: <b>22.09.2025</b>	REVISION: <b>P01</b>

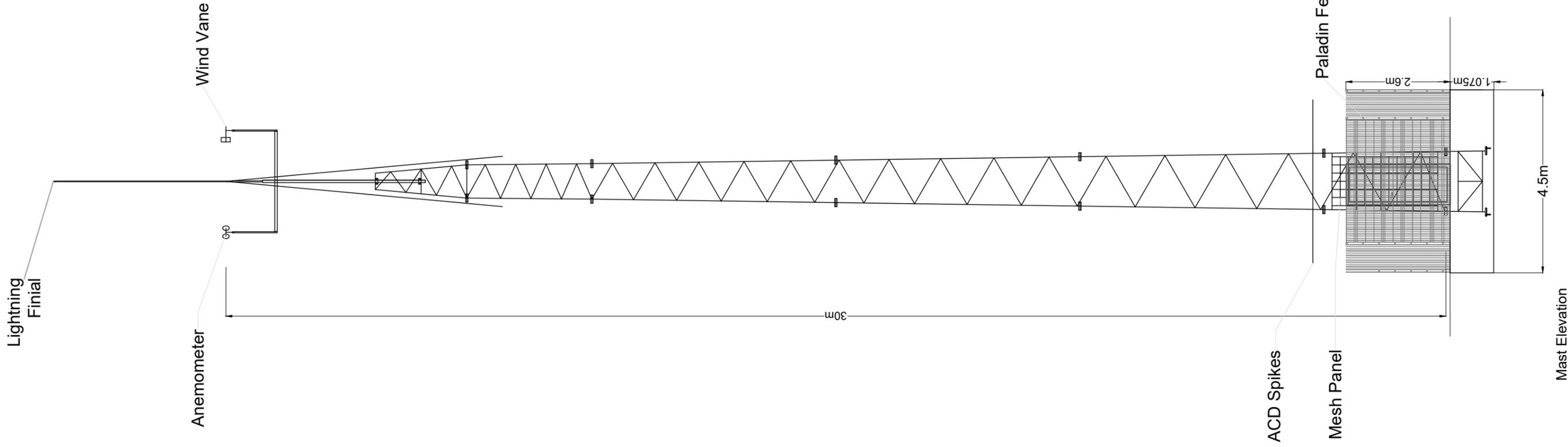




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**Note:**

1. Met Mast exact detail may differ depending on the selected manufacturer.
2. Finished level of the mast to match ground conditions.
3. Mast/foundation orientation to be confirmed with met mast supplier.
4. Earthing and ducting requirements to be confirmed with met mast supplier and forwarded to foundation designer

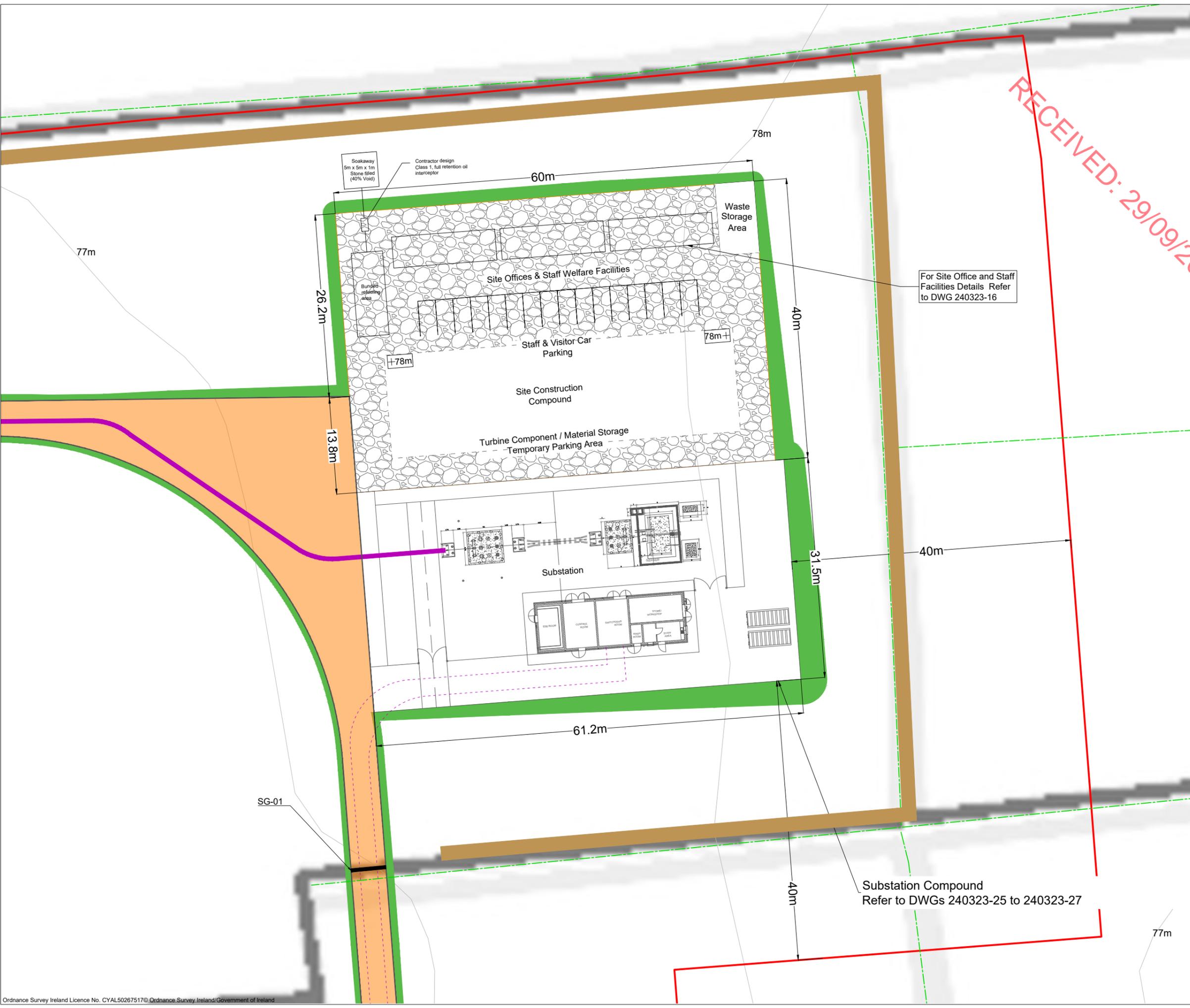


PROJECT TITLE:  
**Gannow Renewable Energy  
Development, Co. Galway**

DRAWING TITLE:  
**Metrological Mast**

PROJECT No.:	DRAWING No.:	SCALE:
240323	Figure 4-12	As shown @ A3
DRAWN BY: GO	CHECKED BY: KD	DATE: 22.09.2025
		REVISION: D01





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  7. Layout plans show typical Turbine rotor diameter as per turbine drawing.
  8. Final levels may vary depending on local ground conditions.
  9. For Drainage Layouts Refer to Drg P1706-0\_D101 to P1706-0\_D104

- Drawing Legend**
- Planning Application Boundary
  - Proposed Road
  - - - 33kV Underground Cable Route
  - - - 38kV Underground Cabling Trench
  - Security Gates (SG) - Refer DWG 240323-15 for detail
  - Proposed Linear Replanting
  - Cut
  - Fill

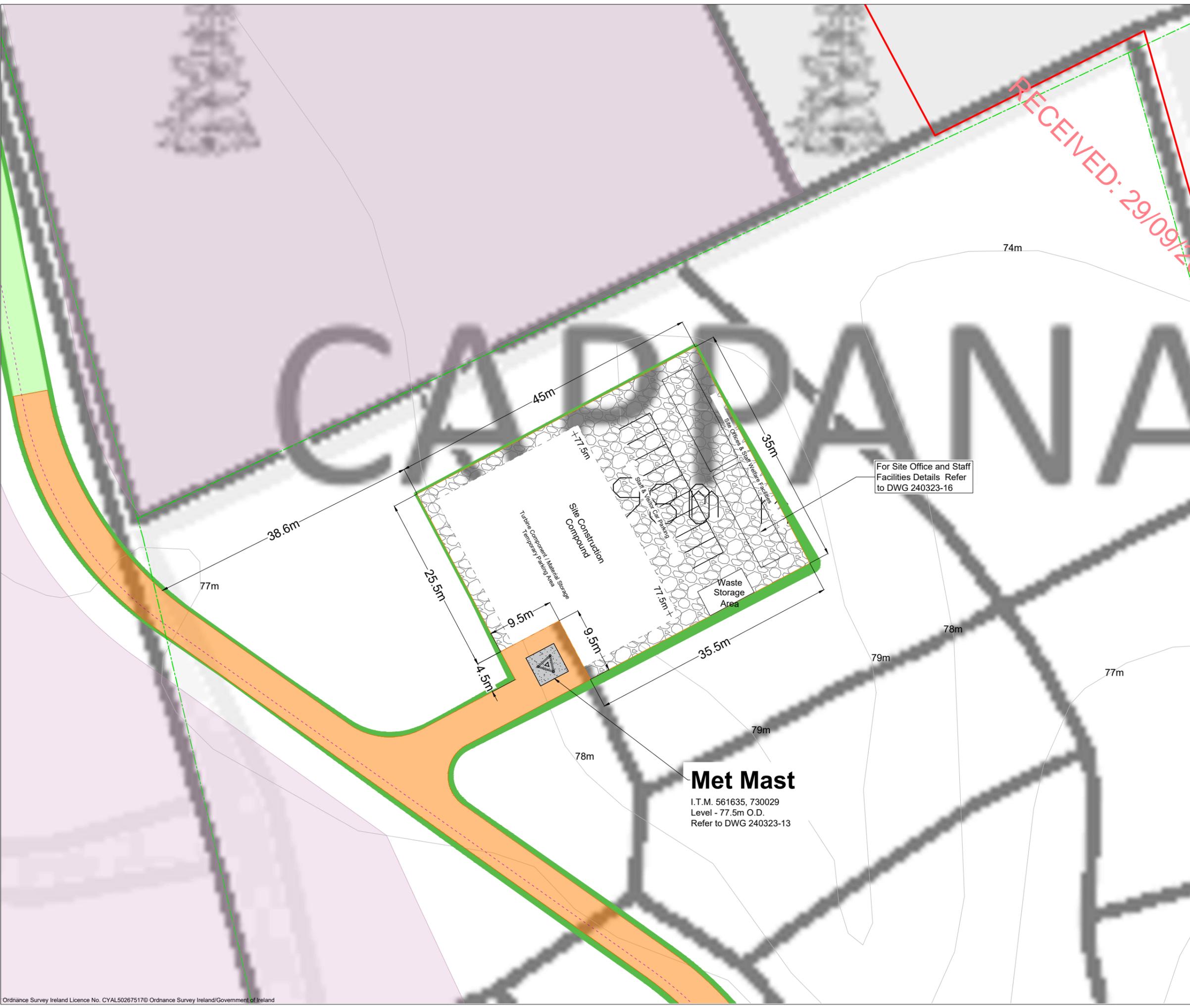
PROJECT TITLE: <b>Gannow Renewable Energy Development, Co. Galway</b>		
DRAWING TITLE: <b>Temporary Construction Compound 1</b>		
PROJECT No.: <b>240323</b>	DRAWING No.: <b>Figure 4-13</b>	SCALE: <b>1:500 @ A3</b>
DRAWN BY: <b>GO</b>	CHECKED BY: <b>KD</b>	DATE: <b>22.09.2025</b>
		REVISION: <b>P01</b>

OS SHEET No.:  
3286, 3289, 3290, 3291, 3292, 3293, 3154, 3155, 3156, 3157, 3158, 3159, 3220, 3221, 3222, 3223, 3224, 3225, 3285, 3286, 3287, 3288, 3289, 3290, 3348, 3349, 3350, 3351, 3352, 3353, 3411, 3412, 3413, 3414, 3415, 3416, 3472, 3473, 3474, 3475, 3476, 3477



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  7. Layout plans show typical Turbine rotor diameter as per turbine drawing.
  8. Final levels may vary depending on local ground conditions.
  9. For Drainage Layouts Refer to Drg P1706-0\_D101 to P1706-0\_D104
  10. For Peat and Spoil Management Area Details Refer to Drg P24-138-06000-0005 to P24-138-06000-0013

**Drawing Legend**

	Existing Road to be Upgraded
	Proposed Road
	33kV Underground Cable Route
	Proposed Linear Replanting
	Drains
	Cut
	Fill
	Enhancement Areas

For Site Office and Staff Facilities Details Refer to DWG 240323-16

**Met Mast**  
 I.T.M. 561635, 730029  
 Level - 77.5m O.D.  
 Refer to DWG 240323-13



PROJECT TITLE: <b>Gannow Renewable Energy Development, Co. Galway</b>		
DRAWING TITLE: <b>Temporary Construction Compound 2</b>		
PROJECT No.: <b>240323</b>	DRAWING No.: <b>Figure 4-14</b>	SCALE: <b>1:500 @ A3</b>
DRAWN BY: <b>GO</b>	CHECKED BY: <b>KD</b>	DATE: <b>22.09.2025</b>
		REVISION: <b>P01</b>

OS SHEET No.:  
 3086, 3089, 3090, 3091, 3092, 3093, 3154, 3155, 3156, 3157, 3158, 3159, 3220, 3221, 3222, 3223, 3224, 3225, 3285, 3286, 3287, 3288, 3289, 3290, 3348, 3349, 3350, 3351, 3352, 3353, 3411, 3412, 3413, 3414, 3415, 3416, 3472, 3473, 3474, 3475, 3476, 3477



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#### 4.3.1.6 Biodiversity Management and Enhancement Plan

A Biodiversity Management and Enhancement Plan (BMEP) has been prepared for the Proposed Project and is included as Appendix 6-4 of this EIAR. This plan has been developed to offset the loss of habitats identified within the Proposed Wind Farm site and further enhance the biodiversity of the Proposed Wind Farm and its environs. These enhancement measures have also been considered in the landscape & visual assessment which is included at Chapter 13: Landscape & Visual, of this EIAR. Similarly, the enhancement proposals have been considered in relation to the existing drainage on the site and in the drainage design for the Proposed Project, which has been prepared by Hydro Environmental Services Ltd. (HES) and is included in Appendix 4-4 of this EIAR.

High value habitats were identified during initial habitat surveys of the Proposed Wind Farm site and include Annex 1 areas active raise bog, wet heath, and Molina meadow mosaic. The Proposed Project has been designed to avoid these areas and where they are located adjacent to proposed works areas, fencing will be implemented with appropriate signage prohibiting entrance to the areas.

##### 4.3.1.6.1 Habitat Creation

###### Replanting Hedgerow

The field boundaries within the Proposed Wind Farm site are largely delineated by mature (managed and unmanaged) hedgerow and treeline habitats. It is anticipated approximately 1,955 of linear habitat will be removed to accommodate the Proposed Wind Farm, including turbines and associated bat buffers, wind farm roads and other key infrastructure. The locations of hedgerow loss are shown in Figure 3.1 of Appendix 6-4 of the EIAR.

It is proposed to plant 3,521m of hedgerow habitat within the Proposed Wind Farm site. The hedgerow replanting areas are depicted on Figure 3-1 in Appendix 6-4 and have been strategically chosen to link up existing areas of bat activity. The hedgerows will be replanted within suitable areas and in consultation with the landowners who are supportive of the hedgerow planting proposals.

Riparian planting will be carried out along the Raforde River in the east of the Proposed Wind Farm site; all saplings will be planted by hand to reduce to potential for bare soil exposure and sediment runoff. Strictly no fertilisers are to be used in the riparian zone. Species to be planted include:

- Hawthorn (*Crataegus monogyna*)
  - Proportion of hedgerow mix: 75%
  - Age class to be planted: combination of whips and advanced nursery stock (10cm – 12 cm girth trees) to increase structure diversity.
- Hazel (*Corylus avellana*)
- Blackthorn (*Prunus spinosa*)
- Rowan (*Sorbus aucuparia*)
- Elder (*Sambucus nigra*)
- Goat Willow (*Salix caprea*)
- Grey willow (*Salix cinerea*)

###### Hedgerow Management

Management measures for hedgerow post replanting include:

- Hedgerows to be trimmed on a 2- or 3-year rotation to maximise structural diversity and to prevent over-trimming,
- Hedgerows to reach approx. 2.5m height with an 'A' shape,
- Cut hedgerows between November and January. This will avoid the bird nesting season (March 1<sup>st</sup> to August 31<sup>st</sup>) and will avoid impacts on foraging pollinators,

- It is expected that ivy will self-colonise, and this will be retained where possible,
- Grassy margins will be retained to preserve flowering ground flora,
- Avoid the use of fertilisers, slurry, herbicides and pesticides.

### Peatland Enhancement

There will be a loss of approx. 4ha of cutover bog habitat as a result of the Proposed Wind Farm. In order to offset this loss, it is proposed to enhance an area measuring 5.3ha which currently consists of cutover, drained peatland on the margin of Article 17-mapped Active Raised Bog. This area is depicted as Block D in Figure 3-2 of Appendix 6-4. Excavated peat generated as a result of construction in peat areas will be used for enhancement purposes here and will be strictly restricted to peat. It is anticipated that blocking the existing drains within this area, as well as ceasing further turbary activity will allow subsurface water levels to rise, making the area wetter and allowing for colonisation of wetland plants. This will in turn be of hydrological benefit to the adjacent Article 17 mapped raised bog area. It is important when blocking drains to consider the hydrology of the Proposed Wind Farm site in order to maximise the benefits to the onsite water table. This can be assessed by field or GIS surveys, which highlight slope and drainage to inform decisions on where to place dams. A map of the existing drains within Block D is shown in Figure 3-2 of Appendix 6-4. Locations of drain blocking and peat profiling will be confirmed by the Project Ecologist and Hydrologist in advance of commencement of works in this area. The key management objectives to be carried out within this area are as follows:

- Cease any further peat cutting activity
- Block existing drains using plastic corrugate or excavated peat sods at strategically chosen points according to existing drainage depicted on Figure 3-2 of Appendix 6-4.
- Plug planting of Sphagnum on bare peat areas
- Removal of Gorse outside of bird nesting season

Re-profiling of sheer face banks to create a soft slope to be revegetated via recolonisation as well as plug planting with Sphagnum and devils bit scabious

### Marsh Fritillary Breeding Habitat

The Proposed Project has been designed such that existing areas of breeding marsh fritillary habitat have been avoided and retained, as discussed in Appendix 6-4. It is further proposed to create additional areas of potential breeding habitat for the populations of marsh fritillary within the Proposed Wind Farm site, and to create additional 'stepping stone' habitat which is key for the survival of the meta populations of the species and to increase its distribution across the landscape.

It is proposed to convert 4.5ha of existing conifer forestry to grasslands comprising devils bit scabious (*Succisa pratensis*), the larval foodplant of the species, within the Proposed Wind Farm site. This will be achieved as follows (please see Blocks F and H, Figure 3-1 of Appendix 6-4):

- Forestry to be felled and removed.
- Coniferous forestry stumps will be left in-situ.
- The areas will be spread with a layer of peat excavated during ground works for the Proposed Project.
- The underlying soils will be treated organically, and no herbicides or fertilisers will be added.
- The soils will be plug planted with devils bit scabious with plants from a certified native source.
- It is also proposed to plant local willow species along the southwest boundary of the proposed grassland around Block F (outside of the bat buffer) to provide shelter and increase suitability for marsh fritillary.
- Habitat maintenance of the newly established areas which are adjacent to existing forestry will involve the eradication of self-seeding conifers.

It is also proposed to create suitable marsh fringing habitat adjacent to existing breeding areas near proposed turbine T03, i.e. within cutover peatland, by planting the proposed peat management area with devil's bit scabious; this area measures 3.5ha (Block C).

### Planting of Native Woodland

It is proposed to plant 1.9ha of native woodland within the Proposed Wind Farm site (Blocks M and O in Figure 3-1 of Appendix 6-4). Trees will be locally sourced, will be of native origin and will be of advanced nursery stock where possible. The following species which are common to the locality will be used:

- > Pedunculate oak (*Quercus robur*)
- > Sessile oak (*Quercus petraea*)
- > Hazel (*Corylus avellana*)
- > Alder (*Alnus glutinosa*)
- > Birch (*Betula pubescens*)
- > Rowan (*Sorbus aucuparia*)
- > Willows (*Salix cinerea*, *Salix caprea*)
- > Hawthorn (*Crataegus monogyna*)

The following measures should be followed when planting trees:

- > Mark out the area for planting so it is clear exactly where planting will be established.
- > Use thin stakes or sticks to mark the rows or areas of trees to be planted.
- > It is recommended that there are 2m spacings between trees. Shelterbelt planting may be applied by planting up two lines of trees as a staggered row.
- > Newly planted trees will need to be protected from poaching by livestock, through the installation of new stockproof fencing which should be at least 2m away from the treeline, and on each side if required. Where new trees are being planted along existing conifer plantation fencing on both sides will likely not be possible. In this case, tall tube tree guards may also be required to protect newly planted trees from wild animals such as deer.

### Native Woodland Management

In order to facilitate the successful establishment of the new trees to be planted within the Proposed Wind Farm site, the following measures are proposed:

- > New tree planting will be kept weed and litter free until the new plants are established, particularly from ruderal weeds. Healthy growth will be maintained by allowing the plant to occupy as much of the planting areas as possible to allow them to achieve as close their natural form as possible.
- > During spring and autumn maintenance periods all trees and plants will be checked and adjusted/replaced as required, soil firmed, and any dead wood present removed back to healthy tissue and mulch added if required. Where tree guards are no longer required these will be removed to avoid damage to the tree.
- > During the first growing season, all standard trees/ semi-mature trees will be watered regularly during any prolonged dry periods during the growing season (i.e. in April, May, June, July and August). During the second growing season the trees will be kept well-watered as often as required, particularly during June, July and August.
- > Newly planted hedgerows and trees will be inspected following the main growing season (i.e. in September) for the first five years of growth, where the requirement for replacement planting will be assessed. If any trees are dead or damaged these will be replaced using the same species within the next planting season. Recommendations

for ongoing or remedial management required will be specified within an Annual Monitoring Report.

#### 4.3.1.6.2 Summary

The BMEP sets out the measures to be implemented to ensure that the Proposed Project will result in a net gain in biodiversity, specifically, a larger area coverage of suitable breeding marsh fritillary habitat, as well as a net gain in native woodland and hedgerow habitats.

The BMEP has set out measures to be implemented during establishment and management phases to ensure that the measures are successful, as well as regularly monitoring by an ecologist to ensure the success of the habitat restoration measures.

#### 4.3.1.7 Tree Felling and Vegetation Removal

Tree felling will be required within and around the Proposed Wind Farm infrastructure footprint to allow for the construction of the proposed turbines, access roads underground cabling, and the other ancillary infrastructure.

Approximately 7.5ha of conifer plantation (WD4) and 0.1ha of native woodland/bog woodland (WN2/WN7) will be felled to accommodate the Proposed Wind Farm infrastructure inclusive of proposed turbines and associated infrastructure and as part of the proposed enhancement as identified in Section 4.3.1.6 above. Please note, there will also be a loss of 1.7ha of scrub (WS1) required to facilitate the Proposed Wind Farm.

Figure 4-15 shows the extent of commercial forestry, native woodland, as well as scrub loss and linear habitat loss to be permanently felled/removed as part of the Proposed Wind Farm.

Please note, the 7.6ha of conifer plantation/native woodland to be felled as part of the Proposed Wind Farm will be the subject of a Limited Felling Licence (LFL) application to the Forest Service in accordance with the Forestry Act 2014 and the Forestry Regulations 2017 (SI 191/2017) and as per the Forest Service's policy on granting felling licenses for wind farm developments. The policy requires that a copy of the planning permission for the Proposed Wind Farm be submitted with the felling licence application; therefore, the felling licence cannot be applied for until such time as planning permission is obtained for the Proposed Wind Farm.

The 0.1ha of native woodland to be felled as part of the Proposed Wind Farm will be replanted within the Proposed Wind Farm site. Please see Section 4.3.1.6.1 above and Appendix 6-4 BMEP for details on native woodland replanting.

Approximately 466m of hedgerows and tree lines require removal to facilitate the construction of the Proposed Wind Farm infrastructure, and to achieve the required Bat foraging buffers from the proposed turbines.

#### 4.3.1.8 Tree and Vegetation Planting

In line with the Forest Service's published policy on granting felling licences for wind farm developments, areas cleared of forestry for access roads, and any other wind farm-related uses will have to be replaced by planting at an alternative site or sites. The Forest Service policy requires replacement or replanting on a hectare for hectare basis for the felling carried out as part of the Proposed Wind Farm.

The identified 7.6ha of conifer plantation / native woodland that will be permanently felled for the Proposed Wind Farm will be replaced or replanted on a hectare for hectare basis as a condition of any felling licence that will be issued in respect of the Proposed Wind Farm site felling. Replanting is a

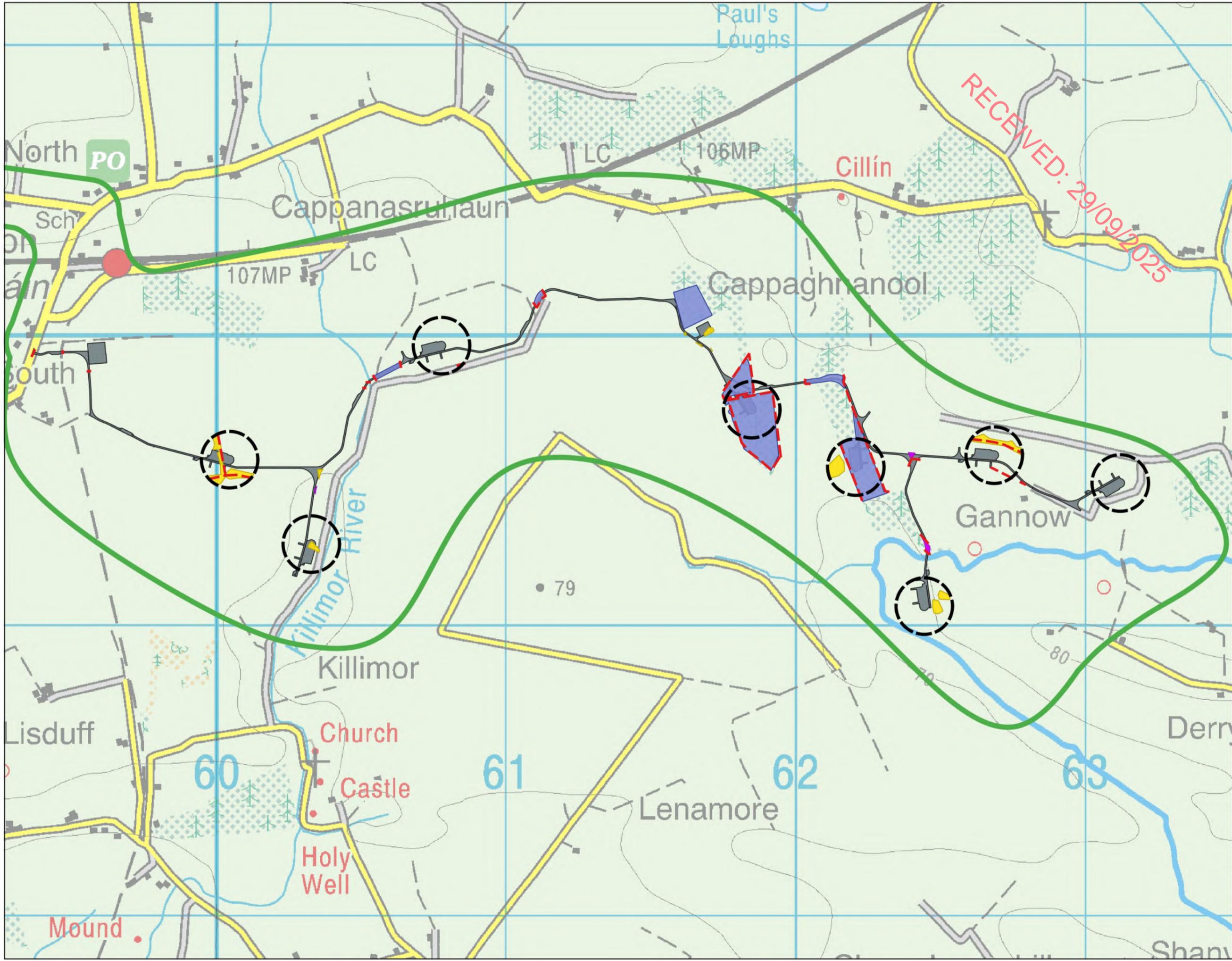
requirement of the Forestry Act and is primarily a matter for the statutory licensing processes that are under the control of the Forest service. The replacement of the felled forestry as part of the Proposed Wind Farm may occur on any lands, outside of the hydrological catchment in which the Proposed Project is located, within the State benefitting from Forest Service Technical Approval<sup>3</sup> for afforestation, should the Proposed Project receive planning consent. Under the Forestry Regulations 2017, all applications for licences for afforestation require the prior written approval (technical approval) of the Minister for Agriculture, Food and the Marine. Before the Minister can grant approval, he/she must first determine if the project is likely to have significant effects on the environment (for EIA purposes) and assess if the development, individually or in combination with other plans or projects is likely to have a significant effect on a European site (for Appropriate Assessment purposes).

The Applicant commits to replanting the 7.5ha of conifer plantation, outside the hydrological catchments within which the Site is located. On this basis, it is reasonable to conclude that there will be no cumulative effects associated with the replanting of 7.5ha of conifer plantation. Therefore, the forestry replanting is not considered further in the impact assessment chapters of this EIAR. In addition, the Applicant commits to not commencing the Proposed Project until both a felling and afforestation licence(s) is in place and, therefore, this ensures the afforested lands are identified, assessed and licenced appropriately by the relevant consenting authority.

As identified in Section 4.3.1.6.1 above, approximately 3,521m of linear habitat will be replanted as part of the Proposed Project. The 1.6ha loss of scrub habitat will be offset by the proposed native woodland replanting identified in Section 4.3.1.6.1 above; please see Appendix 6-2 Bat Survey Report and Appendix 6-4 BMEP for further information.

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<sup>3</sup> All proposed forestry developments where the area involved is greater than 0.1 hectare must receive the prior written approval of the Forest Service. The application for approval is known as Pre-Planting Approval – Form 1.



- Map Legend**
- EIA/ Site Boundary
  - Permanent Infrastructure Footprint
  - 97.5m Bat Felling Buffer
- Felling Areas**
- Conifer
  - Native Woodland
  - Vegetation Removal
  - Linear Vegetation Removal

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**North**

Drawing Title <b>Proposed Forestry to be Felled and Vegetation to be Removed</b>	
Project Title <b>Gannow Renewable Energy Development</b>	
Drawn By <b>CJ</b>	Checked By <b>EC</b>
Project No. <b>240323</b>	Drawing No. <b>Figure 4-15</b>
Scale <b>1:11,500</b>	Date <b>2025-09-17</b>
<p><b>MKO</b> Planning and Environmental Consultants Tuam Road, Galway Ireland, H91 VV84 +353 (0) 91 735611 email: info@mkofireland.ie Website: www.mkofireland.ie</p>	

#### 4.3.1.9 Watercourse / Culvert Crossings

The Site is extensively drained by a network of natural watercourses and manmade land drains. The following watercourses flow through the Proposed Wind Farm site:

- Raford River – flows within the southeast of the Proposed Wind Farm site (around T08) and is hydrologically connected to the Raford River Bog NHA
  - Raford River tributary flows through the western portion of the Proposed Wind Farm across proposed new roads near T03

To facilitate the construction of Proposed Wind Farm roads, it is required to cross 2 no. natural watercourses, the Raford River (access road to T08) and the Raford River tributary (to the west of T03). Both watercourse crossings will be via new clear span crossings. There are several field drains within the Proposed Wind Farm site which will be crossed by appropriately sized pipe crossing.

Please see Section 4.8.1.3 below for detail on the 2 no. watercourse crossings to be used at the Proposed Wind Farm site and associated construction methodologies.

##### 4.3.1.9.1 Clear Span Crossing

The crossing of the Raford River and its tributary will comprise a clear span watercourse. The construction methodology for these crossings have been designed to eliminate the requirement for in-stream works at these locations. The watercourse crossings will be constructed to the specifications of the Office of Public Work (OPW) bridge design guidelines ‘*Construction, Replacement or Alteration of Bridges and Culverts - A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945*’, and in consultation with Inland Fisheries Ireland (IFI).

Abutments will be constructed from precast units combined with in-situ foundations, placed within an acceptable backfill material. Confirmatory inspections of the proposed new watercourse crossing locations will be carried out by the Project Civil/Structural Engineer and the Project Hydrologist prior to the construction of the crossing. Please see Appendix 4-1 for the location of the proposed clear span crossings, Figure 4-28 for the design details and Section 4.8.1.3 for the construction methodology.

##### 4.3.1.9.2 Culvert Crossing

All new proposed culverts and proposed culvert upgrades at field drain crossings required for the Proposed Wind Farm will be suitably sized for the expected peak flows in the relevant drain.

Some culverts may be installed to manage drainage waters from works areas of the Proposed Wind Farm, particularly where the waters have to be taken from one side of an existing roadway to the other for discharge. The size of culverts will be influenced by the depth of the track or road sub-base. In all cases, culverts will be oversized to allow mammals to pass through the culvert. Culverts will be constructed as per the methodology detailed in Section 4.8.1.4. All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance. Please see Figure 4-29 below for design details.

##### 4.3.1.10 Onsite 38kV Substation

It is proposed to construct a 38kV electricity substation within the Proposed Wind Farm site, as shown in Figure 4-1, Figure 4-2 and Figure 4-3. The proposed onsite 38kV substation is located within agricultural land and will be accessed via the internal Proposed Wind Farm road network.

The footprint of the proposed onsite 38kV substation compound measures approximately 1,783m<sup>2</sup> in area and will include 1 no. control building, 2 no. storage containers and the electrical substation components necessary to consolidate the electrical energy generated by each wind turbine, and export

that electricity from the proposed onsite 38kV substation to the national grid. The layout and elevations of the proposed onsite 38kV substation are shown on Figure 4-16 and Figure 4-17 below. The construction and exact layout of electrical equipment in the proposed onsite 38kV substation will be to ESB Networks specifications.

The proposed onsite 38kV substation compound will include steel palisade fencing (approximately 2.6 metre high or as otherwise required by ESB), and internal fences will also segregate different areas within the main substation. Further details regarding the underground cabling connection to the national electricity grid are provided in Section 4.3.2 below. Construction methodologies for the proposed onsite 38kV substation are outlined in Section 4.8.1.8.

The onsite substation will remain in place after the operational phase of the Proposed Wind Farm as it will be under the ownership and control of the ESB Networks and will form a permanent part of the national electricity grid.

#### 4.3.1.10.1 **Substation Control Building**

The substation control building will be located within the substation compound and will measure 21.5 metres x 7.3 metres x 6.1 metres. Layout and elevation drawings of the control building are included in Figure 4-18.

The substation control building will include staff welfare facilities for the operational phase of the Proposed Project. Toilet facilities will be installed with a low-flush cistern and low-flow wash basin. Due to the specific nature of the proposed onsite 38kV substation, there will be a very small water requirement for occasional toilet flushing and hand washing and therefore the water requirement of the Proposed Wind Farm does not necessitate a potable source. It is proposed to either harvest rainwater from the roofs of the building or, alternatively, install a groundwater well adjacent to the substation in accordance with the Institute of Geologists Ireland, 'Guide for Drilling Wells for Private Water Supplies' (IGI, 2007). The well will be flush to the ground and covered with a standard manhole. A pump house is not required as an in-well pump will direct water to a water tank within the roof space of the control building. Bottled water will be supplied for drinking, if required.

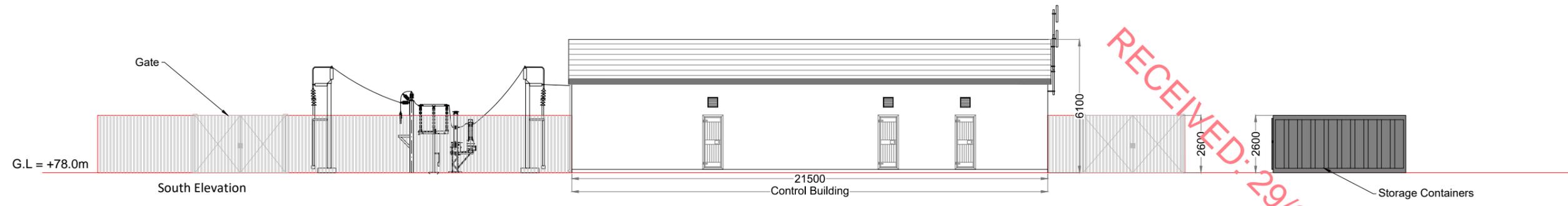
It is not proposed to treat wastewater onsite. Wastewater from the staff welfare facilities in the control buildings will be managed by means of a sealed underground storage tank, with all wastewater being tankered off site by permitted waste collector to a licenced wastewater treatment plant. Such a proposal for managing the wastewater arising at substation compounds has become almost standard practice on wind farm sites, which are often proposed in areas where finding the necessary percolation requirements for on-site treatment would be challenging and has been accepted by numerous Planning Authorities and An Coimisiún Pleanála as an acceptable proposal.

The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. The wastewater storage tank alarm will be part of a continuous stream of data from the proposed turbines, wind measurement devices and electricity substation that will be monitored remotely 24 hours a day, 7 days per week. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended), will be employed to transport wastewater away from the substation underground storage tank.

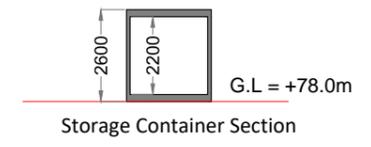
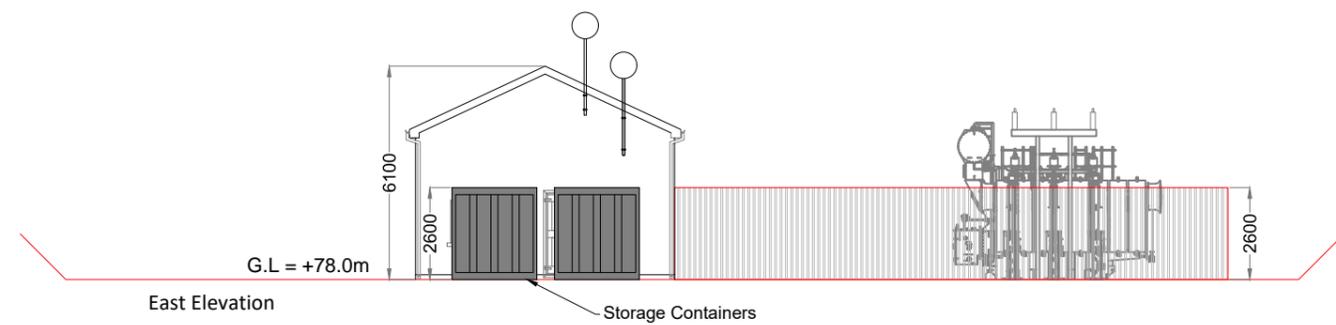
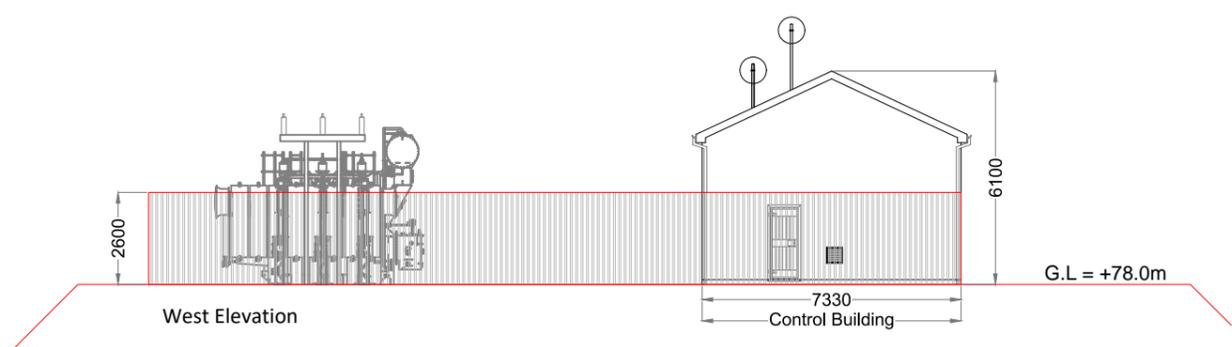
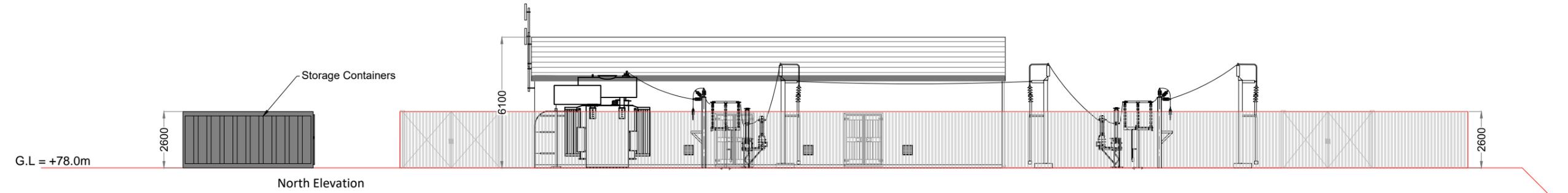
#### 4.3.1.10.2 **Storage Containers**

As part of the proposed onsite 38kV substation, 2 no. storage containers will be located adjacent to eastern boundary of the proposed onsite 38kV substation compound. Each container will measure 6m x 2.4m x 2.6m in height and will be used for the storage of dry goods including spare electrical equipment necessary for the ongoing operation and maintenance of the substation. The location and elevation of the storage containers is shown in Figure 4-19.





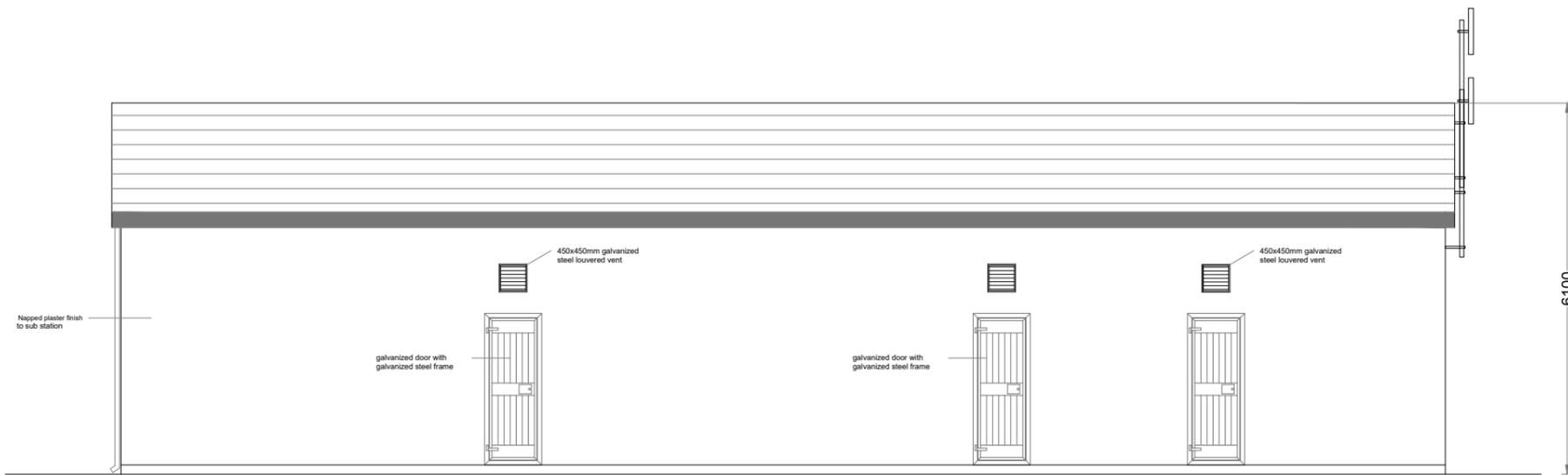
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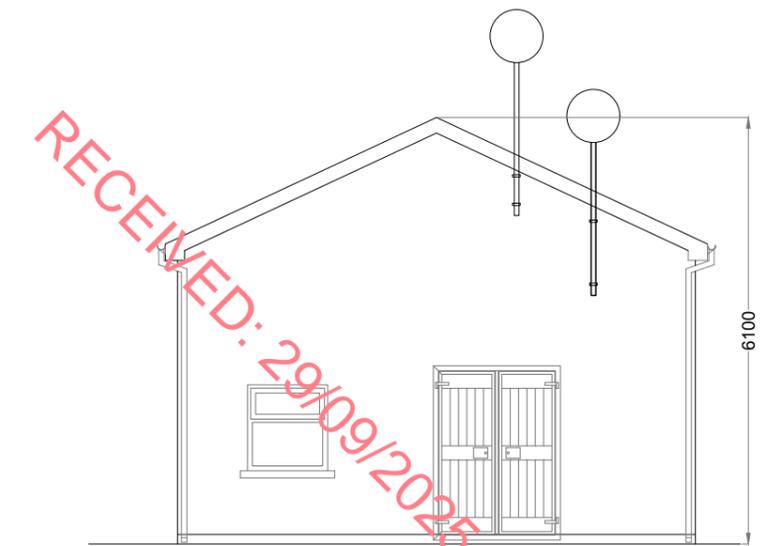
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DRAWING TITLE: <b>Substation Compound Elevations</b>			
PROJECT No.: <b>240323</b>	DRAWING No.: <b>Figure 4-17</b>	SCALE: <b>1:200 @ A3</b>	
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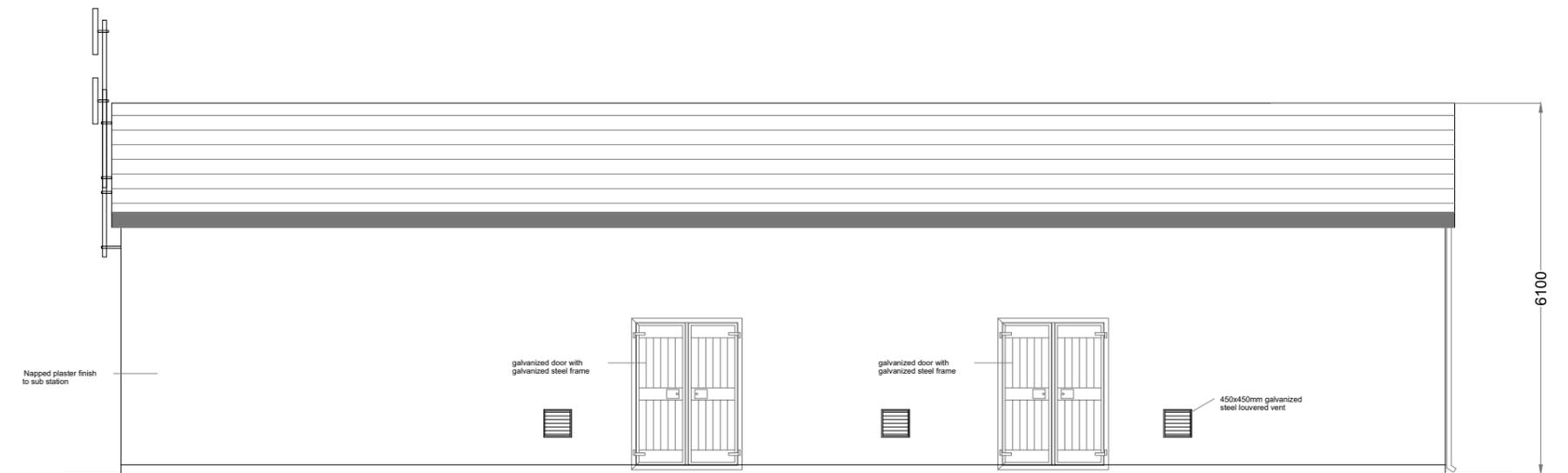
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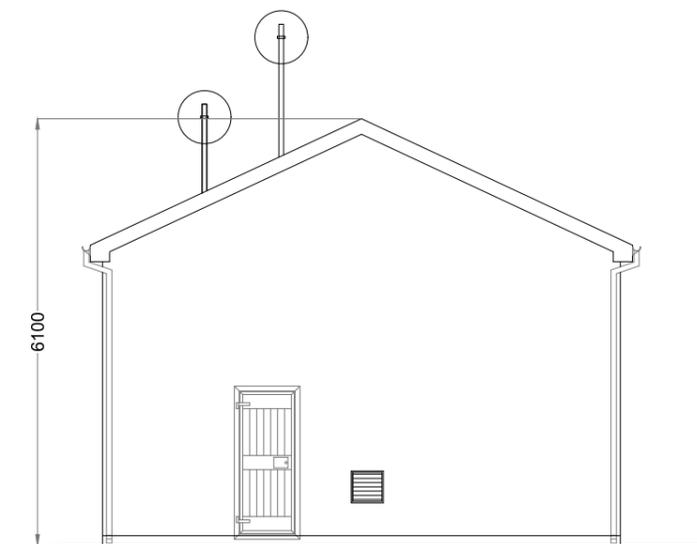
FRONT ELEVATION (West Elevation) 1:100



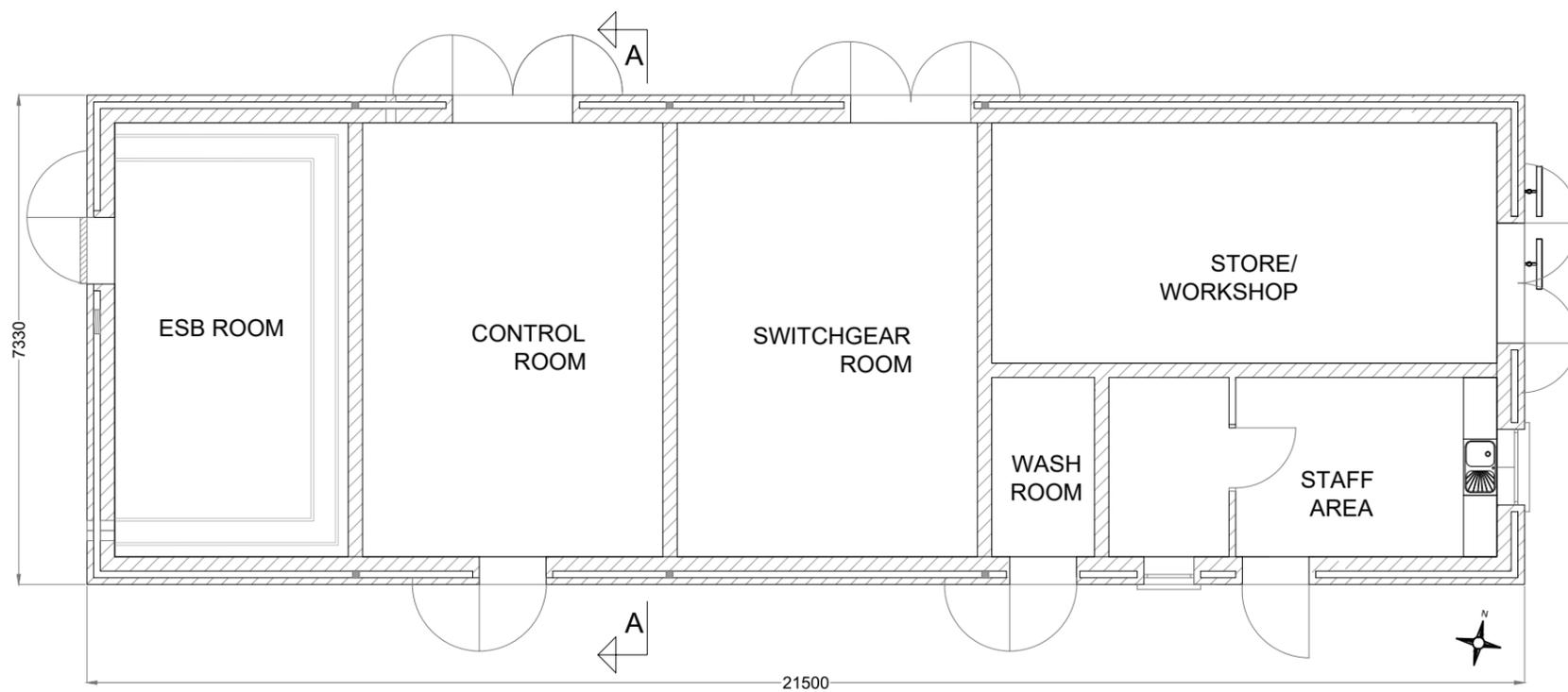
SIDE ELEVATION (South Elevation)



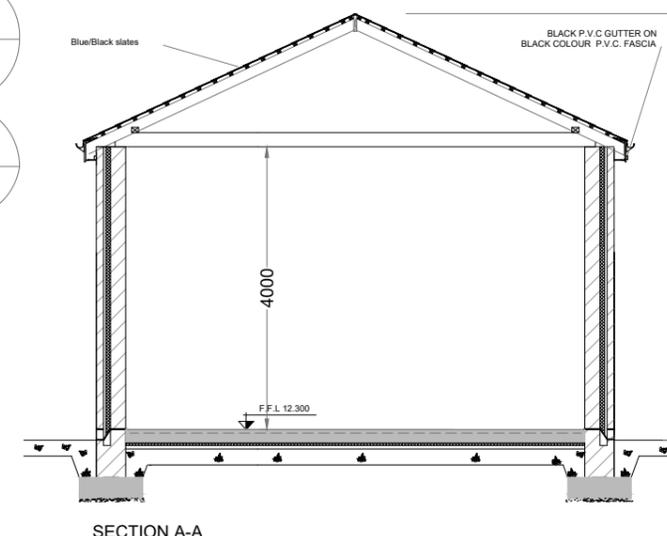
REAR ELEVATION (East Elevation) 1:100



SIDE ELEVATION (North Elevation)



Proposed 38 kV Control Building Layout Plan 1:100



SECTION A-A

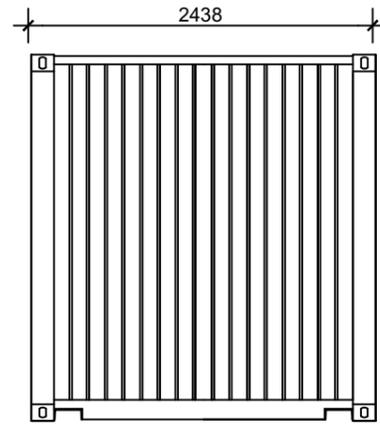
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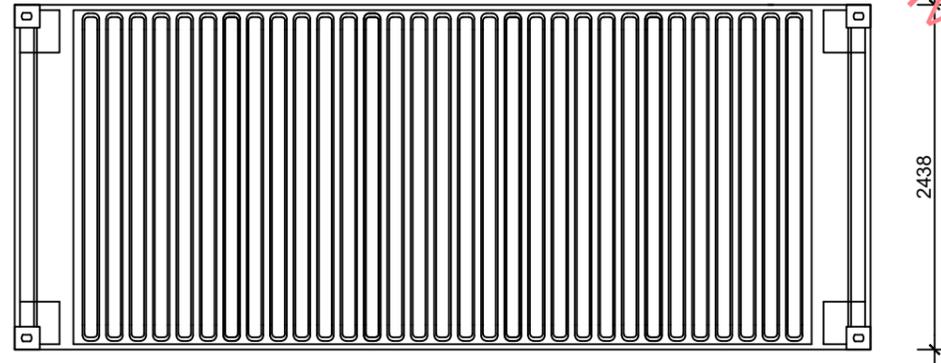
**NOTE:**

1. ALL DIMENSIONS IN mm UNLESS NOTED

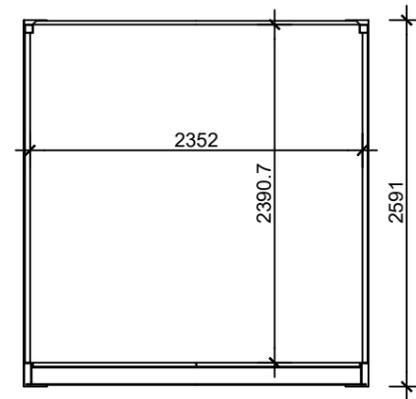
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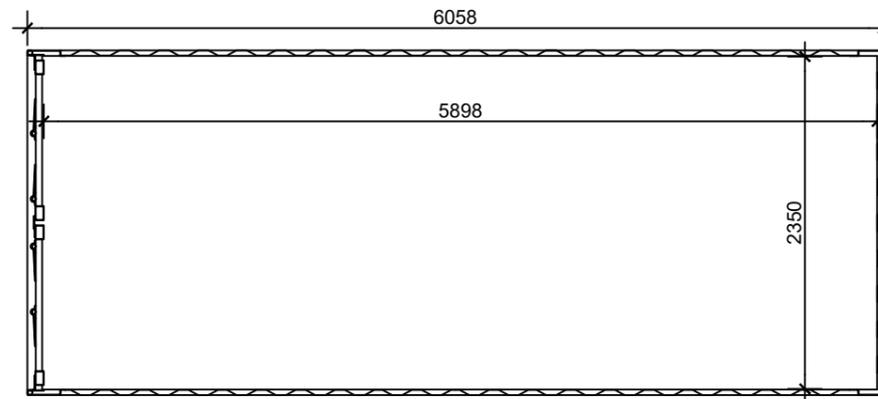
**REAR ELEVATION**



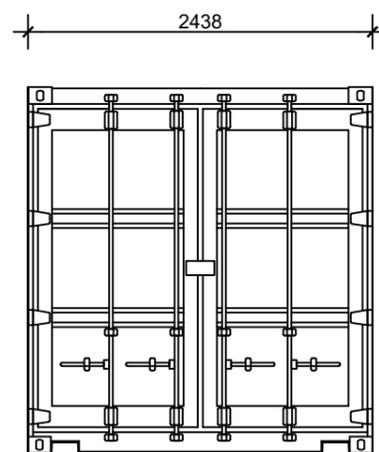
**ROOF PLAN**



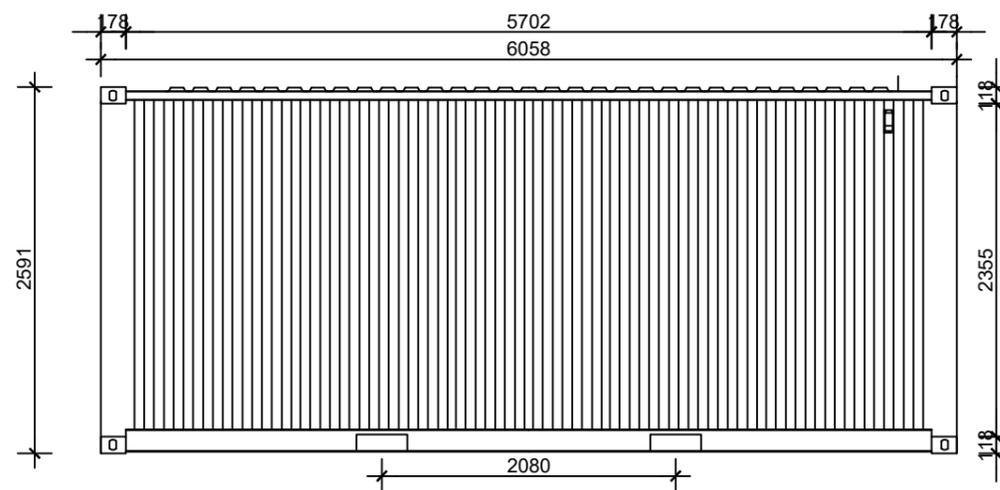
**CROSS SECTION**



**FLOOR PLAN**



**FRONT ELEVATION**



**SIDE ELEVATION**

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DRAWING TITLE: <b>Storage Container Layout and Elevations</b>		
PROJECT No.: <b>240323</b>	DRAWING No.: <b>Figure 4-19</b>	SCALE: <b>1:50 @ A3</b>
DRAWN BY: <b>GO</b>	CHECKED BY: <b>AC</b>	DATE: <b>22.09.2025</b>
		REVISION: <b>P01</b>



## 4.3.2 Proposed Grid Connection

### 4.3.2.1 Underground Electrical (38kV) Cabling

It is proposed to connect the onsite 38kV substation to the existing 220kV Cashla substation in the townland of Barrettspark, Co Galway via 38kV underground electrical cabling. The underground electrical cabling route, illustrated in Figure 4-3, is approximately 21.8km in length and located primarily within the public road corridor, with three subsections (approximately 0.2km, 0.6km and 1.5km respectively) located in private land/existing track.

The underground electrical cabling route will originate at the proposed onsite 38kV substation and travel 0.2m out the Proposed Wind Farm site via the proposed site entrance. It will turn right out of the proposed site entrance and travel north on the L3115 for approximately 0.5km before turning left onto the L7152 south of the Attymon National School. The underground electrical cabling route will travel west on the L7152 for approximately 7km before turning left and travelling west on the L3111 for 1.6km where it turns right and travels north on the L3107 for 0.1km and then turns left and travels west on the L7126 for approximately 2.4km. The underground electrical cabling route will then turn right onto the R347 for approximately 1.4km. The underground cabling route will then turn left off the R347 onto the L7122 and travel for approximately 1.3km before entering private land. The underground electrical cabling will travel through private land for 0.6km before exiting onto the L31030 and travelling in a southwest direction for 1.5km. the route will then turn left onto the L3103 for 0.1km and then turn right onto the L7108. On the L7108, the route will stay to the left when the road splits after 0.2km and travel for 2km to a section of private land. After 1.5km the underground electrical cabling route will exit private land and turn right onto the L7109 and travel north for 1.5km before entering the existing Cashla 220kV substation.

The methodology for construction of the Proposed Grid Connection underground electrical cabling is presented in Section 4.8.2.2 below. The underground electrical cabling route is illustrated in Figure 4-1 and Figure 4-3. The cross section of the 38kV underground cabling trench is shown in Figure 4-20.

### 4.3.2.2 Joint Bays

There are 28 no. joint bays proposed along the Proposed Grid Connection underground cabling route, approximately 600 to 800 metres apart or as otherwise required by ESNB and electrical requirements. There are:

- 1 no. joint bays proposed within the Proposed Wind Farm access roads;
- 9 no. joint bays proposed along the L7152 Local Road;
- 2 no. joint bays proposed along the L3111;
- 3 no joint bays proposed along the L7126 Local Road;
- 2 no. joint bays proposed along the R437 Regional Road;
- 2 no. joint bays proposed along the L7122 Local Road;
- 3 no. joint bays proposed along the L31030 Local Road;
- 3 no. joint bays proposed along L7108 Local Road;
- 1 no. joint bay proposed within private access track
- 1 no. joint bay proposed within private agricultural land where proposed new road will be constructed (Section 4.3.1.2 above);
- 1 no. joint bay proposed within the L7109 Local Road.

Please see Section 4.8.2.3 below for joint bay construction methodology. Please see Figure 4-30 for details.

### 4.3.2.3 Watercourse and Service Crossings

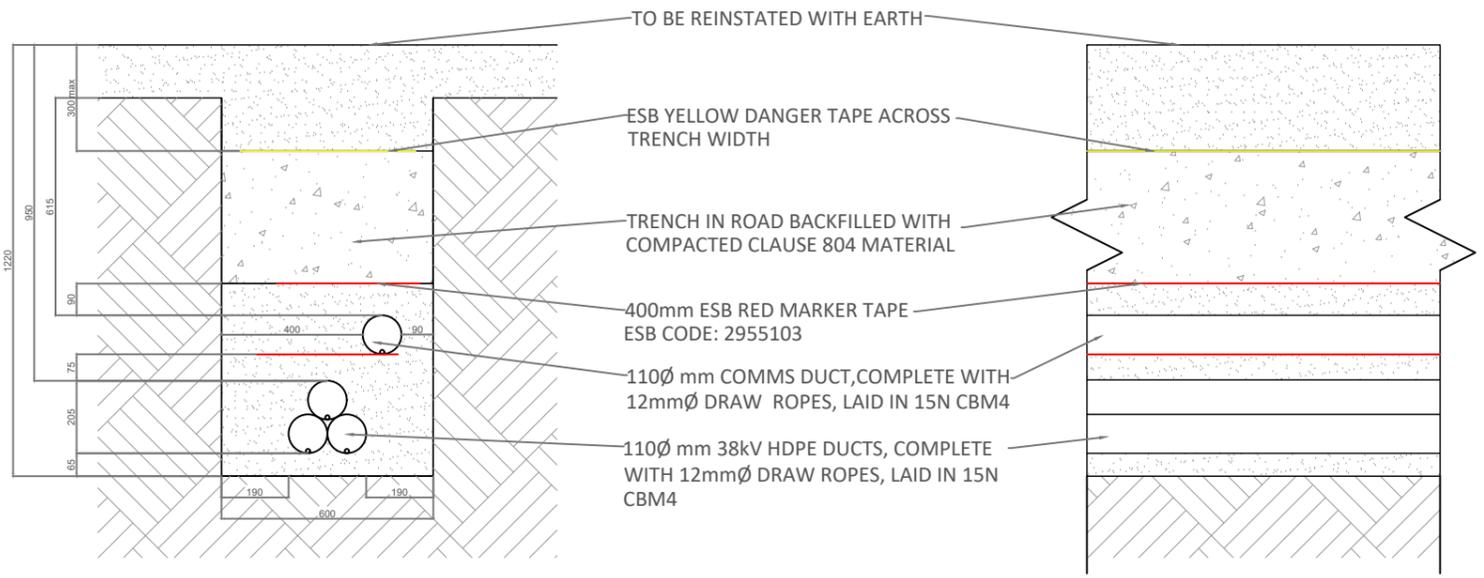
There are 10 no. identified watercourse crossings along the Proposed Grid Connection underground cabling route. Of these, 4 no. are identified watercourse crossings referenced on EPA/OSI mapping. The construction methodology for the 4 no. EPA/OSI mapped, and the unmapped watercourse crossings has been designed to eliminate the requirement for in-stream works at these locations. The Proposed Grid Connection will interact with the GNI network at 2 no. locations (including 1 no. interaction with a high-pressure pipeline), the M17 Motorway, the Irish Rail Galway-Dublin rail line at 1 no. location, and a historic railway which is no longer in use. Please refer to Section 15.3.3.1 of Chapter 15 Material Assets for further information on the interactions with the existing services.

The various crossing methodologies to be employed along the Proposed Grid Connection include the following:

- > Type A: Crossing using standard trefoil formation (Figure 4-32)
- > Type B Flatbed formation under (Figure 4-33)
- > Type C: Flatbed Formation over (Figure 4-34)
- > Type D: Horizontal Directional Drilling (Figure 4-35)

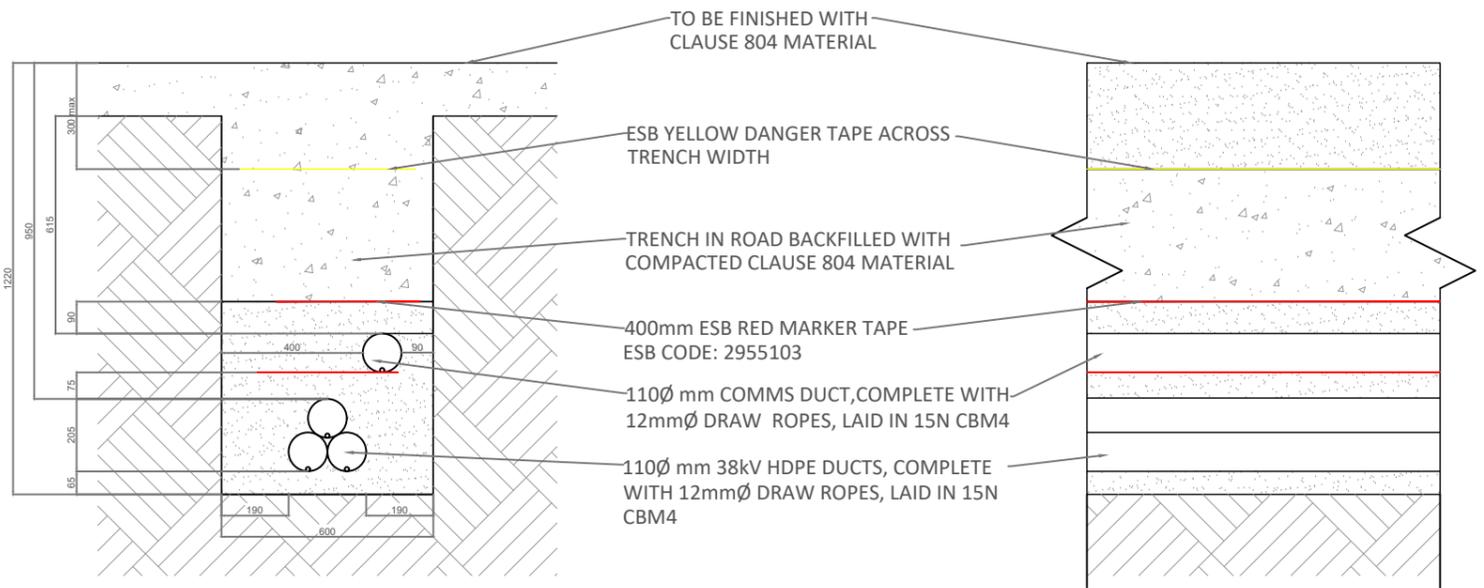
A general description of the construction methods employed at watercourse crossings and existing service crossings are described in Section 4.8.2.4 below. An illustration of the proposed crossing methodology at the 4 no. EPA/OSI mapped crossing locations and crossing points with existing services is included within the detailed site layout drawings in Appendix 4-1. Please see Section 4.8.2.2 below for further detail on the proposed crossing methodologies of services along the Proposed Grid Connection.

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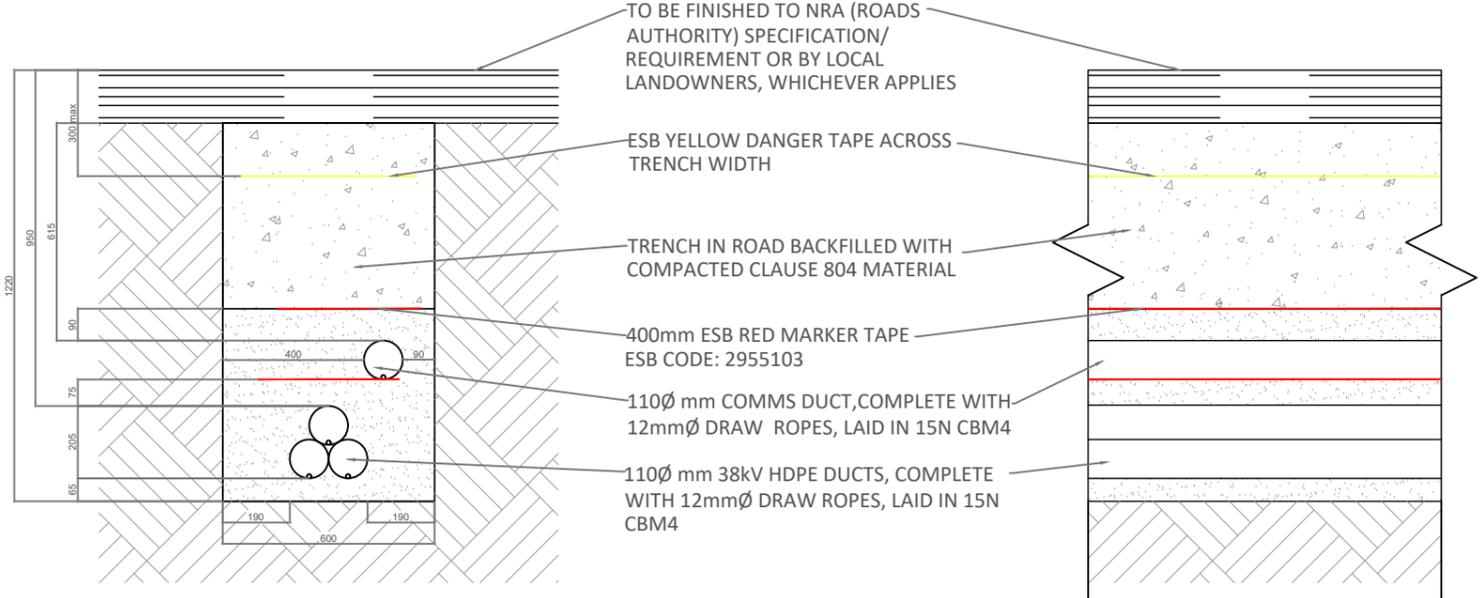
**Option A - Standard 38kV Trench Detail Off-Road**

SCALE 1:20



**Option A - Standard 38kV Trench Detail in Site Road**

SCALE 1:20



**Option A - Standard 38kV Trench Detail in Public Road**

SCALE 1:20

PROJECT TITLE: <b>Gannow Renewable Energy Development, Co. Galway</b>			
DRAWING TITLE: <b>Standard 38kV Trench Details</b>			
PROJECT No.: <b>240323</b>	DRAWING No.: <b>Figure 4-20</b>	SCALE: <b>As Shown @ A3</b>	
DRAWN BY: <b>KD</b>	CHECKED BY: <b>EmcC</b>	DATE: <b>07.10.2024</b>	REVISION: <b>P02</b>



### 4.3.3 Quantities of Peat, Spoil and Crushed Stone

#### 4.3.3.1 Peat and Spoil Management Plan

The construction of the Proposed Project will require the excavation of peat and spoil. The quantities of peat and spoil, requiring management on the Proposed Wind Farm site has been calculated, as presented in Table 4-2 below. The quantities were calculated by FTC as part of the *Peat and Spoil Management Plan* included as Appendix 4-2 of this EIAR.

Table 4-2 Peat and Spoil Volumes requiring management

Development Component	Peat Volume (m <sup>3</sup> ) (approx.)	Spoil Volume (m <sup>3</sup> ) (approx.)
<b>Proposed Wind Farm</b>		
8 no. Turbines and Hardstanding Areas	82,500	26,730
Access Roads	5,280	3,370
Onsite 38kV Substation	1,840	660
Meteorological Mast	130	190
<b>Proposed Grid Connection</b>		
Cable Trench	-	6,750 <sup>2</sup>
Total Peat and Spoil to be managed in the Proposed Wind Farm <sup>1</sup>	89,750m <sup>3</sup>	37,700 m <sup>3</sup>
	127,450m <sup>3</sup>	

**Note 1:** A contingency factor of 15% has been applied and is included in the excavated spoil volumes, and a bulking factor of 20% has been used for excavated peat volumes to allow for expected increase in volume upon excavation and to allow for a variation in ground conditions across the Site.

**Note 2:** The total spoil generation volumes for the Proposed Grid Connection underground cabling route is quantified as 16,200m<sup>3</sup>. Of this total, 2,700m<sup>3</sup> is comprised of road make up material which will be sent to an appropriately licensed facility. The remaining spoil volume of 13,500m<sup>3</sup> will either be managed in the identified peat and spoil management areas within the Proposed Wind Farm or sent to an appropriately licensed facility. Given the length of the Proposed Grid Connection underground cabling route, it is assumed that approximately 50% (6,750m<sup>3</sup>) of the spoil generated during the construction of the Proposed Grid Connection will be managed in the Proposed Wind Farm, which is identified in Table 4-2 above, and the remaining volume will be sent to an appropriately licensed facility. This is dependent on the road makeup at locations along the underground electrical cabling route and the distance from the underground electrical cabling route to the Proposed Wind Farm, the main contractor will determine the appropriate location for management of arisings from the Grid Connection underground electrical cabling route.

#### 4.3.3.1.1 Peat and Spoil Management Areas

Peat and spoil will be managed locally within the Proposed Wind Farm site, in dedicated peat and spoil management areas as shown on Figure 4-1. The placement of peat and spoil within the peat and spoil management areas will be undertaken as follows:

1. *Excavated peat will be placed/spread across the designated areas within the Proposed Wind Farm site.*
2. *The peat placed within the peat and spoil management areas will be restricted to a maximum height of 1.5m. Weak/liquified peat will be placed in the centre of the peat management areas with firmer spoil/drier peat placed around the outside.*
3. *The placement of excavated peat will be avoided without first establishing the adequacy of the ground to support the load. The placement of peat and spoil within the peat and spoil management areas will require the use of long reach excavators, low ground pressure machinery and possibly bog mats in particular for drainage works.*
4. *It will be ensured that the surface of the placed peat will be shaped to allow efficient run-off of surface water. Shaping of the surface of the peat will be carried out as placement of peat within the peat and spoil management area progresses. This will reduce the likelihood of debris run-off and reduce the risk of instability of the placed peat.*
5. *Finished/shaped side slopes in the placed peat will be not greater than 1 (v): 4 (h). This slope inclination will be reviewed during construction, as appropriate.*
6. *The acrotelm will be placed on the finished surface with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the placed peat and spoil within the peat and spoil management areas.*
7. *Movement monitoring instrumentation will be placed around the areas where peat has been placed. The locations where monitoring is required will be identified by the Project Geotechnical Engineer on site.*
8. *Supervision by the Project Geotechnical Engineer will be carried out for the works.*
9. *An interceptor drain will be installed upslope of the designated peat and spoil management areas to divert any surface water away from these areas. This will help ensure stability of the placed peat and reduce the likelihood of debris run-off.*

All the recommendations/best practice guidelines for the placement of spoil in identified spoil management areas and alongside access roads will be confirmed by the Geotechnical Engineer prior to construction.

As identified in Table 4-2 above, the total volume of peat requiring management onsite is estimated at 89,750m<sup>3</sup> and the total volume of spoil requiring management onsite is estimated at 37,700m<sup>3</sup>. This material will be excavated and deposited in the peat and spoil management areas, with a total capacity volume of 130,500m<sup>3</sup>, around turbine foundations and hardstands within clear felled areas, sidelaying along access roads, and landscaping. As such, there is enough capacity in the peat and spoil management areas within the Proposed Wind Farm site, for the total volumes of peat and spoil requiring management for the Proposed Wind Farm as detailed in Table 4-2 above, as well as associated drainage.

The following (as outlined in the Peat and Spoil Management Plan in Appendix 4-2) particular recommendations/best practice guidelines for the placement of peat and spoil with respect to specific aspects of the wind farm will be considered and taken into account during construction.

#### 4.3.3.2 Crushed Stone

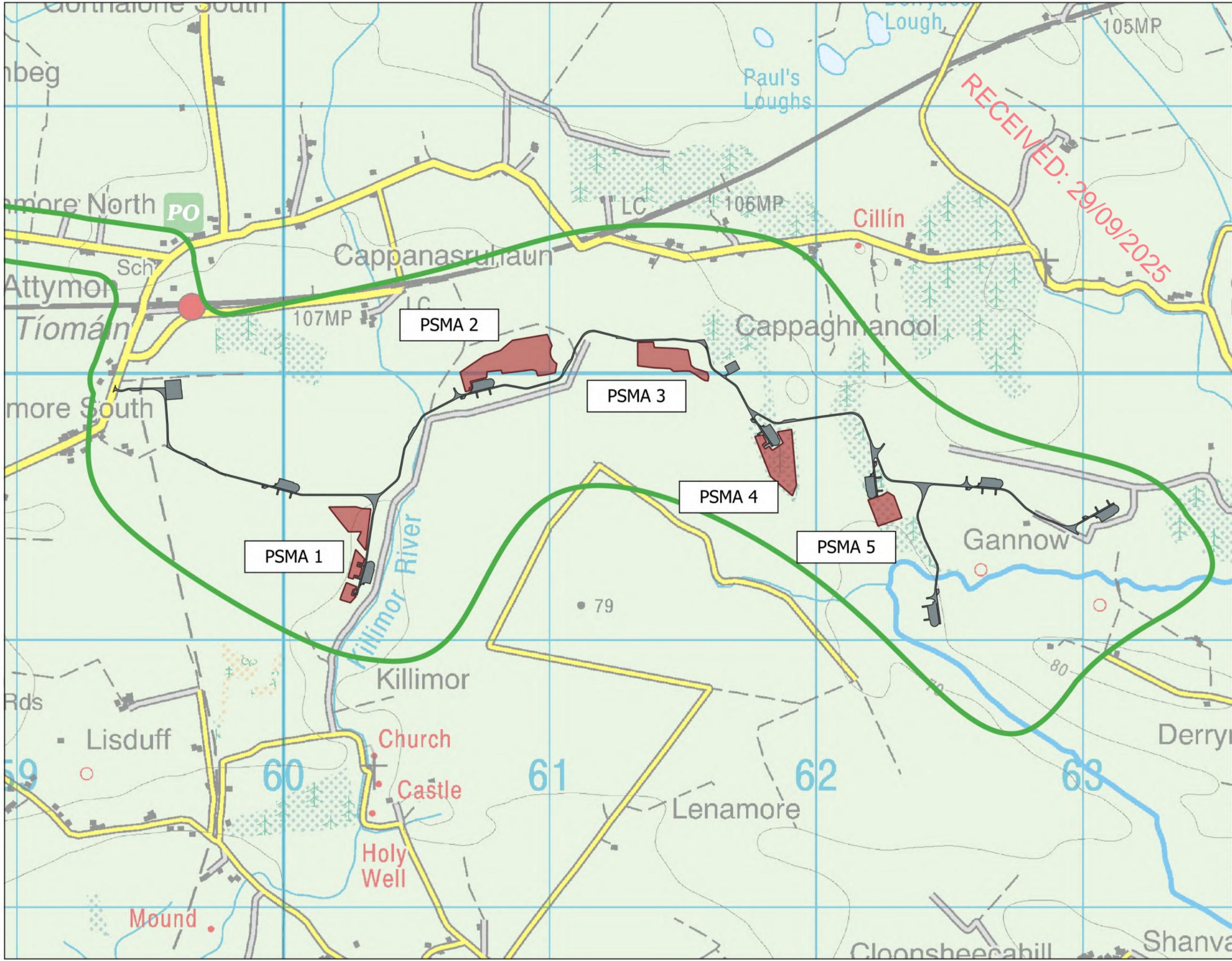
The quantity of crushed stone required for the construction of the Proposed Project has been calculated, as presented in Table 4-3 below.

Table 4-3 Crushed Stone Requirement

Development Component	Crushed Stone Requirement (m3) (approx.)	Comment
<b>Proposed Wind Farm</b>		
<b>8 no. Turbines and Hardstanding Areas (including foundations)</b>	81,000	Hardstanding area and foundation footprint. Allowance included for mini-crane pads and blade finger hardstands associated with the main hardstand, plus allowance for side slopes in areas of fill.
<b>Access Roads (including cabling)</b>	35,400	Allowance includes for widening on bends, at junctions, laybys, and tie-ins to hardstands.
<b>Onsite 38kV Substation</b>	2,200	
<b>Meteorological Mast</b>	120	
<b>Temporary Construction Compounds</b>	4,400	
<b>Proposed Grid Connection</b>		
<b>Cable Trench</b>	11,000	
<b>Total (including 10% contingency)</b>	<b>134,120</b>	

Note: A contingency factor of 10% has been applied and is included in the crushed stone requirements volumes above to allow for a variation in ground conditions across the Proposed Wind Farm site.

The locations of the peat and spoil management areas (PSMA) are outlined in Figure 4-21 below. The cross sections of each PSMA is shown in the Site Layout Drawings in Appendix 4-1 and in Appendix 4-2 Peat and Spoil Management Plan.



- Map Legend**
- EIAR Site Boundary
  - Permanent Infrastructure Footprint
  - Proposed Peat and Spoil Management Areas

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PSMA 2

PSMA 3

PSMA 4

PSMA 5

PSMA 1



Drawing Title Peat and Spoil Management Areas within the Proposed Wind Farm	
Project Title Gannow Renewable Energy Development	
Drawn By CJ	Checked By EC
Project No. 240323	Drawing No. Figure 4-21
Scale 1:12,500	Date 2025-09-05

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## 4.4 Site Activities

### 4.4.1 Environmental Management

All proposed activities on the Site will be provided for in a Construction and Environmental Management Plan (CEMP). A CEMP has been prepared for the Proposed Project and is included in Appendix 4-5 of this EIAR.

The CEMP sets out the key environmental considerations to be considered by the contractor during construction of the Proposed Project. The CEMP includes details of drainage, peat and spoil management, waste management, and details the mitigation and monitoring measures to be implemented in order to comply with the environmental commitments outlined in the EIAR and NIS. The contractor will be contractually obliged to comply with all such measures. In the event planning permission is granted for the Proposed Project, the CEMP will be updated prior to the commencement of the development, to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned and will be submitted to the Planning Authority for approval.

### 4.4.2 Refuelling

Wherever possible, vehicles will be refuelled off-site, particularly for regular road-going vehicles. On-site refuelling of machinery will be carried out at designated refuelling areas at various locations throughout the Site. Heavy plant and machinery will be refuelled on-site by a fuel truck that will come to the Site as required on a scheduled and organised basis. Other refuelling will be carried out using mobile double skinned fuel bowser. The fuel bowser will be parked on a level area in the construction compound when not in use.

All refuelling will be carried out outside designated watercourse buffer zones. Only designated trained and competent operatives will be authorised to refuel plant on-site. Mobile measures such as drip trays and fuel absorbent mats will be used during refuelling operations as required. All plant and machinery will be equipped with fuel absorbent material and pads to deal with any event of accidental spillage.

### 4.4.3 Concrete Deliveries

Only ready-mixed concrete will be used during the construction phase, with all concrete being delivered from local batching plants in sealed concrete delivery trucks. Quarries that could potentially provide stone and ready-mix concrete for the Proposed Project are detailed below in Section 4.5.2.

The use of ready-mixed concrete deliveries will eliminate any potential environmental risks of on-site batching. When concrete is delivered to Site, only the chute of the delivery truck will be cleaned, using the smallest volume of water necessary, before leaving the Site. Concrete trucks will be washed out fully at the batching plant, where facilities are already in place.

Before leaving the Site, washing of the delivery truck will be minimised and restricted to designated wash out areas. Wash out will be restricted to the concrete lorry's chute only. Concrete trucks will be washed out fully at the off-site batching plant, where facilities are already in place.

The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area, or a Siltbuster-type concrete wash unit or equivalent. This type of Siltbuster<sup>4</sup> unit catches the solid concrete and filters and holds wash liquid for pH adjustment and further solids separation. The residual liquids and solids will be removed off-site

<sup>4</sup> [https://www.siltbuster.co.uk/sb\\_prod/siltbuster-roadside-concrete-washout-rcw/](https://www.siltbuster.co.uk/sb_prod/siltbuster-roadside-concrete-washout-rcw/)

by an appropriately authorised waste collector for disposal at an authorised waste facility. Where temporary lined impermeable containment areas are used, such containment areas are typically built using straw bales and lined with an impermeable membrane. Two examples are shown in Plates 4-4 and Plate 4-5 below.



Plate 4-4 Concrete washout area



Plate 4-5 Concrete Wash Out Area

The areas are covered when not in use to prevent rainwater collecting. In periods of dry weather, the areas can be uncovered to allow much of the water to be lost to evaporation. At the end of the concrete pours, any of the remaining liquid contents will be tankered off-site to an appropriately authorised facility as necessary. Any residual solid contents that will have been cleaned down from the chute will have solidified and can be broken up and disposed of along with other construction waste, as noted above, by an appropriately authorised waste collector for disposal at an authorised waste facility.

The risks of pollution arising from concrete deliveries will be further reduced by the following:

- Concrete truck bodies will not be washed out on the Site but will be directed back to their batching plant for washout.
- Site roads will initially be constructed with a subgrade and compacted with the use of a roller to allow concrete delivery trucks access all areas where the concrete will be needed. The final wearing course for the Site roads will not be provided until all turbine foundations have been poured. No concrete will be transported around the Site in open trailers or dumpers so as to avoid spillage while in transport. All concrete used in the construction of turbine foundations will be pumped directly into the shuttered formwork from the delivery truck. If this is not practical, the concrete will be pumped from the delivery truck into a hydraulic concrete pump or into the bucket of an excavator, which will transfer the concrete to the location where it is needed.
- The arrangements for concrete deliveries to the Site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site washout and discussing emergency procedures.
- Clearly visible signage will be placed in prominent locations close to concrete pour areas specifically stating washout of concrete lorries is not permitted at the Site.

Due to the volume of concrete required for each turbine foundation, and the requirement for the concrete pours to be continuous, deliveries are often carried out outside normal working hours in order to limit the traffic impact on other road users, particularly peak period school and work commuter traffic. Such activities are limited to the day of turbine foundation concrete pours, which are normally complete in a single day per turbine. The main concrete pours will be planned approximately one week in advance.

Special procedures will be adopted in advance of and during all concrete pours to minimise the risk of pollution. These will include:

- Using weather forecasting to assist in planning large concrete pours and avoiding large pours where prolonged periods of heavy rain is forecast.
- Restricting concrete pumps and machine buckets from slewing over watercourses (including drains and ditches) while placing concrete.
- Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets.
- Ensuring that covers are available, and used, when necessary, for freshly placed concrete to avoid the surface washing away in heavy rain.
- The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area, or a Siltbuster-type<sup>5</sup> concrete wash unit or equivalent.
- Disposing of surplus concrete after completion of a pour in agreed suitable locations away from any watercourse or sensitive habitats.

#### 4.4.4 Dust Suppression

In periods of extended dry weather, dust suppression may be necessary in areas within the Proposed Project footprint and associated haul roads to ensure dust does not cause a nuisance. If necessary, water will be taken from stilling ponds in the Site's drainage system and will be pumped into a bowser or water spreader to dampen down the relevant areas to prevent the generation of dust. Silty or oily water will not be used for dust suppression, as this would generate polluted runoff or more dust. Water bowser movements will be carefully monitored, as the application of too much water may lead to increased runoff.

<sup>5</sup> ([https://www.siltbuster.co.uk/sb\\_prod/siltbuster-roadside-concrete-washout-rcw/](https://www.siltbuster.co.uk/sb_prod/siltbuster-roadside-concrete-washout-rcw/))

#### 4.4.5 Vehicle Washing

Wheels or vehicle underbodies are often washed before leaving sites to prevent the build-up of mud on public (and site) roads. It is not anticipated that vehicle or wheel washing facilities will be required as part of the construction phase of the Proposed Project as site roads will be formed before road-going trucks begin to make regular or frequent deliveries to the Site (e.g. with steel or concrete). However, to ensure a wheel wash facility is available should this be required, a wheel wash has been included in the design of the Proposed Project. The Proposed Wind Farm roads will be well finished with compacted hardcore, and so the public road-going vehicles will not be travelling over soft or muddy ground where they might pick up mud or dirt.

A road sweeper will be available if any section of the public roads requires cleaning due to construction traffic associated with the Proposed Project.

#### 4.4.6 Waste Management

The CEMP, Appendix 4-5 of this EIAR, provides a waste management plan (WMP) which outlines the best practice procedures during the construction phases of the project. The WMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Project. Disposal of waste will be seen as a last resort. The WMP has been produced in line with the following guidance *'Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects'* (EPA, 2021)<sup>6</sup>. The WMP has been prepared to outline the main objectives that are to be adhered to for the preparation of a more detailed WMP to be completed prior to the construction phase of the Proposed Project. The WMP will be in place throughout the construction and decommissioning phase of the Proposed Project and will be in line with all relevant legislation detailed in Section 3.8 in Appendix 4-5.

The Waste Management Act 1996 and its subsequent amendments provide for measures to improve performance in relation to waste management, recycling and recovery. The Act also provides a regulatory framework for meeting higher environmental standards set out by other national and EU legislation.

The Act requires that any waste related activity has to have all necessary licenses and authorisations. It will be the duty of the Waste Manager on the Site to ensure that all contractors hired to remove waste from the Site have valid Waste Collection Permits. It will then be necessary to ensure that the waste is delivered to a licensed or permitted waste facility. The hired waste contractors and subsequent receiving facilities must adhere to the conditions set out in their respective permits/licenses and authorisations.

Prior to the commencement of the development, a Construction Waste Manager will be appointed by the Contractor. The Construction Waste Manager will be in charge of the implementation of the objectives of the plan, ensuring that all hired waste contractors have the necessary permits/licenses and authorisations and that the waste management hierarchy is adhered to. The person nominated must have sufficient authority so that they can ensure everyone working on the development adheres to the management plan.

The WMP will provide systems that will enable all arisings, movements and treatments of construction waste to be recorded. The system will describe the waste types expected to be produced during the project and identify the waste management action proposed (please refer to Section 3.8.2 and Section 3.8.3 in Appendix 4-5). Estimates of the quantities to be produced will be inserted into a detailed waste management spreadsheet and the data will be updated as the work progresses, and information is

<sup>6</sup> EPA 2021 Best practice guidelines for the preparation of resource & waste management plans for construction & demolition projects <<https://www.epa.ie/publications/circular-economy/resources/CDWasteGuidelines.pdf>>

available and performance against the estimates will be monitored. It will highlight the areas from which most waste occurs and allows the measurement of arisings against performance targets. The WMP can then be adapted with changes that are seen through record keeping.

## 4.5 Site Access and Transportation

### 4.5.1 Site Entrance

The location of the construction phase and operational phase Site access point is shown in Figure 4-22. A Traffic Management Plan is included in Chapter 15 and Appendix 15-3 of this EIAR. In the event planning permission is granted for the Proposed Project, an updated Traffic Management Plan will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned.

#### Construction and Operational Site Entrance

The proposed site entrance for the Proposed Wind Farm will consist of a new access point off the L3115 local road along the western boundary of the Proposed Wind Farm site in the townland of Attimonmore South, Co. Galway. This entrance will be used during both the construction and operational phase of the Proposed Project. On completion of the construction phase, this entrance will be reduced in size and gated for security and will be used as an operational phase entrance.

During the operational phase this entrance will be used to facilitate maintenance and monitoring activities on the Site and will also be used for the delivery of abnormal loads (i.e., turbine component replacement) if required.

During the operational phase it is proposed to access the proposed onsite 38kV substation, which forms part of the Proposed Grid Connection, through the proposed site entrance along the L3115 local road, detailed above.

The proposed site entrance for the Proposed Wind Farm was subject to Autotrack assessment to identify the turning area required and to ensure the safe egress of traffic, as described in Section 15.1.4.1 of Chapter 15 of the EIAR. These access and egress points are shown on the site layout drawings in Appendix 4-1. The location of Proposed Wind Farm site access is shown in Figure 4-22 below.

### 4.5.2 Construction Materials Transport Route

Construction materials will be delivered to the Site via selected haul routes that will be determined based on the source of the construction material. In order to facilitate the construction of the Proposed Project, all crushed stone, hardcore materials and ready-mix concrete that will be required during the construction phase will be sourced from local, appropriately authorised quarries. For the purposes of assessment within the EIAR, quarries within a 20km range of the Proposed Wind Farm site that could potentially provide stone and concrete have been assessed and are illustrated on Figure 4-23. Traffic movements generated by the Proposed Project are discussed in Section 15.1.4 of Chapter 15, Material Assets

For the purposes of assessment within the EIAR, 4 no. existing, authorised quarries, located within 20km of the Proposed Wind Farm site have been selected and are shown in Figure 4-23.

Due to the nature of the Proposed Grid Connection, the proposed works will be transient in nature along the public road network in which the Proposed Grid Connection is proposed. As such, deliveries of construction materials will utilise the surrounding road network along the Proposed Grid Connection as it moves along the public road network in which it's proposed.

It is also envisaged that general construction traffic (including materials and staff) will travel to the Site via the public road network to the proposed site entrance. The construction traffic that will be generated during the construction phase of the Proposed Project is outlined as part of the traffic and transport assessment in Chapter 15 of this EIAR.

### 4.5.3 Turbine Component Transport Route

There are a range of ports within the island of Ireland that have proven capability to accept and store large wind turbine components. These ports include Cork, Foynes, Galway and Dublin ports. Furthermore, subsequent access to the national motorway network during transportation from these ports has been demonstrated. The facilities within the ports and access to and from the ports is continually being upgraded as part of general improvements. It is on this basis that it is not foreseen that this project will require any material change to the port selected should the project be consented and enter into the construction phase.

For the purpose of this EIAR, the Port of Galway has been selected and assessed to facilitate turbine delivery to the Site. It is proposed that large wind turbine components will be delivered to the Proposed Wind Farm, from Galway Port, north through Galway city via the L5048 Lough Atalia Road. After approximately 1.6km on the L5048 Lough Atalia Road, the turbine delivery vehicles will turn right onto the R338 Dublin Road and travel approximately 1.8km southeast before turning north onto the R865 Ballybane Road. After travelling north for 1.3km on the R865 Ballybane Road, the turbines will turn right onto the N6 National Road and travelling east 6.6km before merging onto the M6 Motorway. The turbine delivery vehicles will travel east on the M6 for approximately 11.2km before exiting at Junction 17 to Athenry/Craughwell. After exiting the M6 the turbines will travel north for 1.3km along the R348 regional road before turning south and traveling in a southeastern direction for 9.2km along the R348 regional road. The turbine delivery vehicles will then turn left onto the L3115 local road and travel north for approximately 5.2km to the proposed new site entrance which will facilitate abnormal load delivery (detailed in Section 4.5.1 above).

There are no significant turbine delivery route accommodation works required to facilitate the delivery of components to the Site.

#### 4.5.3.1 Turbine Delivery Route Accommodation Works

Works such as road widening are sometimes required along proposed turbine transport routes to accommodate the large turbine components and associated vehicles seeking to access wind farm sites. The proposed transport route for the Proposed Project, shown on Figure 4-24, has been the subject of a route assessment to determine if any works are required along its length. Full details of the assessment are included as part of the traffic impact assessment set out in Section 15.1.9 and 15.1.10 of this EIAR and summarised below; please note detailed autotracks of the proposed turbine delivery route out of Galway City are include as Appendix 15-3. There are sections on the route where the vertical alignment may require specialist transport vehicles. These sections will be further considered by the appointed transport company following turbine procurement process. Accommodation works will be required at various locations on the national and regional road network between the port of arrival in Galway and the Proposed Wind Farm site. These are detailed below.

##### Location 1 – M6 junction 17 slip / R348 roundabout

The swept path analysis undertaken for this junction is shown for the blade and tower transporters in Figures 15-6 and 15-7 in Chapter 15 respectively. The swept path analysis undertaken for this location shows that both vehicles will be accommodated with overhang of the body of the blade required at the northern corner of the M6 approach to the roundabout. Over-sail of the blade tip will also occur on the southern side of slip approach to the roundabout. The figure indicates that the wheels of both vehicles will be accommodated with the existing carriageway edge.

### Location 2 – R348 / R348 roundabout

The swept path analysis undertaken for this roundabout is shown for the blade and tower transporters in Figures 15-8 and 15-9 in Chapter 15 respectively. The assessment shows that the body of the blade will require to overhang the centre island of the roundabout, and the blade tip will oversail the western side of the roundabout. The assessment indicated that minor over-run of the roundabout centre island edge will be required.

### Location 3 – R348 / R347 Baunmore Roundabout

As shown in Figures 15-10 and 15-11 in Chapter 15, the swept path analysis undertaken for this roundabout indicates that the blade will require to overhang a significant part of the green area of the southwestern corner of the roundabout and the blade tip will oversail the north side of the R348 approach and the centre island of the roundabout.

### Location 4 – R348 / R347 junction at graveyard

The swept path analysis undertaken for this junction is shown for the blade and tower transporters in Figures 15-12 and 15-13 in Chapter 15. The assessment shows that there will be slight overhang of the blade body on the eastern side of the junction and over-sail of the blade tip on the western side of the R348.

### Location 5 – Bend on the R348

The swept path analysis undertaken for this location shown for the blade and tower transporters in Figures 15-14 and 15-15 in Chapter 15 indicates that there will be minor oversail of the blade tip on the southern side of the R348.

### Location 6 – Bend on the R348

The swept path analysis undertaken for this bend shown for the blade and tower transporters in Figures 15-16 and 15-17 in Chapter 15 shows that that there will be minor oversail of the blade tip on the southern side of the R348 and minor overhang of the body of the blade to the north.

### Location 7 – Bend on the R348

In order to ensure the blade tip clears the trees on the northern side of the road there will be minor overhang of the body of the blade on the southern side of the R348. The swept path analysis for this location is shown in Figures 15-18 and 15-19 in Chapter 15.

### Location 8 – Bend on the R348

The swept path assessment for this series of bends indicates that minor oversail of the blade tip and overhang of the blade body will be required north and south of the R348. The swept path analysis for this location is shown in Figures 15-20 and 15-21 in Chapter 15.

### Location 9 – R348 overpass of the M6

The swept path assessment for this section of the R348, as set out in Figures 15-22 and 15-23 in Chapter 15, shows that the approach and the overpass will accommodate the abnormally sized loads.

#### Location 10 – Bend on the R348

The swept path assessment for this bend indicates that minor overhang of the blade body will be required south of the R348. The swept path analysis for this location is shown in Figures 15-24 and 15-25 in Chapter 15.

#### Location 11 – Bend on the R348

The swept path assessment for this bend indicates that the abnormally sized loads will be accommodated at this location. The swept path analysis for this location is shown in Figures 15-26 and 15-27 in Chapter 15.

#### Location 12 – Bend on the R348

The swept path assessment for this bend indicates that minor overhang of the blade tip will be required at this location. The swept path analysis for this location is shown in Figures 15-28 and 15-29.

#### Location 13 – Bend on the R348 at Kiltullagh

The assessment for this relatively sharp left-hand bend shows that the wheels of the abnormally sized loads will be able to negotiate this location with the wheels kept within the existing carriageway. The blade tip will, however, over sail the existing carpark to the south and the body of the blade will overhang the roadside boundary to the north. The swept path analysis for this location is shown in Figures 15-30 and 15-31 in Chapter 15.

#### Location 14 – Bend on the L3115

The swept path assessment for this bend indicates that the abnormally sized loads will be accommodated at this location. The swept path analysis for this location is shown in Figures 15-32 and 15-33 in Chapter 15.

#### Location 15 – Sharp bend on L3115

The assessment for this sharp right-hand bend shows that the wheels of the abnormally sized loads will be able to negotiate this location with the wheels kept within the existing carriageway. Oversail of the blade tip will occur on the west of the bend and overhang of the blade will occur on the eastern side of the L3115. The swept path analysis for this location is shown in Figures 15-33 and 15-35 in Chapter 15.

#### Location 16 – Bend on the L3115 south of the Site

The swept path analysis undertaken for this bend shown for the blade and tower transporters in Figures 15-36 and 15-3 in Chapter 15 7 shows that that there will be oversail of the blade tip on the southern side of the L3115 and overhang of the body of the blade to the northwest.

#### Location 17 – Site access for all vehicles on L3115

The proposed access junction on the L3115 for all traffic that will access the Proposed Wind Farm during the construction and operational stages of the Proposed Project is shown in Figure 15-38 in Chapter 15. The access is located in the townland of Attimonmore, Co Galway and is situated on the eastern side of the L3115. The proposed junction radii are 13m with 1:10 tapers provided for standard HGV access in accordance with TII DN-GEO-03060. STOP road markings and signs are as per Figure 7.35 of the Traffic Signs Manual.

The proposed junction includes a run-over area north and south of the proposed access road in order to facilitate the delivery of the abnormally sized turbine loads. An additional area to the south of the junction will be cleared to facilitate overhang of the turbine blade transport vehicles. On completion of the delivery of the abnormally sized loads the temporary run-over areas will be closed off to traffic with the junction layout reduces in size to the standard junction layout described above.

The required visibility splays for a 60 kph speed limit, 90m along the nearside carriageway edge taken from a setback of 2.4m, are available along the L3115 to the north and south, as shown in Figure 15-39.

The autotrack assessment shown in Figures 15-40 and 15-41 in Chapter 15 demonstrates that the temporary access proposed on the L3115 will accommodate the turning requirements of the blade and tower transport vehicles. Similarly, the autotrack assessment set out in Figure 15-42 demonstrates that the junction layout proposed to accommodate the standard HGVs will accommodate a large articulated HGV.



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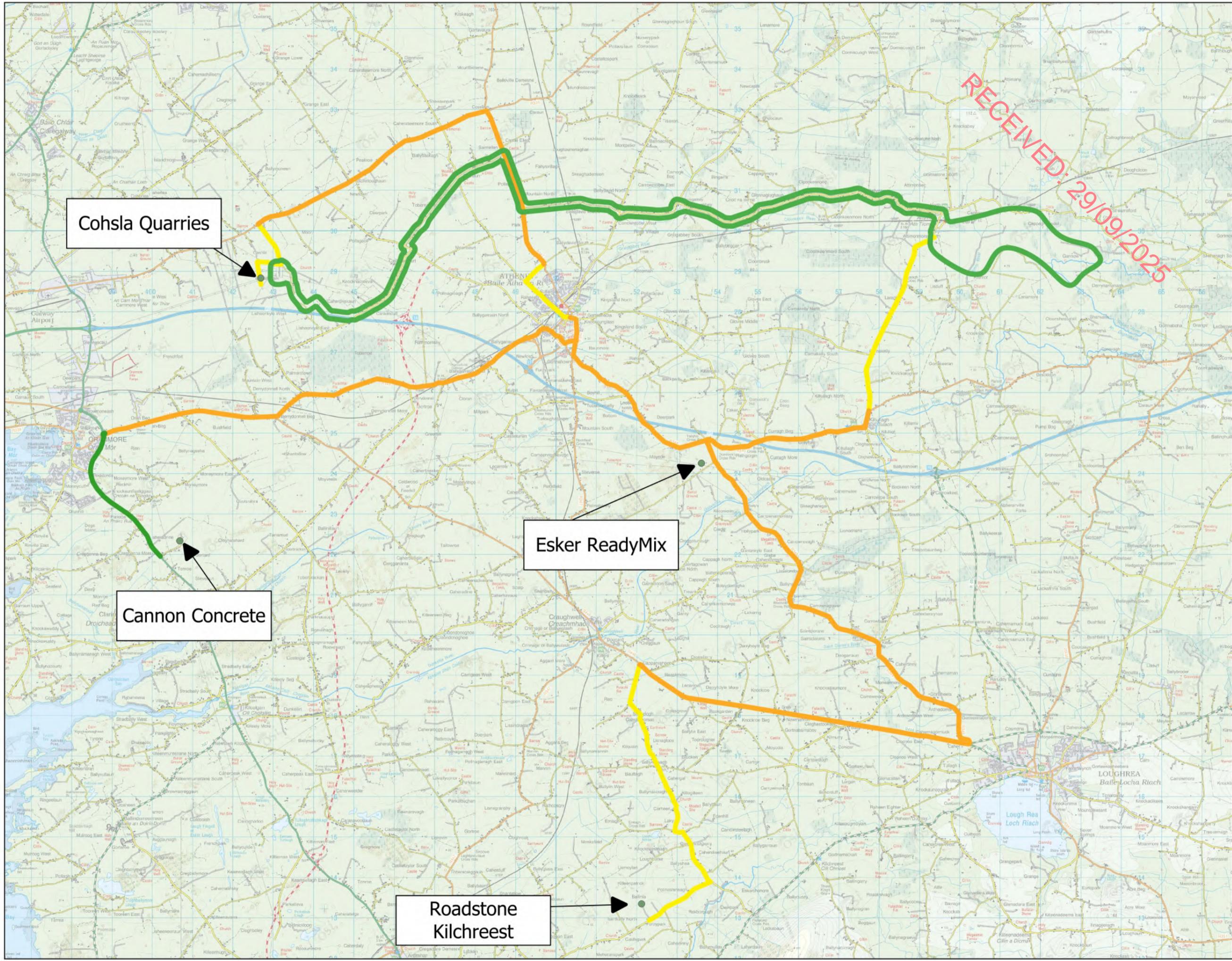
- Map Legend**
- EIAR Site Boundary
  - Proposed Turbine Layout
  - Proposed Turbine Foundations
  - Proposed Hardstands
  - Proposed Met Mast
  - Proposed Upgrades to Existing Roads
  - Proposed New Roads
  - Proposed Temporary Construction Compounds
  - Proposed Onsite 38kV Substation
  - L3115 Local Road

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Drawing Title	
Proposed Site Entrance	
Project Title	
Gannow Renewable Energy Development	
Drawn By	Checked By
CJ	EC
Project No.	Drawing No.
240323	Figure 4-22
Scale	Date
1:12,500	2025-09-05

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Cohsla Quarries

Cannon Concrete

Esker ReadyMix

Roadstone Kilchreest

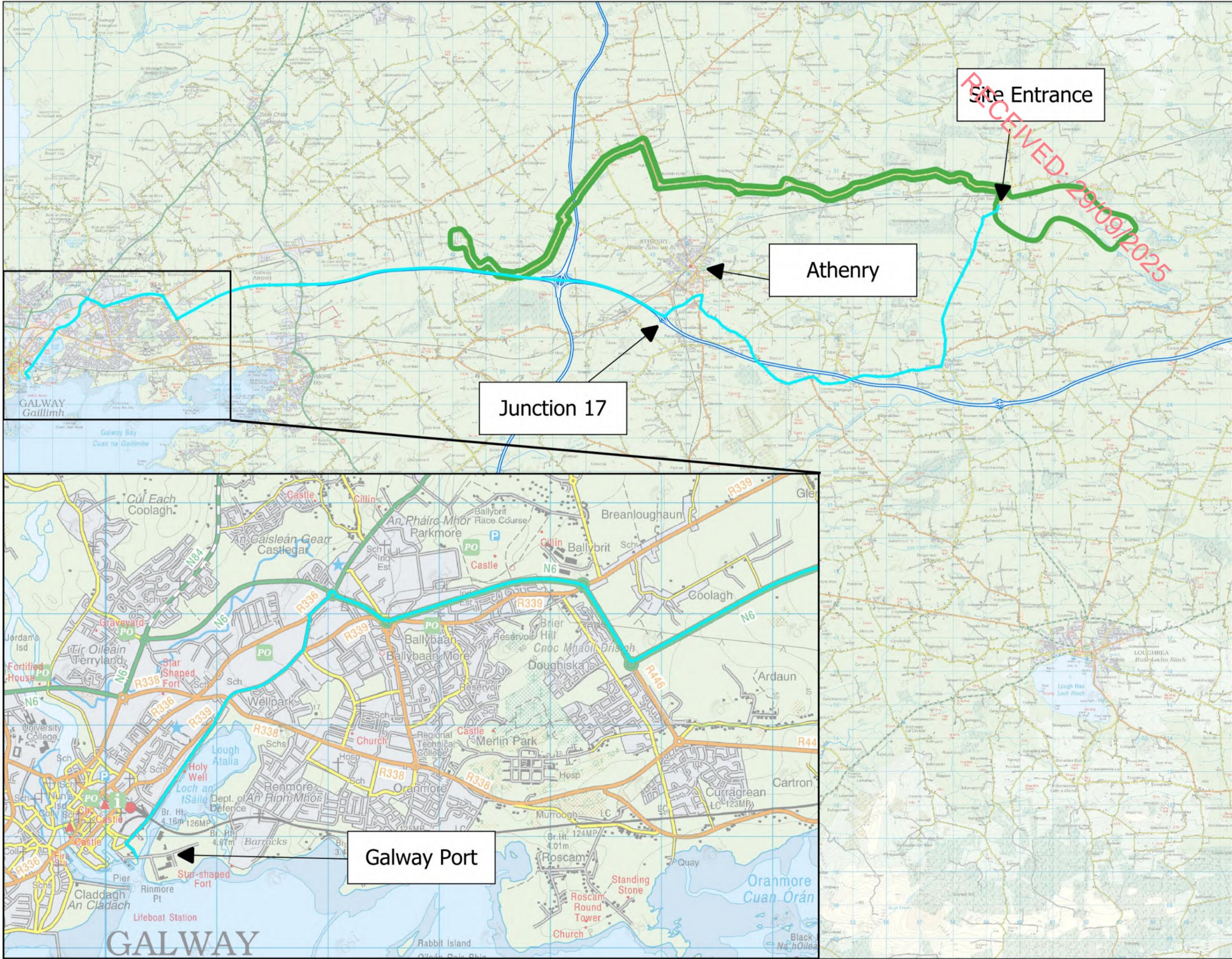
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- Map Legend**
- EIAR Site Boundary
  - Quarries
  - Construction Haul Routes - National Roads
  - Construction Haul Routes - Regional Roads
  - Construction Haul Routes - Local Roads



Drawing Title		Local Quarry Locations and Associated Construction Delivery Routes	
Project Title		Gannow Renewable Energy Development	
Drawn By	CJ	Checked By	EC
Project No.	240323	Drawing No.	Figure 4-23
Scale	1:82,500	Date	2025-09-11
		<b>MKO</b> Planning and Environmental Consultants Team Road, Galway Ireland, H91 V W84 +353 (0) 91 735611 email: info@mkofireland.ie Website: www.mkofireland.ie	

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- Map Legend
-  EIAR Site Boundary
  -  Proposed Turbine Delivery Route

Site Entrance

Athenry

Junction 17

Galway Port

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Drawing Title		Proposed Turbine Delivery Route	
Project Title		Gannow Renewable Energy Development	
Drawn By	CJ	Checked By	EC
Project No.	240323	Drawing No.	Figure 4-24
Scale	1:100,000	Date	2025-09-05
		<b>MKO</b> Planning and Environmental Consultants Tuam Road, Galway Ireland, H91 YW84 +353 (0) 91 735611 email: info@mkofireland.ie Website: www.mkofireland.ie	

#### 4.5.4 Traffic Management

A turbine with the maximum blade length of 81.5m has been used in assessing the traffic impact of the Proposed Project. The blade transporter for such a turbine blade would have a total vehicle length of 87m, including the blade which overhangs the back of the vehicle. The total length of the tower transporter is 47.7 with the axles located at the front and rear of the load with no overhang.

The vehicles used to transport the nacelles will be similar to the tower transporter. All other vehicles requiring access to the Site will be smaller than the large turbine component transport vehicles. The turbine delivery vehicles have been modelled in the swept path assessments of identified pinch points along the proposed turbine delivery route, as detailed in Chapter 15: Material Assets of this EIAR.

The need to transport turbine components on the public roads is not an everyday occurrence in the vicinity of the Proposed Wind Farm site. However, the procedures for transporting abnormal size loads on the country's roads are well established. While every operation to transport abnormal loads is different and requires careful consideration and planning, escort vehicles, traffic management plans, drive tests, road marshals and convoy escorts from the Garda Traffic Corps are all measures that are regularly employed to deliver oversized loads from origin to destination. With just under 400 No. wind farms already built and operating in Ireland (Republic and Northern Ireland combined, as per latest available figures on [www.windenergyireland.com](http://www.windenergyireland.com)), transport challenges are something the wind energy industry and specialist transport sector has become particularly adept in finding solutions to.

As an alternative solution for transport of turbine blades, alternative delivery systems are available. For example, delivery vehicles fitted with blade adapters may be used in order to navigate the existing roads along the turbine delivery route. Blade adaptors allow the turbine blade to be transported at a suitable angle in order to navigate tight bends or obstacles along the delivery route. Plate 4-6 below shows an example of a blade adapter.



Plate 4-6 Blade Adaptor Transport System

A detailed Traffic Management Plan (TMP) will be provided specifying details relating to traffic management and included in the Construction Environmental Management Plan (CEMP) prior to the commencement of the construction phase of the Proposed Project. The TMP will be agreed with the local authority and An Garda Síochána prior to construction works commencing on-site. The TMP will include:

- > A delivery schedule.
- > Details of works or any other minor alteration identified.
- > A dry run of the route using vehicles with similar dimensions.

The deliveries of turbine components to the Proposed Wind Farm site may be made in convoys of three to four vehicles at a time, and at night when roads are quietest. Convoys will be accompanied by escorts at the front and rear operating a “stop and go” system. Although the turbine delivery vehicles are large, they will not prevent other road users or emergency vehicles passing, should the need arise. The delivery escort vehicles will ensure the turbine transport is carried out in a safe and efficient manner with minimal delay or inconvenience for other road users.

It is not anticipated that any section of the public road network will be closed during transport of turbines, although there will be some delays to local traffic at pinch points. During these periods it may be necessary to operate local diversions for through traffic. All deliveries comprising abnormally large loads where required will be made outside the normal peak traffic periods, usually at night, to avoid disruption to work and school-related traffic.

Prior to the TMP being finalised, a full dry run of the transport operation along the potential routes will be completed using vehicles with attachments to simulate the dimensions of the wind turbine transportation vehicles. This dry run will inform the TMP for agreement with the relevant authority. All turbine deliveries will be provided for in a TMP which will be finalised in advance of oversized load deliveries, when the exact transport arrangements are known, delivery dates confirmed and escort proposals in place. Such a traffic management plan is typically submitted to the relevant authority for agreement in advance of any abnormal loads using the local roads, and will provide for all necessary safety measures, including a convoy and Garda escort as required, off-peak turning/reversing movements and any necessary safety controls.

General construction deliveries and staff will access the Proposed Wind Farm site via the proposed new construction and operational entrance on the L-3115 at the west of the Proposed Wind Farm site, as described in Section 4.5.1 above. As set out in Chapter 15, Section 15.1.2.3, based on the location of potential suppliers of concrete and crushed stone, there are 3 additional routes (the R347 which links into Athenry from the west, the R348 which connects into Athenry from the north, and the R349 that joins the TDR from the south) that may be used for the delivery of these materials. Transportation of large turbine components will be carried out at night when traffic is at its lightest and in consultation with the relevant Roads Authorities and An Garda Síochána with deliveries accompanied by Garda escort.

## 4.6 Site Drainage

### 4.6.1 Introduction

The drainage design for the Proposed Project has been prepared by Hydro Environmental Services Ltd (HES). The drainage design has been prepared based on experience of the project team of other wind farm sites, and the number of best practice guidance documents referred to in the References section of the ELAR.

The protection of the watercourses within and surrounding the Site, and downstream catchments that they feed is important to establish the most appropriate drainage proposals for the Proposed Project.

The drainage design for the Proposed Project has been planned with the intention of having no significant negative impact on the water quality of the Site and its associated rivers, and consequently no impact on downstream catchments and ecological ecosystems. The assessment of potential impacts on hydrology and hydrogeology due to the construction, operation and decommissioning of the Proposed Project is included in Chapter 9: Water.

No routes of any natural drainage features will be altered as part of the Proposed Project. Turbine locations and associated new roadways were designed to avoid natural watercourses with existing roads to be used wherever possible. There will be no discharge of untreated or unattenuated water to any natural watercourses or land drains, with all drainage waters being dispersed as overland flows. All

discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses and drains. Buffer zones around the existing natural drainage features have been used to inform the layout of the Proposed Project.

#### 4.6.2 Existing Drainage Features

The Proposed Wind Farm will require 2 no. new clear span or bottomless box culverts watercourse crossings, and the Proposed Grid Connection will require the crossing of 10 no. watercourses (4 no. of which are EPA mapped watercourses). It is important to note that all identified drains within the Proposed Wind Farm site are man-made field drains which run along hedgerows and field headlands and all Proposed Grid Connection crossings are existing bridges and culverts along the public road.

The general design approach to wind farm layouts is to utilise and integrate with the existing drainage infrastructure where possible whether it be existing access roads or the existing forestry / peat / agricultural drainage network. Utilising the existing infrastructure means that there will be less of a requirement for new construction/excavations which have the potential to impact on downstream watercourses in terms of suspended solid input in runoff (unless managed appropriately). The existing forestry and agricultural drains have no major ecological or hydrological value and can be readily integrated into the Proposed Wind Farm drainage scheme.

There will be no discharge of untreated or unattenuated water to natural watercourses or drains. All discharges from the proposed works areas or from interceptor drains will be made over vegetated ground at an appropriate distance from watercourses. Buffer zones around the existing natural drainage features have informed the layout of the Proposed Project and are indicated on the drainage design drawings.

Where artificial drains are currently in place in the vicinity of proposed works areas, these drains may have to be diverted around the proposed works areas to minimise the amount of water in the vicinity of works areas. Where it may not be possible to divert artificial drains around proposed work areas, the drains will be blocked to ensure sediment laden water from the works areas has no direct route to other watercourses. Where drains have to be blocked, the blocking will only take place after an alternative drainage system to handle the same water has been put in place.

Existing artificial drains in the vicinity of existing Proposed Wind Farm roads will be maintained in their present location where possible. If it is expected that these artificial drains will receive drainage water from works areas post treatment, check dams will be added (as specified below) to control flows and sediment loads in these existing artificial drains. If road widening or improvement works are necessary along the existing roads, where possible, the works will take place on the opposite side of the road to the drain.

#### 4.6.3 Drainage Design Principles

The key principles of drainage design that will be implemented and adhered to as part of the Proposed Project are as follows:

- Keep clean water clean by intercepting it where possible, upgradient of works areas, and divert it around the works areas for discharge as diffuse overland flow or for rewetting of land.
- Collect potentially silt-laden runoff from works areas via downgradient collector drains and manage via series of avoidance, source, in-line, treatment and outfall controls prior to controlled diffuse release as overland flow or for rewetting of land.
- No direct hydraulic connectivity from construction areas to watercourses or drains connecting to watercourses.
- Where possible, maintain 50-metre watercourse buffer zones for the wind turbines.
- No alteration of natural watercourses.

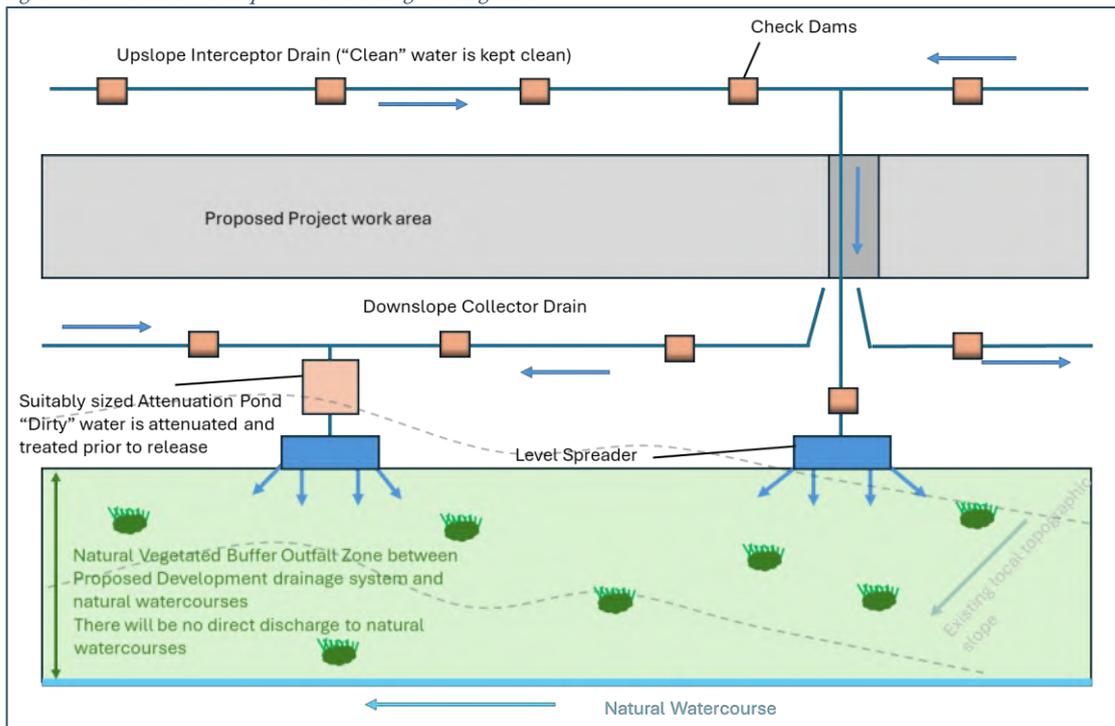
- Maintain the existing hydrology of the Site.
- Blocking of existing manmade drainage as appropriate.
- Daily inspection and recording of surface water management system by on-site Environmental Clerk of Works and immediate remedial measures to be carried out as required and works temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the Site.
- Use of siltbuster or equivalent system if required.

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Drainage water from any works areas of the Site will not be directed to any natural watercourses within the Site. Two distinct methods will be employed to manage drainage water within the Proposed Wind Farm site. The first method involves keeping clean water clean by avoiding disturbance to natural drainage features, minimising any works in or around artificial drainage features, and diverting clean surface water flow around excavations and construction areas. The second method involves collecting any drainage waters from works areas within the Site that might carry silt or sediment, to allow attenuation and settlement prior to controlled diffuse release.

The drainage design is intended to maximise erosion control, which is more effective than having to control sediment during high rainfall. Such a system also requires less maintenance. The area of exposed ground will be minimised. The drainage measures will prevent runoff from entering the works areas of the Site from adjacent ground, to minimise the volume of sediment-laden water that has to be managed. Discoloured run-off from any construction area will be isolated from natural clean run-off. A schematic of the proposed Site drainage management is presented in Figure 4-25 below.

Figure 4-25 Schematic of Proposed Site Drainage Management



#### 4.6.4 Drainage Design

A drainage design for the Proposed Project, incorporating all principles and measures outlined in this drainage design description, has been prepared, and is included in Appendix 4-3 to this ELAR. The drainage design employs the various measures further described below and is cognisant of the following guidance documents:

- Forestry Commission (2011): Forests and Water UK Forestry Standard Guidelines, Fifth Edition. Publ. Forestry Commission, Edinburgh;
- Circular Letter PL 1/2017: Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive);
- Environmental Protection Agency (2022): Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);
- Institute of Geologists Ireland (2013) Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- DoE/NIEA (2015): Wind farms and groundwater impacts - A guide to EIA and Planning considerations”;
- OPW (2009) The Planning System and Flood Risk Management;
- National Roads Authority (2008) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Wind Energy Development Guidelines for Planning Authorities, 2006 (the Guidelines (DoEHLG, 2006)) and the Draft Revised Wind Energy Development Guidelines (the Draft Guidelines (DoEHLG, 2019));
- Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Watercourses;
- Good Practice During Wind Farm Construction (Scottish Natural Heritage, 2010);
- CIRIA (Construction Industry Research and Information Association) Guidance on ‘Control of Water Pollution from Linear Construction Projects’ (CIRIA Report No. C648, 2006);
- Wind Farms and Groundwater Impacts: A guide to EIA and Planning considerations (DoE/NIEA, April 2015);
- Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2001;
- Land Types for Afforestation (Forest Service, 2016b);
- Forest Protection Guidelines (Forest Service, 2002);
- Forest Operations and Water Protection Guidelines (Coillte, 2013);
- Forestry and Water Quality Guidelines (Forest Service, 2000b); and,
- Forests and Water, Achieving Objectives under Ireland’s River Basin Management Plan 2018-2021 (DAFM, 2018).

#### 4.6.4.1 **Interceptor Drains**

Interceptor drains will be installed upgradient of any works areas to collect surface flow runoff and prevent it reaching excavations and construction areas of the Site where it might otherwise have come into contact with exposed surfaces and picked up silt and sediment. The drains will be used to divert upslope runoff around the works area to a location where it can be redistributed over the ground surface as sheet flow. This will minimise the volume of potentially silty runoff to be managed within the construction area.

The interceptor drains will be installed in advance of any main construction works commencing. The material excavated to make the drain will be compacted on the downslope edge of the drain to form a diversion dike. On completion of the construction phase works, it is envisaged that the majority of the interceptor drains could be removed. At that stage, there will be no open excavations or large areas of exposed ground that are likely to give rise to large volumes of potentially silt-laden run off. Any areas in which works were carried out to construct roads, turbines or hardstands, will have been built up with large grade hardcore, which even when compacted in place, will retain sufficient void space to allow water to infiltrate the subsurface of these constructed areas. It is not anticipated that roadways or other installed Site infrastructure will intercept ground-conveyed surface water runoff to any significant extent that would result in scouring or over-topping or spill over. Where the drains are to be removed, they will be backfilled with the material from the diversion dike. Interceptor drains may have to be retained in certain locations, for example where roadways are to be installed on slopes, to prevent the roadways acting as conduits for water that might infiltrate the roadway sub-base. In these cases, interceptor drains would be maintained in localised areas along the roadway with culverts under the roadway, which

would allow the intercepted water to be discharged to vegetation filters downgradient of the roadway. Similarly, in localised hollows where water is likely to be funnelled at greater concentrations than on broader slopes, interceptor drains and culverts may be left in situ following construction. Figure 4-26 below shows an illustrative drawing of an interceptor drain.

The velocity of flow in the interceptor will be controlled by check dams (see Section 4.6.4.3. below), which will be installed at regular intervals along the drains to ensure flow in the channel is non-erosive. On steeper sections where erosion risks are greater, a geotextile membrane will be added to the channel. Interceptor drains will be installed horizontally across slopes to run in parallel with the natural contour line of the slope. Intercepted water will travel along the interceptor drains to areas downgradient of works areas, where the drain will terminate at a level spreader (see Section 4.6.4.4 below). Across the entire length of the interceptor drains, the design elevation of the water surface along the route of the drains will not be lower than the design elevation of the water surface in the outlet at the level spreader.

#### 4.6.4.2 Swales

Drainage swales are shallow drains that will be used to intercept and collect run off from construction areas of the Site during the construction phase. Drainage swales will remain in place to collect runoff from roads and hardstanding areas of the Proposed Wind Farm during the operational phase. A swale is an excavated drainage channel located along the downgradient perimeter of construction areas, used to collect and carry any sediment-laden runoff to a sediment-trapping facility and stabilised outlet. Swales are proven to be most effective when a dike is installed on the downhill side. They are similar in design to interceptor drains and collector drains described above. Figure 4-26 below, shows an illustrative example of a drainage swale.

Drainage swales will be installed downgradient of any works areas to collect surface flow runoff where it might have come into contact with exposed surfaces and picked up silt and sediment. Swales will intercept the potentially silt-laden water from the excavations and construction areas of the site and prevent it reaching natural watercourses.

Drainage swales will be installed in advance of any main construction works commencing. The material excavated to make the swale will be compacted on the downslope edge of the drain to form a diversion dike.

#### 4.6.4.3 Check Dams

The velocity of flow in the interceptor drains and drainage swales, particularly on sloped sections of the channel, will be controlled by check dams, which will be installed at regular intervals along the drains to ensure flow in the swale is non-erosive.

Check dams will restrict flow velocity, minimise channel erosion and promote sedimentation behind the dam. The check dams will be installed as the interceptor drains are being excavated. Check dams may also be installed in some of the existing artificial drainage channels on the Site, downstream of where drainage swales connect in.

The proposed check dams will be made up of straw bales or stone, or a combination of both depending on the size of the drainage swale it is being installed in. Where straw bales are to be used, they will be secured to the bottom of the drainage swale with stakes. Clean 4–6-inch stone will be built up on either side and over the straw bale to a maximum height of 600mm over the bottom of the interceptor drain. In smaller channels, a stone check dam will be installed and pressed down into place in the bottom of the drainage swale with the bucket of an excavator. Figure 4-26 shows illustrative examples of check dams.

The check dams will be installed at regular intervals along the interceptor drains to ensure the bottom elevation of the upper check dam is at the same level as the top elevation of the next down-gradient check dam in the drain. The centre of the check dam will be approximately 150mm lower than the edges to allow excess water to overtop the dam in flood conditions rather than cause upstream flooding or scouring around the dams.

Check dams will not be used in any natural watercourses, only artificial drainage channels and interceptor drains. The check dams will be left in place at the end of the construction phase to limit erosive linear flow in the drainage swales during extreme rainfall events.

Check dams are designed to reduce velocity and control erosion and are not specifically designed or intended to trap sediment, although sediment is likely to build up. If necessary, any excess sediment build up behind the dams will be removed. For this reason, check dams will be inspected and maintained regularly to insure adequate performance. Maintenance checks will also ensure the centre elevation of the dam remains lower than the sides of the dam.

#### 4.6.4.4 Level Spreaders

A level spreader will be constructed at the end of each interceptor drain to convert concentrated flows in the drain, into diffuse sheet flow on areas of vegetated ground. The level spreaders will be located downgradient of any proposed works areas in locations where they are not likely to contribute further to water ingress to construction areas of the Site.

The water carried in interceptor drains will not have come in contact with works areas of the Site and therefore should be free of silt and sediment. The level spreaders will distribute clean drainage water onto vegetated areas where the water will not be reconcentrated into a flow channel immediately below the point of discharge. The discharge point will be on level or only very gently sloping ground rather than on a steep slope so as to prevent erosion. Figure 4-26 below shows an illustrative example of a level spreader.

The slope in the channel leading into the spreader will be less than or equal to 1%. The slope downgradient of the spreader onto which the water will dissipate will have a grade of less than 6%. The availability of slopes with a grade of 6% or less will determine the locations of level spreaders. If a slope grade of less than 6% is not available in the immediate area downgradient of a works area at the end of a diversion drain, a piped slope drain (see Section 4.6.4.5 below) will be used to transfer the water to a suitable location.

The spreader lip over which the water will spill will be made of a concrete kerb, wooden board, pipe, or other similar piece of material that can create a level edge similar in effect to a weir. The spreader will be level across the top and bottom to prevent channelised flow leaving the spreader or ponding occurring behind the spreader. The top of the spreader lip will be 150mm above the ground behind it. The length of the spreader will be a minimum of 4m and a maximum length of 25m, with the actual length of each spreader to be determined by the size of the contributing catchment, slope and ground conditions.

Clean four-inch stone can be placed on the outside of the spreader lip and pressed into the ground mechanically to further dissipate the flow leaving the level spreader over a larger area.

#### 4.6.4.5 Piped Slope Drains

Piped slope drains will be used to convey surface runoff from diversion drains safely down slopes to flat areas without causing erosion. Once the runoff reaches the flat areas it will be reconverted to diffuse sheet flow. Level spreaders will only be established on slopes of less than 6% in grade. Piped slope drains will be used to transfer water away from areas where slopes are too steep to use level spreaders.

The piped slope drains will be semi-rigid corrugated pipes with a stabilised entrance and a rock apron at the outlet to trap sediment and dissipate the energy of the water. The base of drains leading into the top of the piped slope drain will be compacted and concavely formed to channel the water into the corrugated pipe. The entrance at the top of the pipe will be stabilised with sandbags if necessary. The pipe will be anchored in place by staking at approximately 3-4 metre intervals or by weighing down with compacted soil. The bottom of the pipe will be placed on a slope with a grade of less than 1% for a length of 1.5m, before outflowing onto a rock apron.

The rock apron at the outlet will consist of 6-inch stone to a depth equal to the diameter of the pipe, a length six times the diameter of the pipe. The width of the rock apron will be three times the diameter of the pipe where the pipe opens onto the apron and will fan out to six times the diameter of the pipe over its length. Figure 4-26 below shows a diagrammatic example of a piped slope drain and rock apron.

Piped slope drains will only remain in place for the duration of the construction phase of the Proposed Project. On completion of the works, the pipes and rock aprons will be removed, and all channels backfilled with the material that was originally excavated from them.

Piped slope drains will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and blockages. Stake anchors or fill over the pipe will be checked for settlement, cracking, and stability. Any seepage holes where pipe emerges from the drain at the top of the pipe will be repaired promptly.

#### 4.6.4.6 Vegetation Filters

Vegetation filters are the existing vegetated areas of land that will be used to accept surface water runoff from upgradient areas. The selection of suitable areas to use as vegetation filters will be determined by the size of the contributing catchment, slope and ground conditions.

Vegetation filters will carry outflow from the level spreaders as overland sheet flow, removing any suspended solids and discharging to the groundwater system by diffuse infiltration.

Vegetation filters will not be used in isolation for waters that are likely to have higher silt loadings. In such cases, silt-bearing water will already have passed through stilling ponds prior to diffuse discharge to the vegetation filters via a level spreader.

#### 4.6.4.7 Stilling Ponds (Settlement Ponds)

Stilling ponds will be used to attenuate runoff from works areas of the Proposed Project during the construction phase and will remain in place to handle runoff from roads and hardstanding areas of the Proposed Project during the operational phase. The purpose of the stilling ponds is to intercept runoff potentially laden with sediment and to reduce the amount of sediment leaving the disturbed area by reducing runoff velocity. Reducing runoff velocity will allow larger particles to settle out in the stilling ponds, before the run-off water is redistributed as diffuse sheet flow in filter strips downgradient of any works areas.

Stilling ponds will be excavated/constructed at each required location as two separate ponds in sequence, a primary pond and a secondary pond. The points at which water enters and exits the stilling ponds will be stabilised with rock aprons, which will trap sediment, dissipate the energy of the water flowing through the stilling pond system, and prevent erosion. The primary stilling pond will reduce the velocity of flows to less than 0.5 metres per second to allow settlement of silt to occur. Water will then pass from the primary pond to the secondary pond via another rock apron. The secondary stilling pond will reduce the velocity of flows to less than 0.3 metres per second. Water will flow out of the secondary stilling pond through a stone dam, partially wrapped in geo-textile membrane, which will control flow

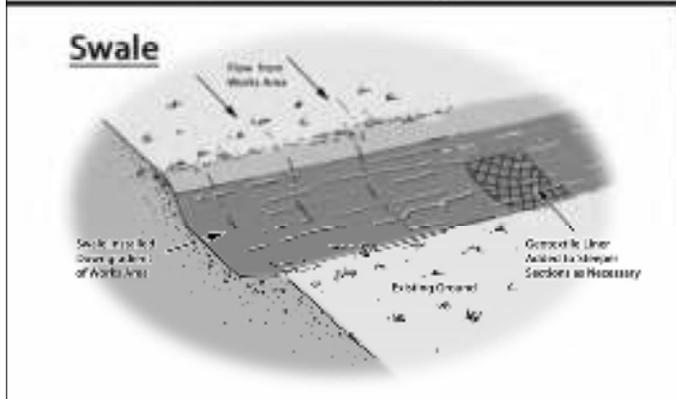
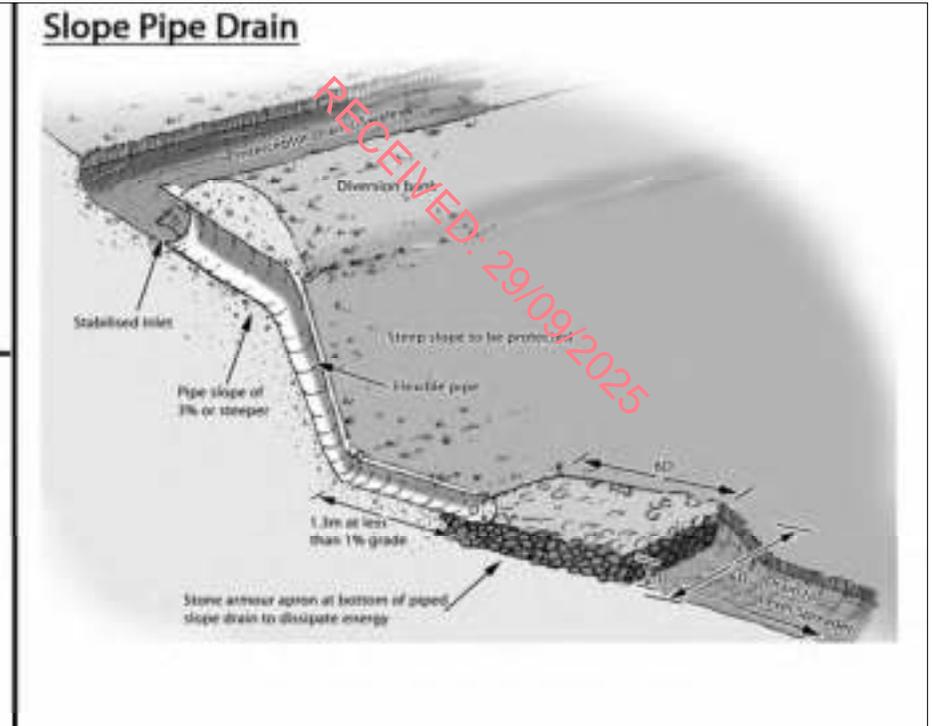
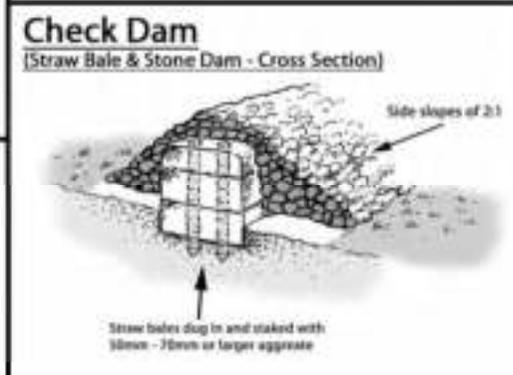
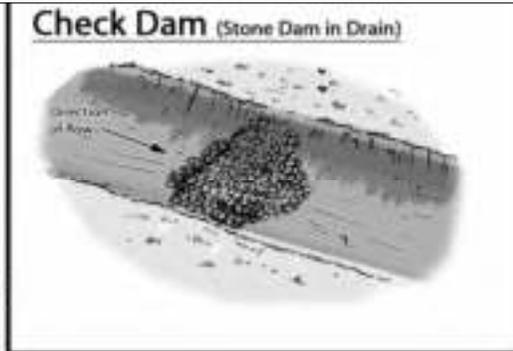
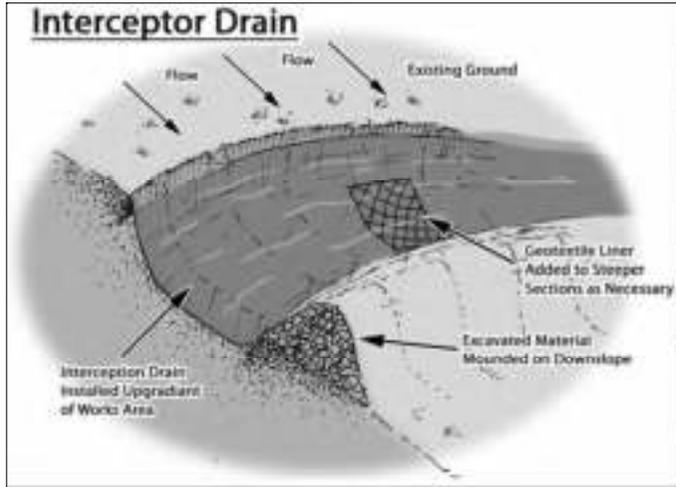
velocities and trap any sediment that has not settled out. Figure 4-26 below shows an illustrative example of a stilling pond system.

Water will flow by gravity through the stilling pond system. The stilling ponds will be sized according to the size of the area they will be receiving water from but will be sufficiently large to accommodate peak flows storm events. The stilling ponds will be dimensioned so that the length to width ratio will be greater than 2:1, where the length is the distance between the inlet and the outlet. Where ground conditions allow, stilling ponds will be constructed in a wedge shape, with the inlet located at the narrow end of the wedge. Each stilling pond will be a minimum of 1-1.5 metres in depth. Deeper ponds will be used to minimise the excavation area needed for the required volume.

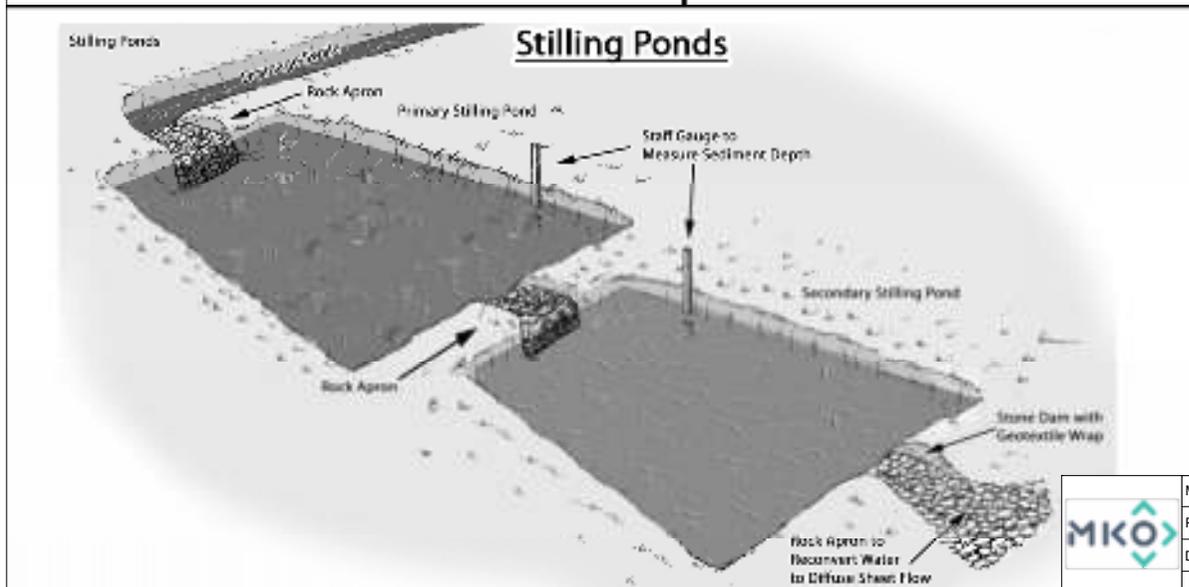
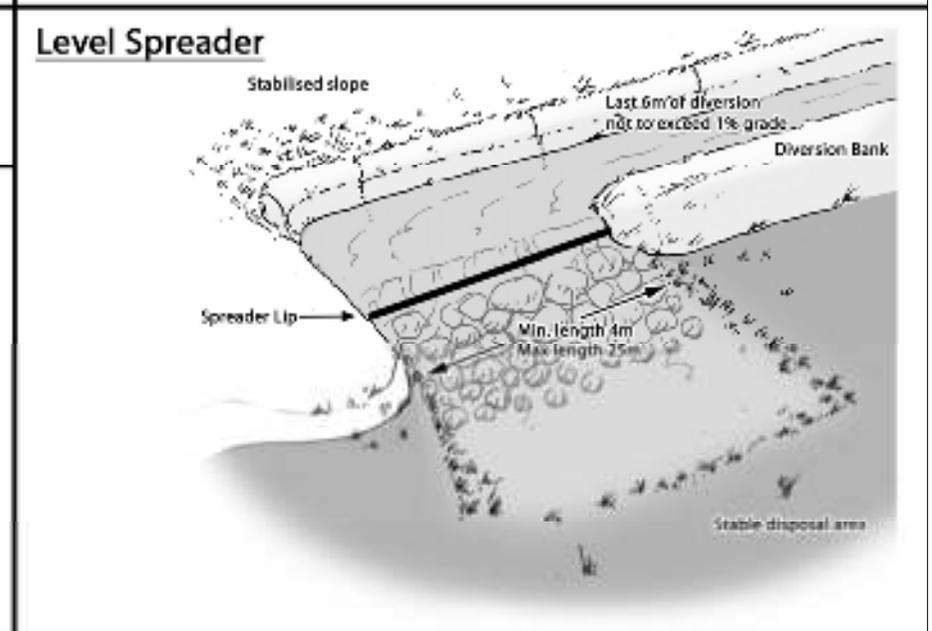
The embankment that forms the sloped sides of the stilling ponds will be stabilised with vegetated turves, which will have been removed during the excavation of the stilling ponds area. All material excavated during pond construction will be used locally for landscaping and berm construction around these ponds.

Stilling ponds will be located towards the end of swales, close to where the water will be reconverted to diffuse sheet flow. Upon exiting the stilling pond system, water will be immediately reconverted to diffuse flow via a fan-shaped rock apron if there is adequate space and ground conditions allow. Otherwise, a swale will be used to carry water exiting the stilling pond system to a level spreader to reconvert the flow to diffuse sheet flow.

Stilling ponds will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and anything else that might interfere with flows.



## Drainage Design Measures



	MAP TITLE: <b>Drainage Design Illustrations</b>	MAP NO.: <b>Figure 4-26</b>	SCALE: <b>NTS</b>
	PROJECT TITLE: <b>Gannow Renewable Energy Development, Co. Galway</b>	DATE: <b>26.09.2025</b>	
	DRAWING BY: <b>Catherine Johnson</b>	CHECKED BY: <b>Ellen Costello</b>	ISSUE NO.: <b>240323 - 2025.09.26 - F</b>
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#### 4.6.4.8 Siltbuster

A “siltbuster” or similar equivalent piece of equipment will be available to filter any water pumped out of excavation areas, if necessary, prior to its discharge to stilling ponds or swales.

Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction sites.

The unit stills the incoming water/solids mix and routes it upwards between a set of inclined plates for separation. Fine particles settle onto the plates and slide down to the base for collection, whilst treated water flows to an outlet weir after passing below a scum board to retain any floating material. The inclined plates dramatically increase the effective settling area of the unit giving it a very small footprint onsite and making it highly mobile. Figure 4-27 shows an illustrative diagram of the Siltbuster.

The Siltbuster units are now considered best practice for the management of dirty water pumped from construction sites. The UK Environment Agency and the Scottish Environmental Protection Agency have all recommended/specified the use of Siltbuster units on construction projects.

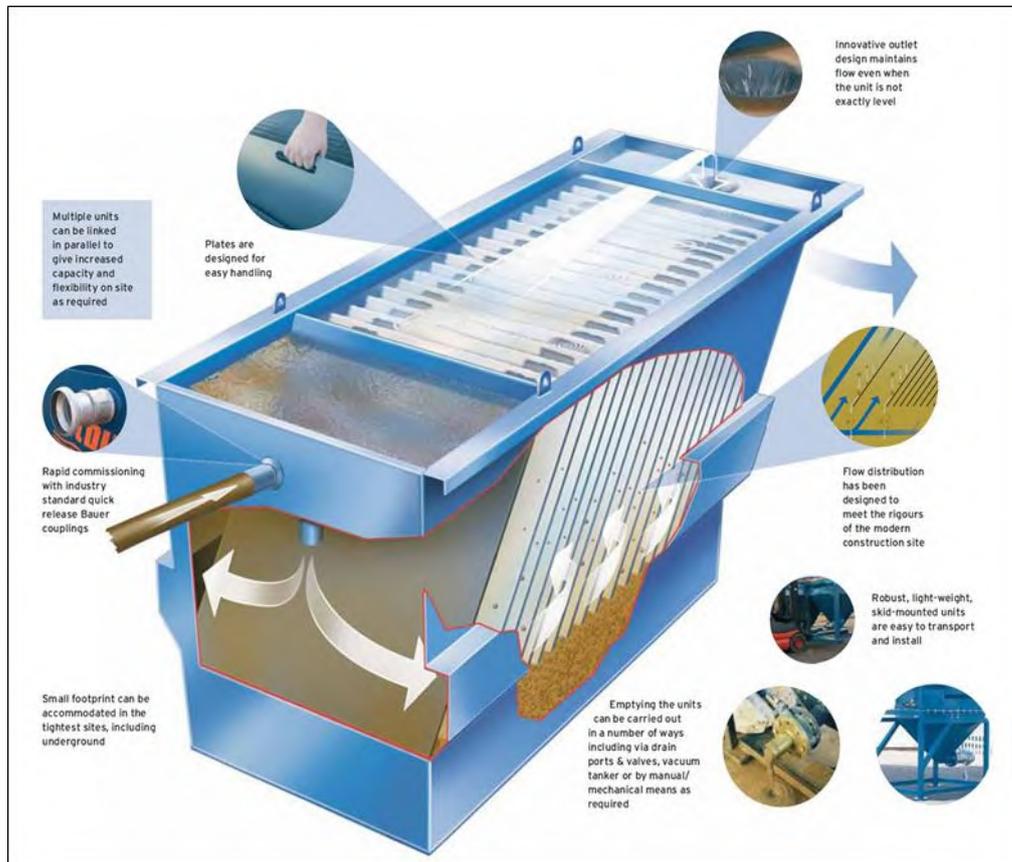


Figure 4-27 Siltbuster (Source: [https://www.siltbuster.co.uk/sb\\_prod/siltbuster-fb50-settlement-unit/](https://www.siltbuster.co.uk/sb_prod/siltbuster-fb50-settlement-unit/))

#### 4.6.4.9 Silt Bags

Dewatering silt bags allow the flow of water through them while trapping any silt or sediment suspended in the water. The silt bags provide a passive non-mechanical method of removing any remaining silt contained in the potentially silt-laden water collected from works areas within the Site.

Dewatering silt bags are an additional drainage measure that can be used downgradient of the stilling ponds at the end of the drainage swale channels and will be located, wherever it is deemed appropriate, throughout the Site. The water will flow, via a pipe, from the stilling ponds into the silt bag. The silt bag will allow the water to flow through the geotextile fabric and will trap any of the finer silt and sediment remaining in the water after it has gone through the previous drainage measures. The dewatering silt bags will ensure that there will be no loss of silt into the stream.

The dewatering silt bag that will be used will be approximately 3 metres in width by 4.5 metres (see Plate 4-7 and Plate 4-8 below) in length and will be capable of trapping approximately four tonnes of silt. The dewatering silt bag, when full, will be removed from Site by a waste contractor with the necessary waste collection permit, who will then transport the silt bag to an appropriate, fully licensed waste facility.



Plate 4-7 Silt Bag under inspection



Plate 4-8 Silt Bag with water being pumped through

#### 4.6.4.10 Sedimats

Sediment entrapment mats, consisting of coir or jute matting, will be placed at the outlet of the silt bag to provide further treatment of the water outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure.

#### 4.6.4.11 Culverts

All new proposed culverts and proposed culvert upgrades will be suitably sized for the expected peak flows in the watercourse.

Some culverts may be installed to manage drainage waters from works areas of the Proposed Project, particularly where the waters have to be taken from one side of an existing roadway to the other for discharge. The size of culverts will be influenced by the depth of the track or road sub-base. In all cases, culverts will be oversized to allow mammals to pass through the culvert.

Culverts will be installed with a minimum internal gradient of 1% (1 in 100). Smaller culverts will have a smooth internal surface. Larger culverts may have corrugated surfaces which will trap silt and contribute to the stream ecosystem. Depending on the management of water on the downstream side of the culvert, large stone may be used to interrupt the flow of water. This will help dissipate its energy and help prevent problems of erosion. Smaller water crossings will simply consist of an appropriately sized pipe buried in the sub-base of the road at the necessary invert level to ensure ponding or pooling does not occur above or below the culvert and water can continue to flow as necessary.

All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance.

#### 4.6.4.12 Silt Fences

Silt fences will be installed as an additional water protection measure around existing watercourses in certain locations, particularly where works are proposed within the 50m buffer zone of a stream, which is inevitable where existing roads in proximity to watercourses are to be upgraded as part of the Proposed Project. These areas include around existing culverts, around the headwaters of watercourses, and the proposed locations are indicated on the drainage design drawings included in Appendix 4-3.

Silt fences will be installed as single, double or a series of triple silt fences, depending on the space available and the anticipated sediment loading. The silt fence designs follow the technical guidance document '*Control of Water Pollution from Linear Construction Projects*' published by Construction Industry Research and Information Association (CIRIA, No. C648, 1996). Up to three silt fences may be deployed in series.

All silt fencing will be formed using Terrastop Premium or equivalent silt fence product.

Silt fences will be inspected regularly to ensure water is continuing to flow through the fabric, and the fence is not coming under strain from water backing up behind it.

#### 4.6.4.13 Hydrocarbon Interceptor

A hydrocarbon (or petrol) interceptor is a trap used to filter out hydrocarbons from surface water runoff. A suitably sized hydrocarbon interceptor will be installed wherever it is intended to store hydrocarbons and oils (i.e., construction compounds and substation compound) or where it is proposed to park vehicles during the construction and operational phases of the Proposed Project (i.e., construction compounds and substation compound).

#### 4.6.4.14 Tree Felling Drainage

Tree felling will be required within and around Proposed Project footprint to allow for the construction of the proposed turbines, access roads, underground cabling, and the other ancillary infrastructure. The felling will not be undertaken simultaneously with construction groundworks. Keyhole felling to facilitate construction works will take place prior to groundworks commencing. A Harvest Management Plan is included as Appendix 4-4.

During tree felling there is a potential to generate silts and sediments in surface water runoff due to tracking of machinery and disturbance of the ground surface etc, however mitigation is provided in Chapter 9 Water with regard surface water quality protection for this activity which is summarised

below. Also, prior to the commencement of tree felling for subsequent road construction the following key temporary drainage measures will be installed:

- All existing dry forestry drains that intercept the proposed works area will be temporarily blocked down-gradient of the works using forestry check dams/silt traps;
- Clean water diversion drains will be installed upgradient of the works areas;
- Check dams/silt fence arrangements (silt traps) will be placed in all existing forestry drains that have surface water flows and also along existing forestry roadside drains; and,
- A double silt fence perimeter will be placed down-slope of works areas that are located inside the watercourse 50m buffer zone.

Before the commencement of any felling works, an Environmental Clerk of Works (ECoW) shall be appointed to oversee the keyhole and extraction works. The ECoW shall be experienced and competent, and shall have the following functions and operate their record using a Schedule of Works Operation Record (SOWOR), as proposed in the planning application:

- Attend the Site for the setup period when drainage protection works are being installed and be present onsite during the remainder of the forestry keyhole felling works.
- Prior to the commencement of works, review and agreement of the positioning by the Operator of the required Aquatic Buffer Zones (ABZs), silt traps, silt fencing (see below), water crossings and onsite storage facilities for fuel, oil and chemicals (see further below).
- Be responsible for preparing and delivering the Environmental Tool Box Talk (TBT) to all relevant parties involved in site operations, prior to the commencement of the works.
- Conduct daily and weekly inspections of all water protection measures and visually assess their integrity and effectiveness in accordance with Section 3.4 (Monitoring and Recording) and Appendix 3 (Site Monitoring Form (Visual Inspections)) of the Forestry & Freshwater Pearl Mussel Requirements.
- Take representative photographs showing the progress of operation onsite, and the integrity and effectiveness of the water protection measures.
- Collect water samples for analysis by a 3rd party accredited laboratory, adhering to the following requirements:
- Surface water samples shall be collected upstream and downstream of the keyhole felling at suitable sampling locations.
- Sampling shall be taken from the stream / riverbank, with no in-stream access permitted.
- The following minimum analytical suite shall be used: pH, EC, TSS, BOD, Total P, Ortho-P, Total N, and Ammonia.
- Review of operator's records for plant inspections, evidence of contamination and leaks, and drainage checks made after extreme weather conditions.
- Prepare and maintain a contingency plan.
- Suspend work where potential risk to water from siltation and pollution is identified, or where operational methods and mitigation measures are not specified or agreed.
- Prepare and maintain a Water Protection Measure Register. This document is to be updated weekly by the ECoW.

To protect watercourses, the following measures will be adhered to during all keyhole/tree felling activities.

- All relevant measures, best practice methods and requirements set out in Chapter 9 of the EIAR will be adhered to including Forestry & Water Quality Guidelines, Forest Harvesting & the Environment Guidelines and the Forest Protection Guidelines.

- The extent of all necessary tree felling will be identified and demarcated with markings on the ground in advance of any felling commencing.
- All roads and culverts will be inspected prior to any machinery being brought on Site to commence the felling operation. No tracking of vehicles through watercourses will occur. Vehicles will only use existing road infrastructure and established watercourse crossings.
- Existing drains that drain an area to be felled towards surface watercourses will be blocked, and temporary silt traps will be constructed to ensure collection of all silt within felling areas. These temporary silt traps will be cleaned out and backfilled once felling works are complete. This ensures there is no residual collected silt remaining in blocked drains after felling works are completed. No direct discharge of such drains to watercourses will occur from within felling areas.
- New collector drains and sediment traps will be installed during ground preparation to intercept water upgradient of felling areas and divert it away. Collector drains will be excavated at an acute angle to the contour (0.3% - 3% gradient), to minimise flow velocities.
- All silt traps will be sited outside of buffer zones and have no direct outflow into the aquatic zone. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of away from all aquatic zones.
- All new collector drains will taper out before entering the aquatic buffer zone to ensures the discharging water gently fans out over the buffer zone before entering the aquatic zone.
- Machine combinations, such as mechanical harvesters or chainsaw felling will be chosen which are most suitable for ground conditions at the time of felling, and which will minimise soils disturbance.
- Mechanised operations will be suspended during and immediately after heavy rainfall.
- Where brush is required to form brush mats, it is to be laid out at harvesting stage to prevent soil disturbance by machine movement.
- Brush which has not been pushed into the soil may be moved within the Site to facilitate the creation of mats in more demanding locations.
- Felling of trees will be pointed directionally away from watercourses.
- Felling will be planned to minimise the number of machines passes in any one area.
- Extraction routes, and hence brush mats, will be aligned parallel to the ground contours where possible.
- Harvested timber will be stacked in dry areas, and outside any 50m watercourse buffer zone. Straw bales and check dams to be emplaced on the down gradient side of timber storage sites.
- Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when harvesting operations have been completed, but removing of natural debris deflectors will be avoided.

#### 4.6.4.15 Transverse Drains (Grips)

On sections of access road, transverse drains ('grips') are constructed within the surface layer to divert runoff into swales or roadside drains. These drains can run perpendicularly from edge to edge of the road and are most commonly used on steeper gradients to prevent surface water from flowing down the centreline, thereby reducing the risk of erosion and protecting the road structure

#### 4.6.5 Cable Trench Drainage

Cable trenches are typically constructed in short, controlled sections, thereby minimising the amount of ground disturbed at any one time and minimising the potential for drainage runoff to pick up silt or suspended solids. Each short section of trench is excavated, ducting installed and bedded, and backfilled with the appropriate materials, before work on the next section commences.

To efficiently control drainage runoff from cable trench works areas, excavated material is stored on the up-gradient side of the trench and is temporarily sealed/smoothed over, using the back of the excavator bucket. Should any rainfall cause runoff from the excavated material, the material is therefore collected and contained in the downgradient cable trench. Spoil generated along the Proposed Grid Connection will either be transported to one of the on-site designated spoil management areas or transferred to an appropriately licensed facility.

On steeper slopes, silt fences, as detailed in Section 4.6.4.12, above, will be installed temporarily downgradient of the cable trench works area, or on the downhill slope below where excavated material is being temporarily stored to control run-off.

## 4.6.6 Site Drainage Management

### 4.6.6.1 Preparative Site Drainage Management

All materials and equipment necessary to implement the drainage measures detailed above, will be brought on-site in phases as they are required during the construction phase. A sufficient number of straw bales, clean drainage stone, terram, stakes, etc. will be kept on-site at all times to implement the drainage design measures as necessary. The drainage measures detailed in the above will be installed prior to, or at the same time as the works they are intended to drain.

### 4.6.6.2 Pre-emptive Site Drainage Management

The works programme for the groundworks part of the construction phase of the Proposed Project will also take account of weather forecasts and predicted rainfall. Large excavations, large movements of overburden or large-scale overburden or soil stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast.

### 4.6.6.3 Reactive Site Drainage Management

The final drainage design prepared for the Proposed Project prior to commencement of construction will provide for reactive management of drainage measures. The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat silt-laden water from the works areas, will be monitored continuously by the ECoW or supervising hydrologist on-site. The ECoW or supervising hydrologist will respond to changing weather, ground or drainage conditions on the ground as the project proceeds, to ensure the effectiveness of the drainage design is maintained in so far as is possible. This may require the installation of additional check dams; interceptor drains or swales as deemed necessary on-site. The drainage design may have to be modified on the ground as necessary, and the modifications will draw on the various features outlined above in whatever combinations are deemed to be most appropriate to situation on the ground as a particular time.

In the event that works are giving rise to siltation of watercourses, the ECoW or supervising hydrologist will stop all works in the immediate area around where the siltation is evident. The source of the siltation will be identified and additional drainage measures such as those outlined above will be installed in advance of works recommencing.

## 4.6.7 Drainage Maintenance

An inspection and maintenance plan for the drainage system on-site will be prepared in advance of commencement of any works on the Proposed Project. Regular inspections of all installed drainage

features will be necessary, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water at parts of the systems where it is not intended. The inspection of the drainage system will be the responsibility of the ECoW or the Project Hydrologist. The drainage inspection and maintenance plan are included in the CEMP in Appendix 4-5 of this EIAR.

If necessary, any excess sediment build up behind check dams will be removed. For this reason, check dams will be inspected and maintained weekly during the construction phase of the Proposed Project to insure adequate performance. Maintenance checks will also ensure the centre elevation of the dam remains lower than the sides of the dam.

Check dams will also be inspected weekly during the construction phase of the Proposed Project and following rainfall events to ensure the structure of the dam is still effective in controlling flow. Any scouring around the edges of the check dams or overtopping of the dam in normal flow conditions will be rectified by reinforcement of the check dam.

Drainage swales will be regularly inspected for evidence of erosion along the length of the swale. If any evidence of erosion is detected, additional check dams will be installed to limit the velocity of flow in the channel and reduce the likelihood of erosion occurring in the future.

Silt traps will be inspected weekly during the construction phase of the Proposed Project and following rainfall events. Inlet and outlets will be checked for sediment accumulation and anything else that might interfere with flows.

The frequency of drainage system inspections will be reduced following completion of the construction phase of the Proposed Project. The Project Hydrologist will inspect and review the drainage system after construction has been completed to provide guidance on the requirements of an operational phase drainage system.

## 4.7 Construction Management

### 4.7.1 Construction Timing

It is estimated that the construction phase of the Proposed Project will take approximately 18-24 months from commencement of civil works to the commissioning of the wind turbines. The commencement of works where the removal of vegetation is required, or where works take place in sensitive breeding habitats will be scheduled to commence outside the bird breeding season (1st of March to 31st of August) to avoid any potentially significant effects on nesting birds. Construction where removal of vegetation is required, or where works take place in sensitive breeding habitats may commence from September to March so that construction activities are ongoing by the time the next bird breeding season comes around and can continue throughout that bird breeding season.

Construction activities will be carried out during normal daytime working hours (i.e., 0700 – 1900hrs Monday to Saturday). However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (i.e., concrete pours) or to accommodate delivery of large turbine components along public routes it will be necessary on occasion to work outside of these hours. Any such out of hours working will be notified in advance to the Local Authority.

### 4.7.2 Construction Sequencing

The construction phase can be broken down into three main overlapping phases and will take approximately 18-24 months to complete: 1) civil engineering works - 10 months, 2) electrical works including grid connection works - 9-12 months, and 3) turbine erection and commissioning - 8 months. The main task items under each of the three phases are outlined below.

### Civil Engineering Works

- > Construct new Site entrance.
- > Construct new Site roads to temporary compound.
- > Clear and hardcore area for temporary Site offices. Install same.
- > Construct bunded area for oil storage.
- > Construct new Site roads and hard-standings and crane pads.
- > Construct drainage ditches, culverts etc. integral to road construction.
- > Excavate for turbine foundations. Place blinding concrete to turbine foundation. Fix reinforcing steel and anchorage system for tower section. Construct shuttering. Fix any ducts etc. to be cast in. Pour concrete foundations. Cure concrete. Remove shutters after concrete cures.
- > Excavate trenches for Site cables, lay cables and backfill. Provide ducts at road crossings.
- > Backfill turbine foundations and landscape with previously stored topsoil.
- > Complete Site works, reinstate Site.
- > Remove temporary Site offices. Provide any gates, landscaping, signs etc. which may be required.

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### Electrical Works

- > Clear and hardcore area for temporary Site offices. Install same
- > Clear and Hardcore area for substation footprint
- > Construct foundations/plinths for substation building.
- > Install external electrical equipment at substation.
- > Install transformer at compound.
- > Erect stock proof and palisade fencing around substation area.
- > Install internal collector network and communication cabling.
- > Construct grid connection cabling.

### Turbine and Meteorological Mast Erection

- > Commission erection crane(s) and deliver components to turbine hardstands.
- > Erect towers, nacelles and blades.
- > Complete electrical installation.
- > Install meteorological mast.
- > Commission and test turbines.
- > Complete Site works, reinstate Site.
- > Remove temporary Site offices. Provide any gates, landscaping, signs etc. which may be required.

All relevant Site Health & Safety procedures, in accordance with the relevant Health and Safety Legislation and guidance (listed in Section 5.2.2 of this EIAR), including the preparation of the Health & Safety Plan, erection of the relevant and appropriate signage onsite, inductions and toolbox talks, will take place prior to and throughout the construction phase of the Proposed Project. Further details of on-site health, safety and welfare are included in Chapter 5 Population and Human Health of this EIAR.

The phasing and scheduling of the main construction task items are outlined in Table 4-4 below, where the 1<sup>st</sup> of January has been selected as an arbitrary start date for construction activities.

Table 4-4 Indicative Construction Schedule

ID	Task Name	Year 1				Year 2			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Site Health and Safety								
2	Grid Connection								
3	Site Compounds								
4	Site Roads								
5	Substation and Electrical Works								
6	Turbine Hardstands								
7	Turbine Foundations								
8	Backfilling and Landscaping								
9	Turbine Delivery and Erection								
11	Substation Commissioning								
12	Turbine Commissioning								

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### 4.7.3 Construction Phase Monitoring and Oversight

The requirement for a CEMP to be prepared in advance of any construction works commencing on any wind farm development site and submitted for agreement to the Planning Authority is now well-established. The proposed procedures for the implementation of the mitigation measures outlined in such a CEMP and their effectiveness and completion is typically audited by the ECoW on behalf of the developer, in an and objective manner.

The CEMP Audit Report (Section 10.2 of the CEMP) will list all mitigation measures prescribed in any of the planning documentation and all conditions attached to the grant of planning permission and allows them to be audited on a systematic and regular basis. The first assessment is a simply Yes/No question, has the mitigation measure been employed on-site or not? Following confirmation that the mitigation measure has been implemented, the adherence to mitigation measures must be the subject of regular review and audit during the full construction stage of the project. If remedial actions are needed to improve the effectiveness of the mitigation measure, then these are notified to the Site staff immediately during the audit site visit, and in writing by way of the circulation of the audit report. Depending on the importance and urgency of rectifying the issue, the construction site manager is given a timeframe by when the remedial works need to be completed.

A CEMP has been prepared for the Proposed Project and is included in Appendix 4-5 of this EIAR. The CEMP includes details of drainage, overburden management, waste management etc, and describes how the above-mentioned Audit Report will function and be presented. In the event planning permission is granted for the Proposed Project, the CEMP will be updated prior to the commencement of the development, to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned and will be submitted to the Planning Authority for written approval.

The on-site construction staff will be responsible for implementing the mitigation measures specified in the EIAR and the CEMP and compiled in the Audit Report. Their implementation will be overseen by the ECoW or supervising hydrogeologists, environmental scientists, ecologists or geotechnical engineers, depending on who is best placed to advise on the implementation. The system of auditing referred to above ensures that the mitigation measures are maintained for the duration of the construction phase, and into the operational phase where necessary.

## 4.8 Construction Management and Methodologies Overview

This section of the chapter outlines the construction methodologies and management practices to be used for the various elements of the Proposed Wind Farm and Proposed Grid Connection. Further details in relation to construction methodologies is included in Section 2.3 of the CEMP, included as Appendix 4-5 of this EIAR.

### 4.8.1 Proposed Wind Farm

#### 4.8.1.1 Turbine and Met Mast Foundations

Each of the turbines to be erected on the Proposed Wind Farm will have a reinforced concrete foundation that is installed below the finished ground level. It is anticipated that the turbine foundations will be formed on competent strata (i.e., bedrock or sublayer of sufficient load bearing capacity). Where the ground conditions do not have a competent stratum of sufficient load bearing capacity, piling method will be utilised. As detailed above in Section 4.3.1.1.2, numerous intrusive site investigations were undertaken across the Proposed Wind Farm site, to provide detail and clarity on the nature and extent of sublayers and bedrock present. This assisted in providing additional information on the most suitable location for turbines and associated infrastructure. A methodology for reinforced concrete foundations and piled foundations is included in Section 2.3.3.1 of the CEMP, Appendix 4-5 of this EIAR.

Please note, confirmation ground investigative works will take place prior to construction of turbine foundations. As identified in Appendix 8-1: Peat Stability Risk Assessment, it is likely that following the completion of these works, it will be identified that the turbine foundations for all proposed turbines will require piled foundations. Gravity foundations may be constructed at T04, T05 and T06 subject to confirmatory ground investigation to confirm the depth to bedrock.

For the piled turbine foundations, a typical piling type and configuration could be up to 20 no. 900mm rotary bored piles. Overburden will be stripped off the foundation area to a suitable formation using a 360° excavator and will be stored locally for later reuse in backfilling around the turbine foundation. A two-metre-wide working area will be required around each turbine foundation, with the sides of the excavated areas sloped sufficiently to ensure that slippage does not occur. Material excavated to create the working area will be stored locally for later reuse in backfilling and/or landscaping the working area around the turbine foundation. The excavated material will be sealed using the back of the excavator bucket and surrounded by silt fences to ensure sediment-laden run-off does not occur.

The formation material will have to be approved by an engineer as meeting the turbine manufacturer's requirements. If the formation level is reached at a depth greater than the depth of the foundation, the ground level will have to be raised with clause 804 or similar hardcore material, compacted in 250 millimetres (mm) layers, with sufficient compacted effort (i.e., compacted with seven passes using 12 tonne roller. Drainage measures will be installed to protect the formation by forming an interceptor drain around the perimeter of the base which will be pumped out or outfall out at the lowest point level spreader or settlement pond.

An embankment approximately 600mm high will be constructed around the perimeter of each turbine foundation base and a fence will be erected to prevent construction traffic from driving into the excavated hole and to demarcate the working area. All necessary health and safety signage will be erected to warn of deep excavations etc. Access to and from excavated bases will be formed by excavating a pedestrian walkway to 1:12 grade.

There will be a minimum of 100 mm of binding concrete laid on the formation material positioned using concrete skip and 360° excavator to protect ground formation and to give a safe working platform.

The anchor cage is delivered to the Proposed Wind Farm site in two or more parts depending on the turbine type. A 360° excavator or crane with suitable approved lifting equipment will be used to unload sections of the anchor cage and reinforcing steel. The anchor cage is positioned in the middle of the turbine foundation base and is assembled accordingly. When the anchor cage is in final position it is checked and levelled by using an appropriate instrument. The anchor cage is positioned 250mm – 300mm from formation level by use of adjustable legs. Reinforcement bars are then placed around the anchor cage, first radial bars, then concentric bars, shear bars and finally the superior group of bars. Earthing material is attached during the steel foundation build up. The level of the anchor cage will be checked again prior to the concrete pour and during the concrete pour. As noted in Section 4.8.1.5 below, the transformer in each turbine is connected to the on-site substation through a network of underground cabling ducts which are installed through the centre of the anchor cage.

Formwork to concrete foundations will be propped/supported sufficiently so as to prevent failure. Concrete for foundations will be poured using a concrete pump. Each turbine foundation will be poured in three stages. Stage 1 will see the concrete being poured and vibrated in the centre of the anchor cage to bring the concrete up to the required level inside the cage. Stage 2 will see the centre of the steel foundation being poured and vibrated to the required level. Stage 3 will see the remaining concrete being poured around the steel foundation to bring it up to the required finished level. After a period of time when the concrete has set sufficiently the top surface of the concrete surface is to be finished with a power float.

Once the concrete foundation has sufficient curing time it will be backfilled with suitable fill up to existing ground level and finished with the original material that was excavated.

## 4.8.1.2 Site Roads and Hardstand Areas

### 4.8.1.2.1 Upgrading of Existing Road

Approximately 2.4km of the existing roads will require upgrading which will comprise widening of the roadway to a total running width of approximately five metres, with wider sections at corners and the laying of a new surface dressing on the existing section of roadway where necessary. The road widening will be undertaken as follows:

- i. Access road construction will be to the line and level requirements as per design*
- ii. For upgrading of existing excavated access roads the following guidelines will be implemented in full*
  - a. Excavation of the widened section of access road will take place to a competent stratum beneath the peat (as agreed with the designer) and backfilled with suitable granular fill.*
  - b. Benching of the excavation may be required between the existing section of access road and the widened section of access road where the depth of excavation required exceeds 500mm.*
  - c. The surface of the existing access road will be overlaid with up to 500mm of selected granular fill.*

- d. *Access roads will be finished with a layer of capping across the full width of the track.*
- e. *A layer of geogrid/geotextile may be required at the surface of the existing access road and at the base of the widened section of access road (to be confirmed by the designer).*
- f. *For excavations in peat, side slopes will be not greater than 1 (v): 3 (h). This slope inclination will be reviewed during construction. Where areas of weaker peat are encountered then slacker slopes will be required to ensure stability.*
- iii. *The finished road width will have a running width of 5m, with wider sections on bends and corners.*
- iv. *On side long sloping ground any road widening works required will be done on the upslope side of the existing access road, where possible.*
- v. *At transitions between new floating and existing excavated roads a length of about 10 to 20m will have all peat excavated and placed with suitable fill. The surface of this fill will be graded to accommodate wind turbine construction and delivery traffic*

#### 4.8.1.2.2 New Site Access Roads

Approximately 6.6km of new road will be constructed which will comprise a roadway with a final running width of approximately five metres, with wider sections at corners and the laying of appropriate surface dressing on the new roadway where necessary. Approximately 4.8km of proposed new road will be excavated road and approximately 1.8km of proposed new road will be floating road.

The construction methodology for the proposed new excavated roads and turbine hardstands is outlined as follows:

- i. *Prior to commencing the construction of the excavated roads movement monitoring posts should be installed in areas where the peat depth is greater than 2.0m.*
- ii. *Interceptor drains should be installed upslope of the access road alignment to divert any surface water away from the construction area.*
- iii. *Excavation of roads shall be to the line and level given in the design requirements. Excavation should take place to a competent stratum beneath the peat (as agreed with the site designer).*
- iv. *Road construction will be carried out in sections of up to 20m lengths i.e., no more than 20m of access road will be excavated without replacement with stone fill.*
- v. *Excavation of materials with respect to control of peat stability:*
  - a. *Where Acrotelm (to about 0.3 to 0.4m of peat) is required for landscaping, it will be stripped and temporarily stockpiled for re-use as required. Acrotelm stripping will be undertaken prior to main excavations.*
  - b. *Where possible, the acrotelm will be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation.*
  - c. *All catotelm peat (peat below about 0.3 to 0.4m depth) will be transported immediately on excavation, where possible, to the designated peat and spoil management areas.*
- vi. *Once excavated, non-catotelm peat will be temporarily stored in localised areas adjacent to excavations for roads and hardstands before being placed into the permanent Peta and Spoil management Areas. All temporary peat and spoil management areas will be upslope of founded roads/hardstands and will be inspected by the Project geotechnical Engineer before material is stored in the area.*
- vii. *Excavation side slopes in peat shall be not greater than 1 (v): 2 or 3 (h). This slope inclination will be reviewed during construction, as appropriate. Where areas of weaker peat are encountered then slacker slopes will be required. Battering of the side slopes of the excavations should be carried out as the excavation progresses.*
- viii. *End-tipping of stone onto the road during the construction/upgrading of the access road will be carefully monitored to ensure that excessive impact loading, which may adversely affect the adjacent peat, is limited.*

- ix. *The excavated access road will be constructed with an average depth of 750mm of selected granular fill. Granular fill will be placed and compacted in layers in accordance with the TII Specification for Road Works.*
- x. *Access roads will be finished with a layer of capping across the full width of the road.*
- xi. *A layer of geogrid/geotextile may be required at the surface of the competent stratum where cohesive material is present to prevent mixing of the underlying material with the granular fill.*
- xii. *At transitions between floating and excavated roads a length of road of about 10 to 20m shall have all peat excavated and replaced with suitable fill. The surface of this fill shall be graded so that the road surface transitions smoothly from floating to excavated road.*
- xiii. *Where slopes of greater than 5 degrees are encountered along with relatively deep peat (i.e., greater than 1.5m) and where it is proposed to construct the access road perpendicular to the slope contours it is best practice to start construction at the bottom of the slope and work towards the top, where possible. This method avoids any unnecessary loading to the adjacent peat and greatly reduces any risk of peat instability.*
- xiv. *The construction and upgrading of access roads in areas of deep peat (greater than 2m) will be inspected on a routine basis (by the site manager/Ecological Clerk of Works/Project Geotechnical Engineer) during the works, particularly before/following trafficking by heavy vehicular loads.*

The construction methodology for the proposed new floating roads is outlined as follows:

- i. *Prior to commencing floating road construction movement monitoring posts will be installed in areas where the peat depth is greater than 2m and will be placed at 10m intervals along these sections.*
- ii. *Base geogrid will be laid directly onto the existing peat surface along the line of the road in accordance with geogrid provider's requirements.*
- iii. *Construction of road will be in accordance with appropriate design from the designer.*
- iv. *The make-up of the new floated access road is up to 1,000mm of selected granular fill with 2 no. layers of geogrid with possibly the inclusion of a geotextile separator*
- v. *Granular fill will be placed and compacted in layers in accordance with designer specifications.*
- vi. *Following the detailed design of the floated access roads it may be deemed necessary to include pressure berms either side of the access road in some of the deeper peat areas. The inclusion of a 2 to 5m wide pressure berm (typically 0.5m in height) either side of the access road will reduce the likelihood of potential bearing failures beneath the access road.*
- vii. *The finished road running width will be 5m, with wider sections on bends and corners.*
- viii. *Stone delivered to the floating road construction will be end-tipped onto the constructed floating road. Direct tipping of stone onto the peat will be avoided.*
- ix. *To avoid excessive impact loading on the peat due to concentrated end-tipping all stone delivered to the floating road will be tipped over at least a 10m length of constructed floating road.*
- x. *Where it is not possible to end-tip over a 10m length of constructed floating road then dumpers delivering stone to the floating road will carry a reduced stone load (not greater than half full) until such time as end-tipping can be carried out over a 10m length of constructed floating road.*
- xi. *Following end-tipping a suitable bulldozer will be employed to spread and place the tipped stone over the base geogrid along the line of the road.*
- xii. *A final surface layer will be placed over the full width of the floating road, as per design requirements, to provide a road profile and graded to accommodate wind turbine construction and delivery traffic*

### 4.8.1.3 Clear-Span Watercourse Crossing

It is proposed to construct a clear-span watercourse crossing at the 2 no. locations where new watercourse crossings are required within the Proposed Wind Farm site. The locations of these crossings are shown on the layout drawings included in Appendix 4-1. The clear-span watercourse crossing methodology presented below will ensure that no instream works are necessary. The standard construction methodology for the installation of a clear-span watercourse crossing is as follows:

- The access road on the approach either side of the watercourse will be completed to a formation level which is suitable for the passing of plant and equipment required for the installation of each watercourse crossing.
- All drainage measures along the proposed road will be installed in advance of the works.
- A foundation base will be excavated to rock or competent ground with a mechanical excavator with the foundation formed in-situ using a semi-dry concrete lean mix. The base will be excavated along a 1m setback from the stream bank with no instream works required.
- Access to the opposite side of the watercourse for excavation and foundation installation will require the installation of a temporary pre-cast concrete or metal bridge across the watercourse to provide temporary access for the excavator. Plant and equipment will not be permitted to track across the watercourse.
- Once the foundation base has been completed, the pre-cast concrete box culvert will be installed using a crane which will be set up on the bank of the watercourse and will be lifted into place from the bank with no contact with the watercourse.
- Where the bottomless box culvert is installed in sections, the joints will be sealed to prevent granular material entering the watercourse,
- Once the crossing is in position stone backfill will be placed and compacted against the structure up to the required level above the foundations.
- Underground cabling ducting will be contained within the road make-up of the proposed crossing.

A standard design drawing of a pre-cast concrete, clear span crossing is shown in Figure 4-28 and included.

The watercourse crossing will be constructed to the specifications of the OPW bridge design guidelines '*Construction, Replacement or Alteration of Bridges and Culverts - A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945*', and in consultation with Inland Fisheries Ireland. Abutments will be constructed from precast units combined with in-situ foundations, placed within an acceptable backfill material.

Confirmatory inspections of the proposed new watercourse crossing locations will be carried out by the Project Civil/Structural Engineer and the Project Hydrologist prior to the construction of the crossing.

### 4.8.1.4 Culvert Crossing

All new proposed culverts and proposed culvert upgrades at field drain crossings required for the Proposed Wind Farm will be suitably sized for the expected peak flows in the watercourse. Some culverts may be installed to manage drainage waters from works areas of the Proposed Wind Farm, particularly where the waters have to be taken from one side of an existing roadway to the other for discharge. The size of culverts will be influenced by the depth of the track or road sub-base but will have a minimum 900mm diameter. In all cases, culverts will be oversized to allow mammals to pass through the culvert.

Culverts will be installed with a minimum internal gradient of 1% (1 in 100). Smaller culverts will have a smooth internal surface. Larger culverts may have corrugated surfaces which will trap silt and

contribute to the stream ecosystem. Depending on the management of water on the downstream side of the culvert, large stone may be used to interrupt the flow of water. This will help dissipate its energy and help prevent problems of erosion. Smaller water crossings will simply consist of an appropriately sized pipe buried in the sub-base of the road at the necessary invert level to ensure ponding or pooling does not occur above or below the culvert and water can continue to flow as necessary.

All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance. Please see Figure 4-29 for details.

#### 4.8.1.5 **Underground Electrical (33kV) and Communication Cabling**

The transformer in each turbine and the met mast will be connected to the on-site substation through a network of underground electrical and communication cabling. The ground is trenched using a mechanical excavator. The top layer of soil (or road surface) is removed and saved so that it is replaced on completion. The cable ducting will be bedded with suitable material. The cabling will be laid at a depth of approximately 1.2m below ground level; a suitable marker tape is installed between the cabling and the surface (see Plate 4-9 below illustrating an example of a single 33kV cable trench and Plate 4-10 below illustrates an example of a trefoil 33kV cable trench). On completion, the ground will be reinstated. The route of the underground electrical and communication cabling will follow the access tracks as illustrated on the Proposed Wind Farm layout drawings included as Appendix 4-1 of the ELAR. The cabling may be placed on either side of the road footprint, on both sides of the road and/or within the road. The exact configuration of the underground cabling will be set by the requirements of the electrical designers at detailed design stage.

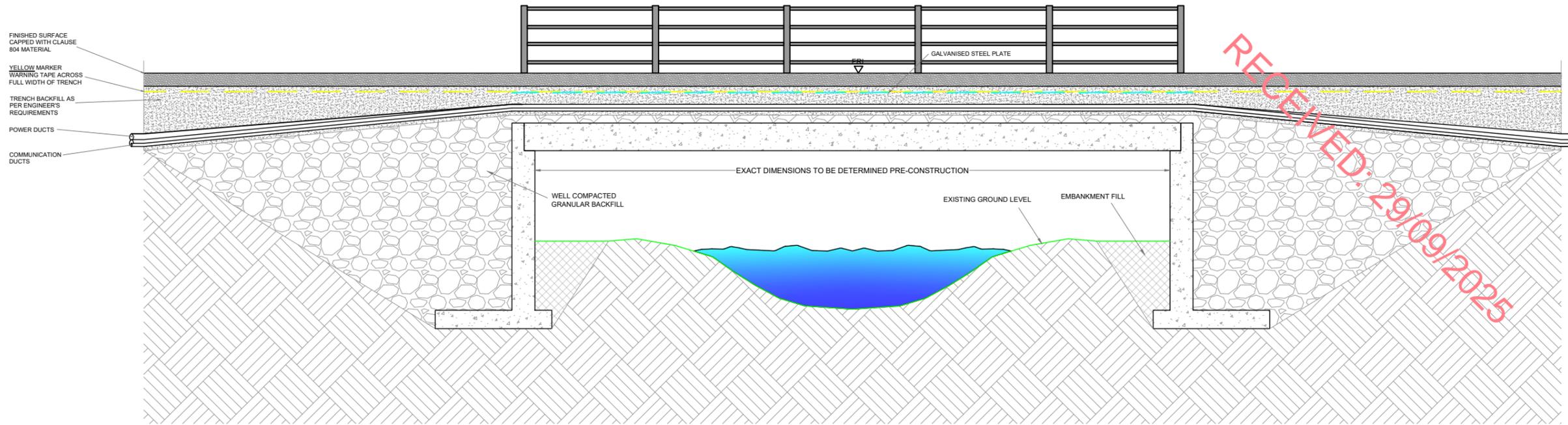


Plate 4-9 Typical Single Cable Trench View

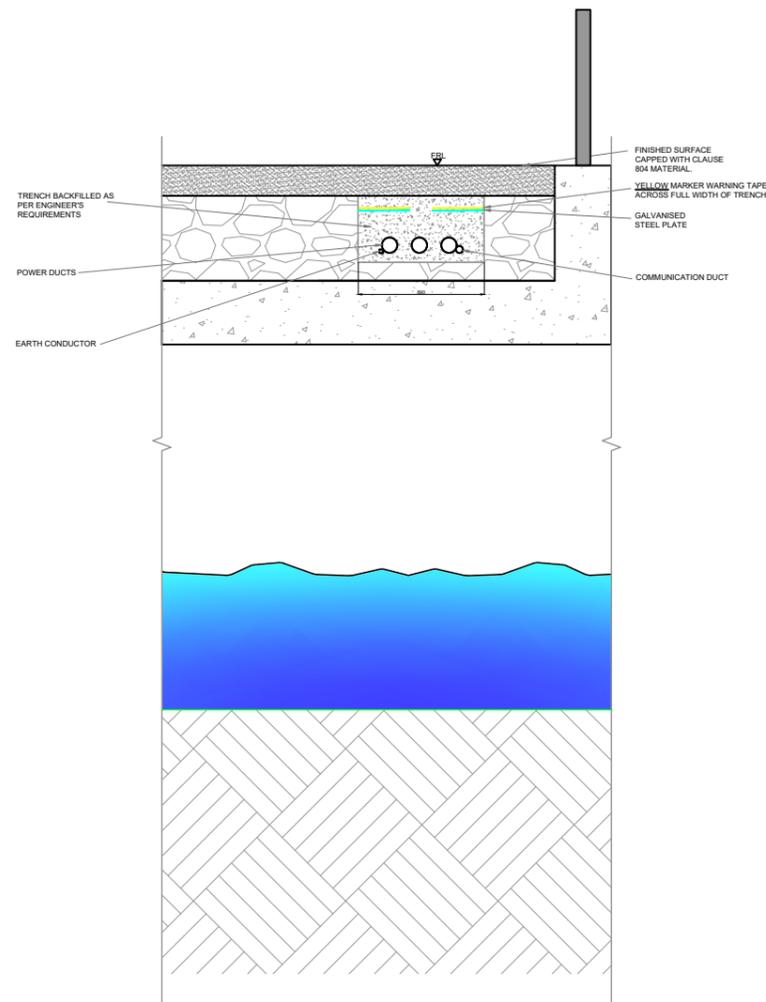


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Plate 4-10 Typical Trefoil Cable Trench View



Clear Span Watercourse Crossing - Longitudinal Section  
SCALE: 1:75



Clear Span Watercourse Crossing - Cross Section  
SCALE: 1:50

PROJECT TITLE: <b>Gannow Renewable Energy Development, Co. Galway</b>			
DRAWING TITLE: <b>Standard 20/33kV Clear Span Watercourse Crossing</b>			
PROJECT No.: <b>240323</b>	DRAWING No.: <b>Figure 4-28</b>	SCALE: <b>As Shown @ A3</b>	
DRAWN BY: <b>GO</b>	CHECKED BY: <b>AC</b>	DATE: <b>22.09.2025</b>	REVISION:. <b>P01</b>



FINISHED SURFACE  
CAPPED WITH CLAUSE  
804 MATERIAL

YELLOW MARKER  
WARNING TAPE  
ACROSS FULL WIDTH  
OF TRENCH

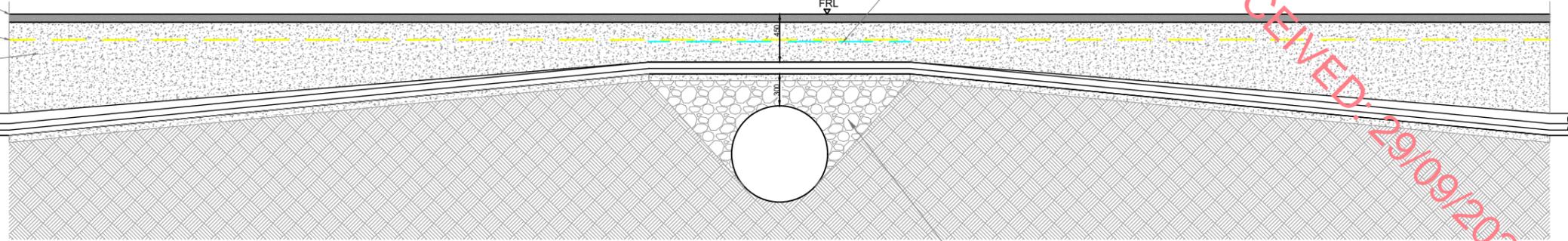
TRENCH BACKFILL  
AS PER ENGINEER'S  
REQUIREMENTS

POWER DUCTS

COMMUNICATION  
DUCTS

GALVANISED STEEL PLATE

FRL



WELL COMPACTED  
GRANULAR BACKFILL

**Culvert Crossing - Longitudinal Section**

SCALE 1:50

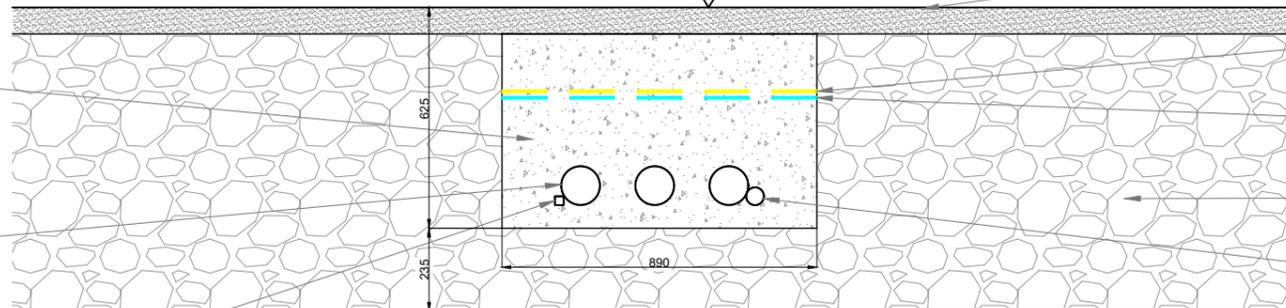
RECEIVED: 29/09/2025

TRENCH BACKFILLED AS  
PER ENGINEER'S  
REQUIREMENTS

POWER DUCTS

EARTH CONDUCTOR

FRL



FINISHED SURFACE  
CAPPED WITH CLAUSE  
804 MATERIAL.

YELLOW MARKER WARNING TAPE.  
ACROSS FULL WIDTH OF TRENCH

GALVANISED  
STEEL PLATE

WELL COMPACTED  
GRANULAR BACKFILL

COMMUNICATION DUCT

**Culvert Crossing - Cross Section**

SCALE 1:20

PROJECT TITLE: <b>Gannow Renewable Energy Development, Co. Galway</b>			
DRAWING TITLE: <b>Standard 20/33kV Culvert Crossing</b>			
PROJECT No.: <b>240323</b>	DRAWING No.: <b>Figure 4-29</b>	SCALE: <b>As Shown @ A3</b>	
DRAWN BY: <b>GO</b>	CHECKED BY: <b>AC</b>	DATE: <b>22.09.2025</b>	REVISION.: <b>P01</b>



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#### 4.8.1.6 Peat and Spoil Management Areas

The following recommendations and best practice guidelines for the placement of peat and spoil in identified peat and spoil management areas and in linear berms will be adhered to during the construction of the Proposed Project:

- i. Excavated peat will be placed/spread across the 5 no. areas within the Proposed Wind Farm site.*
- ii. The peat placed within the peat and spoil management areas will be restricted to a maximum height of 1.5m. Weak/liquified peat will be stored in the centre of the peat and spoil management areas with firmer drier peat placed around the outside.*
- iii. The placement of excavated peat will be avoided without first establishing the adequacy of the ground to support the load. The placement of peat and spoil within the peat and spoil management areas will require the use of long reach excavators, low ground pressure machinery and possibly bog mats in particular for drainage works.*
- iv. Where there is any doubt as to the stability of the peat surface then no material will be placed on to the peat surface. The risk of peat instability is reduced by not placing any loading onto the peat surface.*
- v. It will be ensured that the surface of the placed peat will be shaped to allow efficient run-off of surface water. Shaping of the surface of the peat will be carried out as placement of peat within the peat and spoil management area progresses. This will reduce the likelihood of debris run-off and reduce the risk of instability of the placed peat.*
- vi. Finished/shaped side slopes in the placed peat will be not greater than 1 (v): 4 (h). This slope inclination will be reviewed during construction, as appropriate.*
- vii. The acrotelm will be placed on the finished surface with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the placed peat and spoil within the peat and spoil management areas.*
- viii. Movement monitoring instrumentation will be placed around the areas where peat has been placed. The locations where monitoring is required will be identified by the Project Geotechnical Engineer on site.*
- ix. Supervision by the Project Geotechnical Engineer will be carried out for the works.*
- x. An interceptor drain will be installed upslope of the designated peat and spoil management areas to divert any surface water away from these areas. This will help ensure stability of the placed peat and reduce the likelihood of debris run-off.*

All the above-mentioned general guidelines and requirements will be confirmed by the Geotechnical Engineer prior to construction.

#### 4.8.1.7 Temporary Construction Compounds

As discussed in Section 4.3.1.5, there are two proposed construction compounds. The temporary construction compounds will be constructed as follows:

- The compound area will be marked out at the corners using ranging rods or timber posts. Drains and associated settlement ponds will be installed around the perimeter;
- The compound platform will be established using a similar technique as the construction of the platform as discussed below:
  - The area of the temporary construction compound will be marked out using ranging rods or wooden posts and the soil and overburden stripped and temporarily stockpiled for later use in landscaping. Any excess material will be sent to one of the designated peat and spoil management areas.
  - The foundations will be excavated down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it. An anti-bleeding admixture will be included in the concrete mix.

- The block work walls will be built up from the footings to DPC level and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors.
- The block work will then be raised to wall plate level and the gables & internal partition walls formed. Scaffold will be erected around the outside of the building for this operation.
- The roof slabs will be lifted into position using an adequately sized mobile crane.
- The timber roof trusses will then be lifted into position using a telescopic load all or mobile crane depending on-site conditions. The roof trusses will then be felted, battened, tiled and sealed against the weather.
- The transformer, electrical equipment, and storage container plinths will be excavated down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it. An anti-bleeding admixture will be included in the concrete mix.
- Lightning poles will be erected at appropriate locations adjacent to the substation. All lightning poles will be appropriately earthed.
- The electrical equipment will be installed and commissioned.
- Perimeter fencing will be erected.
- A layer of geo-grid will be installed where deemed necessary by the designer and compacted layers of well graded granular material will be spread and lightly compacted to provide a hard area for Site offices and storage containers;
- A limited amount of fuel will have to be stored in appropriately bundled containers and a designated area for oil storage will be constructed within the compound.
- Areas within the compound will be constructed as access roads and used as vehicle hardstandings during deliveries and for parking;
- A bundled containment area will be provided within the compound for the storage of lubricants, oils and site generators etc;
- A waste storage area will be provided within the compound;
- The compound will be fenced and secured with locked gates if necessary; and,
- Upon completion of the Proposed Project, the temporary construction compounds will be decommissioned and allowed to vegetate naturally.

#### 4.8.1.8 Onsite 38kV Electricity Substation and Control Buildings

A detailed drawing of the proposed onsite 38kV substation is shown in Appendix 4-1. The proposed onsite 38kV substation will be constructed by constructed by the following methodology:

- The area of the on-site substation will be marked out using ranging rods or wooden posts and the soil and overburden stripped and temporarily stockpiled for later use in landscaping. Any excess material will be sent to one of the designated peat and spoil management areas.
- The dimensions of the onsite substation area have been designed to meet the requirements of the ESNB and the necessary equipment to safely and efficiently operate the Proposed Wind Farm;
- The foundations will be excavated down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it. An anti-bleeding admixture will be included in the concrete mix.
- The block work walls will be built up from the footings to DPC level and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors.
- The block work will then be raised to wall plate level and the gables & internal partition walls formed. Scaffold will be erected around the outside of the building for this operation.
- The roof slabs will be lifted into position using an adequately sized mobile crane.

- The timber roof trusses will then be lifted into position using a telescopic load all or mobile crane depending on-site conditions. The roof trusses will then be felted, battened, tiled and sealed against the weather.
- The transformer, electrical equipment, and storage container plinths will be excavated down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it. An anti-bleeding admixture will be included in the concrete mix.
- Lightning poles will be erected at appropriate locations adjacent to the substation. All lightning poles will be appropriately earthed.
- The electrical equipment will be installed and commissioned.
- Perimeter fencing will be erected.
- The construction and components of the substation will be built to ESBN specifications.

1 no. control building will be built within the on-site substation compound.

The 2 no. storage containers located adjacent to eastern boundary of the proposed onsite 38kV substation compound will be constructed in a similar manner as the temporary construction compound methodology identified above in Section 4.8.1.7.

## 4.8.2 Proposed Grid Connection

### 4.8.2.1 Underground Electrical (38kV) Cabling

The underground cabling works will consist of the installation of ducting in an excavated trench to accommodate electrical and fibre communications cabling to facilitate a connection between the proposed onsite 38kV substation and the existing 220kV Cashla Substation. Please see Appendix 4-1 for details.

The underground cabling will be laid underground using the following methodology:

- Before works commence, updated surveying will take place along the proposed cabling route, with all existing culverts and services identified. All relevant bodies i.e., ESBN, Galway County Council, GNI etc. will be contacted and all up to date information for all existing services sought.
- When the underground cabling is located on public roads, a traffic management plan will be prepared prior to any works commencing. A road opening licence will be obtained where required and all plant operators and general operatives will be inducted and informed as to the location of any services.
- A tracked 360-degree excavator will then proceed to dig out the proposed trench, typically to a depth of 1.2m, within which the ducting will be laid.
- The cable ducting will be concrete surrounded where they pass under the public road and under drains or culverts.
- Trench supports will be installed, or the trench sides will be benched or battered back where appropriate and any ingress of ground water will be removed from the trench using submersible pumps, fitted with appropriate silt filtration systems, to prevent contamination of any watercourse.
- Once the trench has been excavated, a base-layer will be laid and compacted, comprising Clause 804, or 15 Newton CBM4 concrete as required.
- The ducting will be installed as per specification, with couplers fitted and capped to prevent any dirt etc. entering the duct. In poor ground conditions, the ends of the ducts will be shimmed up from the bed of the trench, to prevent any possible ingress of water dirt. The shims will be removed again once the next length has been connected. Extreme care will be taken to ensure that all duct collars (both ends) are clean and in good condition prior to ducts being joined.

- As the works progress, the as-built location of the ducting will be recorded using a total station or GPS.
- As per the associated base-layer (Clause 804 material or 15 Newton CBM4 concrete) will be installed and compacted as per approved detail, with care not to displace the ducting.
- Spacers will be used to ensure that the correct cover is achieved at both sides of the ducting.
- The remainder of the trench will be backfilled in two compacted layers with approved engineer's specified material.
- Yellow marker warning tape will be installed across the width of the trench, at 300mm depth,
- The finished surface is to be reinstated, as per original specification. Off-road cabling may be finished with granular fill to facilitate access to the trench for any potential maintenance that is required during the operational phase of the Proposed Project.
- Marker posts will then be placed at regular intervals (generally at joint bays and any change in direction) to denote the location of the underground cabling.

#### 4.8.2.2 Existing Underground Services

Any underground services encountered along the Proposed Grid Connection will be surveyed for level and the ducting will pass over the service provided adequate cover is available. A minimum clearance of 300 mm will be required between the bottom of the ducts and the service in question. If the clearance cannot be achieved the ducting will pass under the service and again 300 mm clearance between the top of the Proposed Grid Connection ducting and bottom of the service will be achieved. In deeper excavations an additional layer of marker tape will be installed between the ducting and top-level yellow marker tape. If the required separation distances cannot be achieved then a number of alternative options are available such as using steel plates laid across the width of the trench and using 35N concrete surrounding the proposed ducting, with marker tape on the side of the trench. Back fill around any utility services will be with dead sand/pea shingle where appropriate.

Where the Proposed Grid Connection interacts with existing underground services, e.g. the GNI network, the service crossings will be constructed in accordance with best practice information from the relevant entities, supplemented by detailed engineer design. The Applicant will hold consultation with the relevant entities prior to the commencement of works along the Proposed Grid Connection.

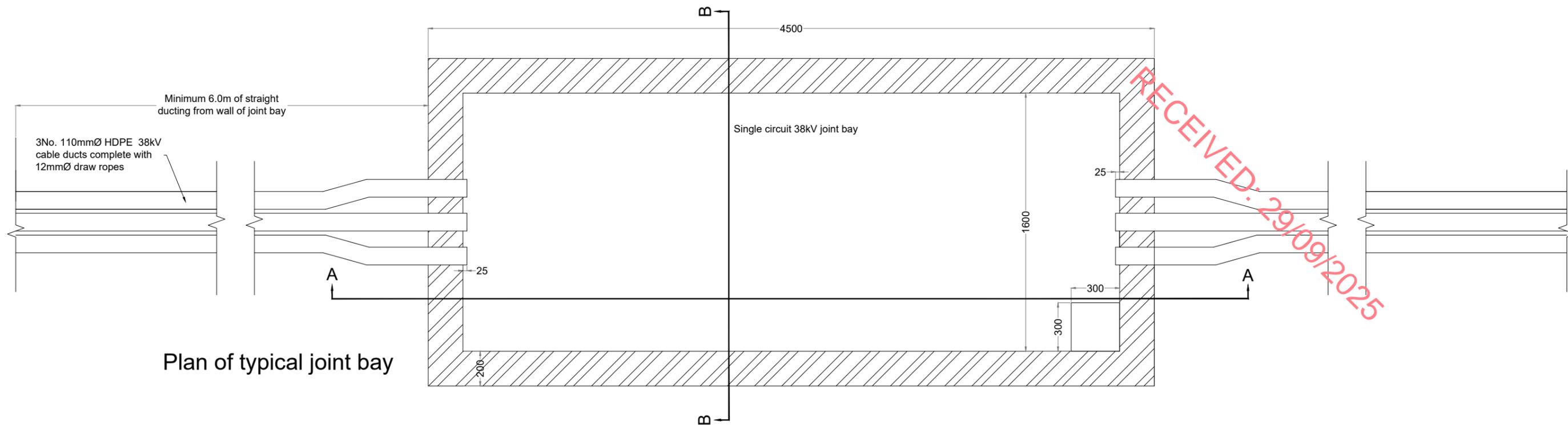
#### 4.8.2.3 Joint Bays

Joint bays are typically pre-cast concrete chambers where lengths of cable will be joined to form one continuous cable. Joint bays will be located at various points along the Proposed Grid Connection route generally between 600 to 800 metre intervals or as otherwise required by ESBN and electrical designer requirements. Joint Bays are typically 2.03m x 4.5m x 1.475m pre-cast concrete structures installed below finished ground level.

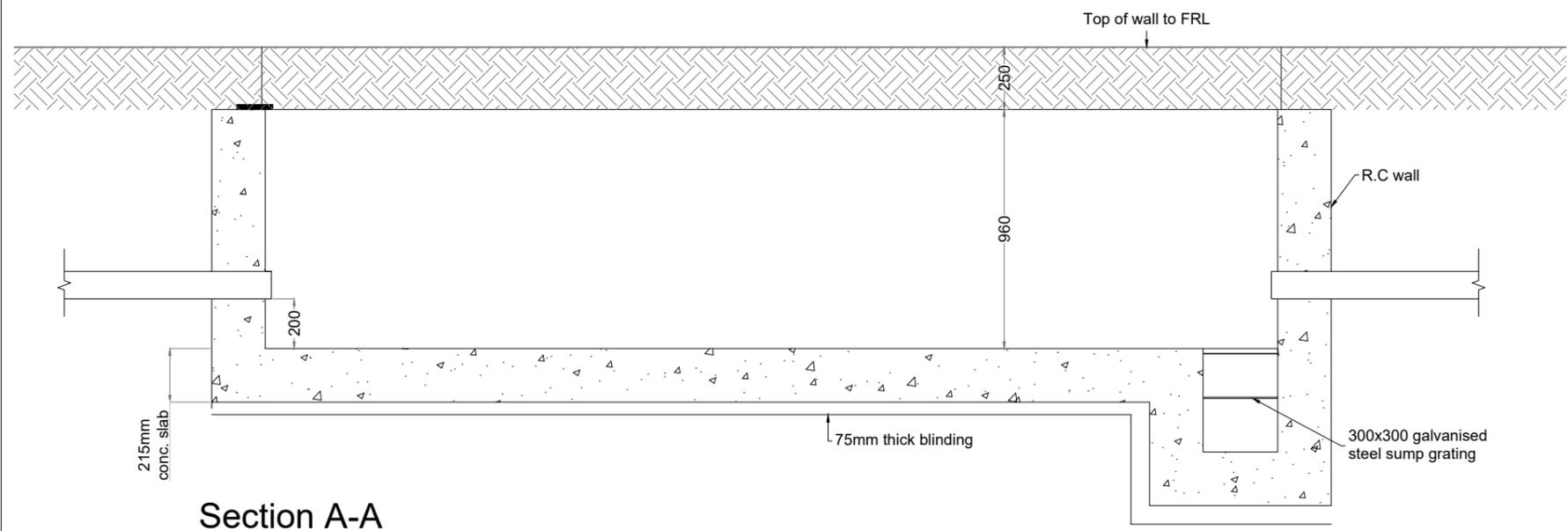
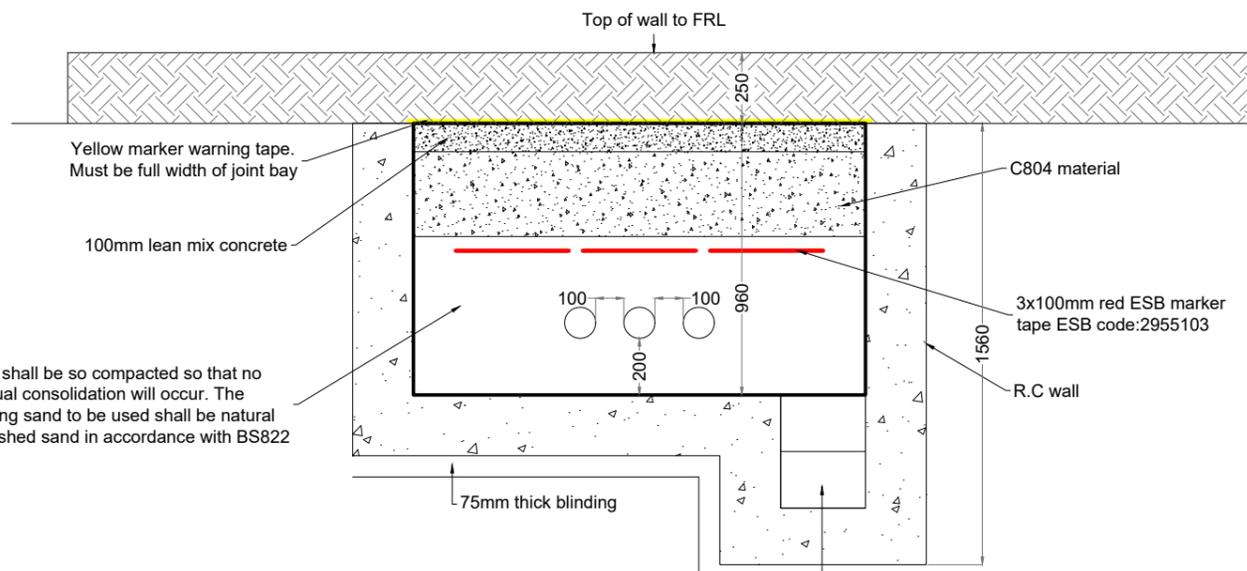
Where possible, joint bays will be located in areas where there is a natural widening/wide grass margin on the road in order to accommodate easier construction, cable installation and create less traffic congestion. Joint Bays will be located in the non-wheel bearing strip of roadways, however given the narrow profile of local roads this may not always be possible. During construction the joint bay locations will be completely fenced off once they have been constructed, they will be backfilled until cables are being installed. Once the cabling is installed the joint bays will be permanently backfilled with the existing surface re-instated and there will be no discernible evidence of the joint bay on the ground. Mitigation measures will be implemented throughout the construction process to ensure the installation and construction of the joint bays does not impact nearby protected structures and/or watercourses.

In association with Joint Bays, Communication Chambers are required at joint bay locations to facilitate communication links between the onsite 38kV substation and the existing Cashla 220kV substation. Earth Sheath Link Chambers are also required approximately every second joint bay along the Proposed Grid Connection. Communication Chambers will typically be pre-cast concrete structures with an access cover at finished surface level. The locations of the joint bays and chambers are shown in Appendix 4-1.

The precise siting of all Joint Bays, Earth Sheath Link Chambers and Communication Chambers within the corridor assessed is subject to approval by ESB Networks.



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PROJECT TITLE: <b>Gannow Renewable Energy Development, Co. Galway</b>			
DRAWING TITLE: <b>Standard 38kV Joint Bay Detail</b>			
PROJECT No.: <b>240323</b>	DRAWING No.: <b>Figure 4-30</b>	SCALE: <b>1:25 @ A3</b>	
DRAWN BY: <b>KD</b>	CHECKED BY: <b>AC</b>	DATE: <b>12.09.2025</b>	REVISION: P01



#### 4.8.2.4 **Underground Cabling Watercourse/Culvert/Service Crossings**

A total of 10 no. existing watercourse crossings will be traversed along the Proposed Grid Connection route to cater for the proposed collector cable and external grid connection cabling towards the existing Cashla 220kV substation. The locations of the watercourse crossings are shown on the detailed layout drawings in Appendix 4-1 and details of each crossing method are presented in Table 4-5 below. The watercourse crossing methodologies for the provision of the underground Proposed Grid Connection component of the Proposed Project at these locations is set out in Table 4-5 below, with proposed crossing methodology illustrated on Figure 4-32 to Figure 4-35, with the most appropriated option being selected for each crossing. Instream works are not required at any watercourse crossing along the Proposed Grid Connection.

Should an alternative methodology option listed below be required for individual crossings during the construction process this will be agreed with the relevant authorities including Galway County Council prior to works commencing.

##### 4.8.2.4.1 **Crossing Using Standard Trefoil Formation Over – Type A**

Watercourses will not be directly impacted upon since no instream works or bridge/culvert alterations are proposed. Where adequate cover exists above a bridge/culvert or where a new bottomless box culvert or clear-span structure has been installed at a sufficient depth, the standard ESB approved trefoil arrangement will be used where the cable ducts pass over a culvert without any contact with the existing culvert, water course or existing underground service. The cable trench will pass over the crossing in a standard trench.

Please see Figure 4-32 below for further details.

##### 4.8.2.4.2 **Flatbed Formation Under– Type B**

Where cable ducts are to be installed under an existing watercourse or service crossing where sufficient cover cannot be achieved by installing the ducts in a trefoil arrangement, the ducts will be laid in a much shallower trench, the depth of which will be determined by the location of the top of the obstacle or the depth of excavatable material under it. The ducts will be laid in this trench in a flatbed formation under the existing watercourse/ service and will be encased in 6mm thick steel galvanized plate with a 35N concrete surround as per ESB Networks specification.

Please see Figure 4-33 below for further details.

##### 4.8.2.4.3 **Flatbed Formation Over– Type C**

Where cable ducts are to be installed over a watercourse or service crossing where sufficient cover cannot be achieved by installing the ducts in a trefoil arrangement, the ducts will be laid in a much shallower trench the depth of which will be determined by the location of the top of the obstacle or the depth of excavatable material over it. The ducts will be laid in this trench in a flatbed formation over the existing culvert and will be encased in 6mm thick steel galvanized plate with a 35N concrete surround as per ESB Networks specification.

Where a bridge/culvert or service has insufficient cover depth to fully accommodate the required trench, the ducts can be laid in a flatbed formation partially within the existing road surface. Where this option is to be employed, the ducts will also be encased in steel with a concrete surround as per ESB Networks specifications. In order to achieve cover over these ducts and restore the carriageway of the road, it may be necessary to raise the pavement level locally to fully cover the ducts. The increased road level will be achieved by overlaying the existing pavement with a new wearing course as required. Any addition of a new pavement will be tied back into the existing road pavement at grade. After the

crossing over the culvert has been achieved, the ducts will resume to the trefoil arrangement within a standard trench.

Please see Figure 4-34 below for further details.

#### 4.8.2.4.4 Horizontal Directional Drilling – Type D

The HDD method of duct installation is carried out using Vermeer D36 x 50 Directional Drill (approximately 22 tonnes), or similar plant. The launch and reception pits will be approximately 2.5m wide, 2.5m long and 2.0m deep. The pits will be excavated with a suitably sized excavator. The drilling rig will be securely anchored to the ground by means of anchor pins which will be attached to the front of the machine. The drill head will then be secured to the first drill rod, and the operator will commence to drill into the launch pit to a suitable angle which will enable him to obtain the depths and pitch required to the line and level of the required profile. Drilling of the pilot bore will continue with the addition of 3.0m long drill rods, mechanically loaded and connected into position.

During the drilling process, a mixture of a natural, inert and fully biodegradable drilling fluid such as Clear Bore™ and water is pumped through the centre of the drill rods to the reamer head and is forced in to void and enables the annulus which has been created to support the surrounding subsoil and thus prevent collapse of the reamed length. Depending on the prevalent ground conditions, it may be necessary to repeat the drilling process by incrementally increasing the size of the reamers. When the reamer enters the launch pit, it is removed from the drill rods which are then passed back up the bore to the reception pit and the next size reamer is attached to the drill rods and the process is repeated until the required bore with the allowable tolerance is achieved.

The use of a natural, inert and biodegradable drilling fluid such as Clear Bore™ is intended to negate any adverse impacts arising from the use of other, traditional polymer-based drilling fluids and will be used sparingly as part of the drilling operations. It will be appropriately stored prior to use and deployed in the required amounts to avoid surplus. Should any excess drilling fluid accumulate in the reception or drilling pits, it will be contained and removed from the Site in the same manner as other subsoil materials associated with the drilling process to a licensed recovery facility.

Backfilling of launch & reception pits will be conducted in accordance with the normal specification for backfilling excavated trenches. Sufficient controls and monitoring, as listed below, will be put in place during drilling to prevent frack-out, such as the installation of casing at entry points where reduced cover and bearing pressure exists.

- The area around the Clear Bore™ batching, pumping and recycling plants shall be bunded using terram and sandbags in order to contain any spillages;
- One or more lines of silt fences shall be placed between the works area and adjacent rivers and streams on both banks;
- Accidental spillage of fluids shall be cleaned up immediately and transported off site for disposal at a licensed facility; and,
- Adequately sized skips will be used for temporary storage of drilling arisings during directional drilling works. This will ensure containment of drilling arisings and drilling flush

Please see an illustration of the HDD methodology on Figure 4-35 below.

## Watercourses

Table 4-5 Watercourse Crossing Types

Crossing No.	Watercourse Type	Width of Channel (m)	Cover from Road Level to Top of Bridge/ Culvert (m)	Crossing Type Description	Watercourse Crossing Type
WC 1	Plastic Pipe	0.3	0.4	Flatbed Formation Under	Type B
WC 2 (EPA Mapped WC)	Stone Arch Bridge	1.6	1.2	HDD	Type D
WC 3	Plastic Pipe	0.2	0.9	Flatbed Formation Over	Type C
WC 4	Concrete Pipe	0.35	0.8	Flatbed Formation Over	Type C
WC 5	Concrete Pipe	.45	1.1	Flatbed Formation Over	Type C
WC 6 (EPA Mapped WC)	Plastic Pipe	1.2	0.2	HDD	Type D
WC 7	Concrete Pipe	0.6	0.9	Flatbed formation Over	Type C
WC 8 (EPA Mapped WC)	Plastic Pipe	0.3	0.5	Flatbed Formation Under	Type B
WC 9 (EPA Mapped WC)	Stone Arch Bridge	4.4	0.4	HDD	Type D
WC 10	Stone Culvert	1.2	1.2	Flatbed Formation Over	Type C

## Built Services

The Proposed Grid Connection will utilise HDD (Type D) crossing at both the interaction point with the GNI high-pressure pipeline and to traverse beneath the Galway-Dublin railway near the Attymon rail station. The Proposed Grid Connection will interact with the M17 motorway at 1 no. location and historic railway which is no longer in use. In both instances the Proposed Grid Connection will remain within the curtilage of the public road network which will traverse beneath the bridge containing the historic railway and beneath the M17 motorway (along the L31031) Please see Section 15.3 of Chapter 15 Material Assets of the EIAR for further information on the impact of the Proposed Grid Connection on these built services.



- Map Legend**
- EIAR Site Boundary
  - Proposed Grid Connection
  - Cashla 220kV Substation
  - Proposed Onsite 38kV Substation
  - Watercourse Crossing Locations

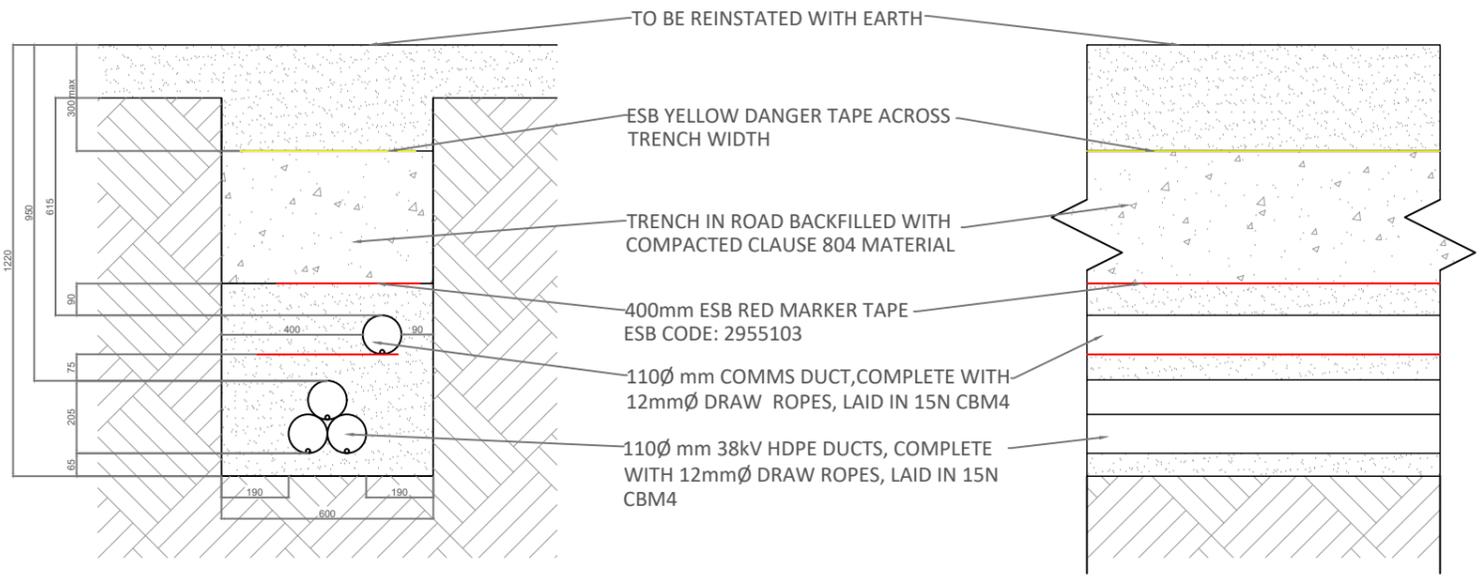


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Drawing Title	
Proposed Grid Connection Watercourse/Services Crossings	
Project Title	
Gannow Renewable Energy Development	
Drawn By	Checked By
CJ	EC
Project No.	Drawing No.
240323	Figure 4-31
Scale	Date
1:60,000	2025-09-15

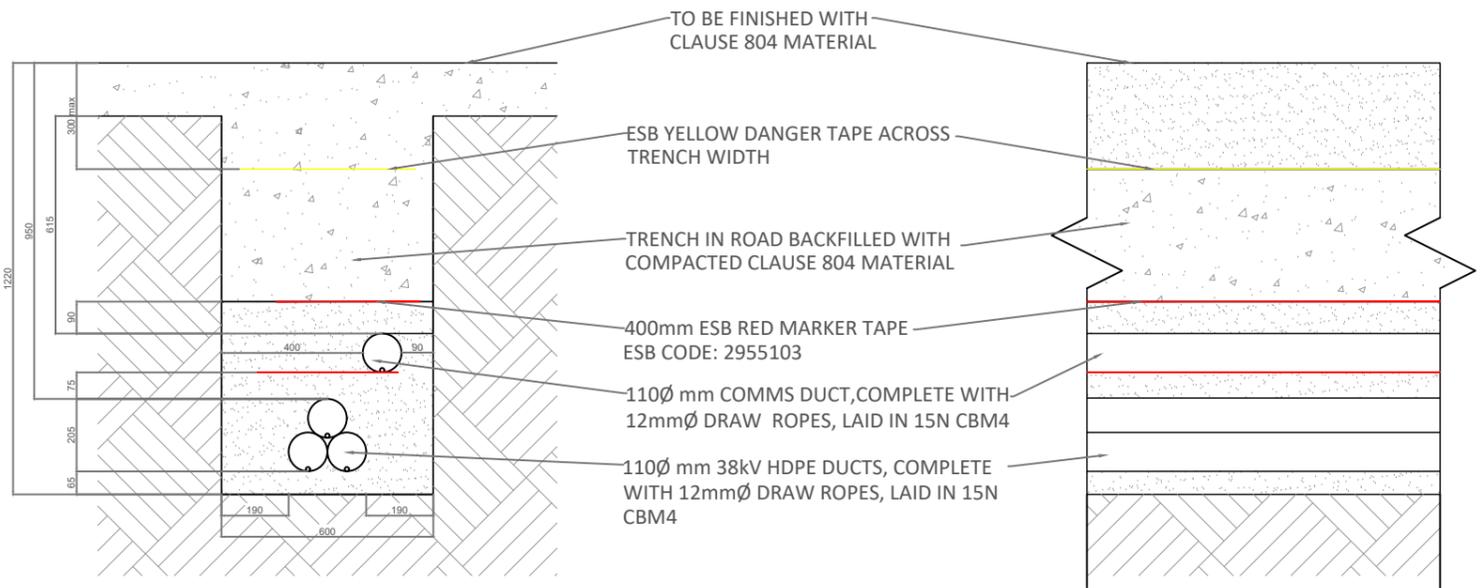
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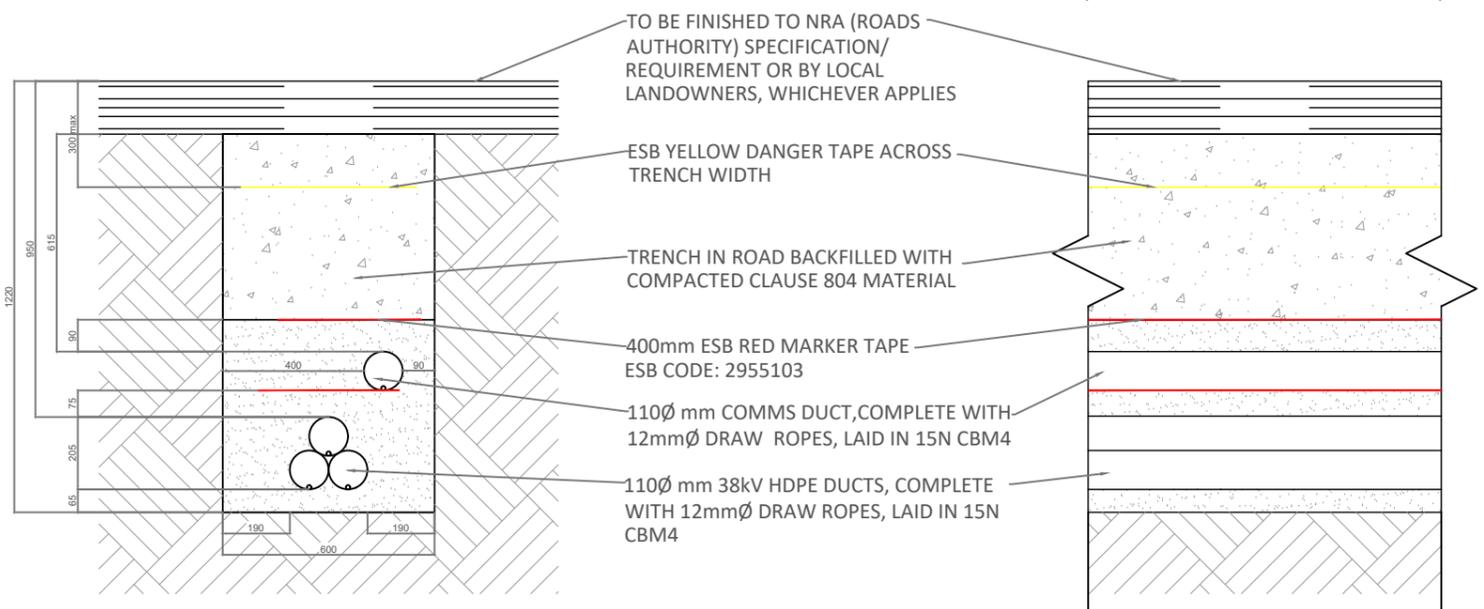
**Option A - Standard 38kV Trench Detail Off-Road**

SCALE 1:20



**Option A - Standard 38kV Trench Detail in Site Road**

SCALE 1:20

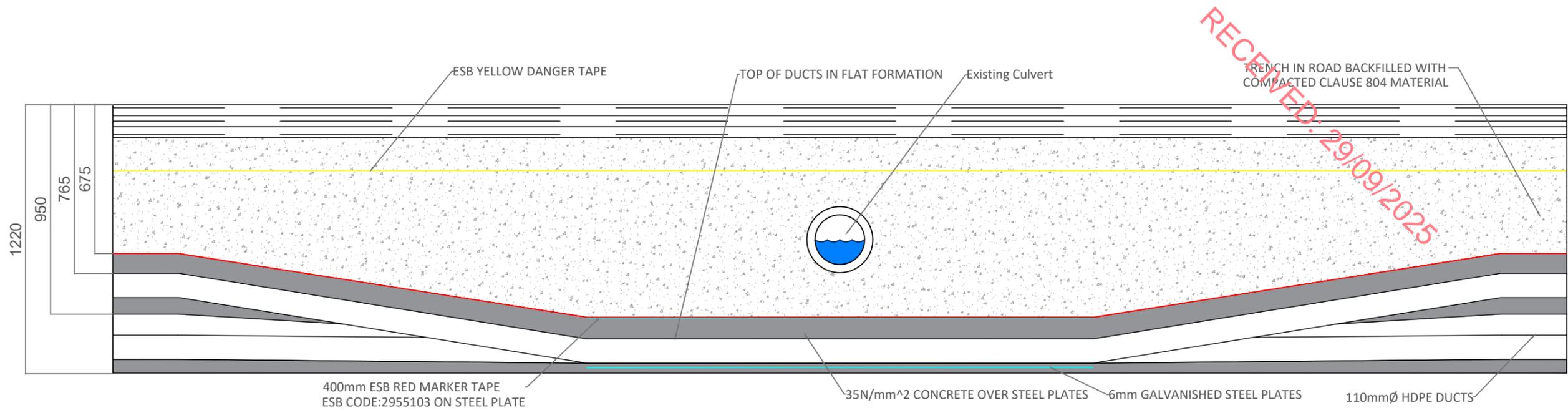


**Option A - Standard 38kV Trench Detail in Public Road**

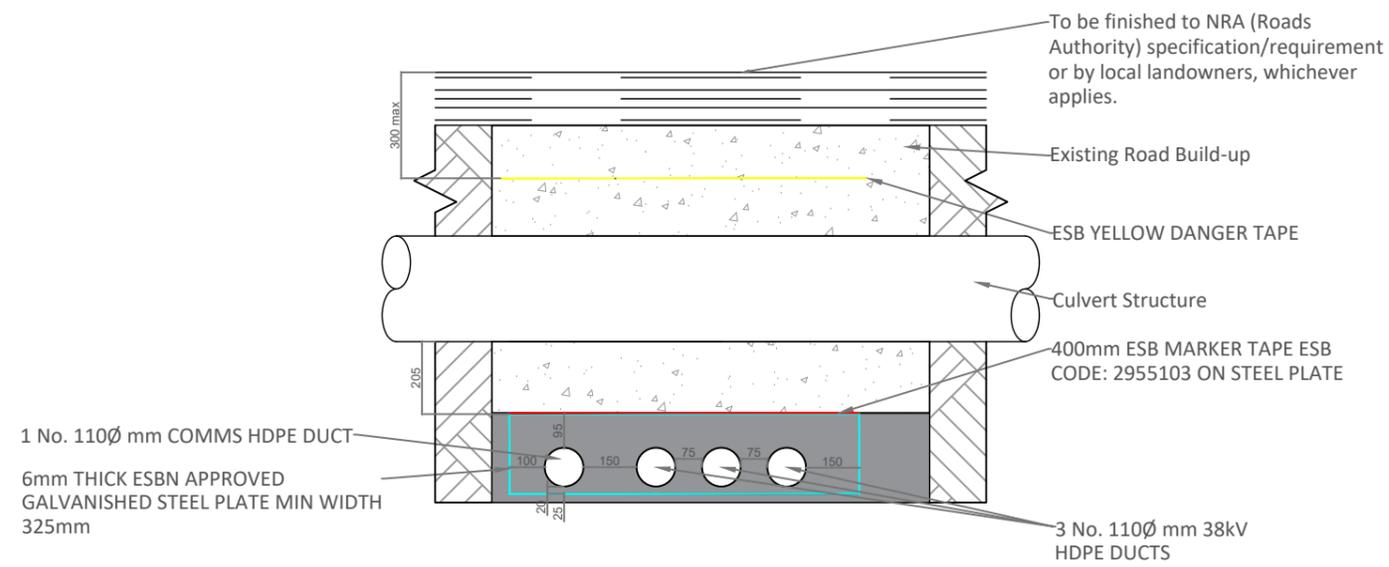
SCALE 1:20

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DRAWING TITLE: <b>Standard 38kV Trench Details</b>			
PROJECT No.: <b>240323</b>	DRAWING No.: <b>Figure 4-32</b>	SCALE: <b>As Shown @ A3</b>	
DRAWN BY: <b>KD</b>	CHECKED BY: <b>EmcC</b>	DATE: <b>07.10.2024</b>	REVISION: <b>P02</b>





**Option B - Flatbed Under Existing Culvert 38kV**  
SCALE 1:20

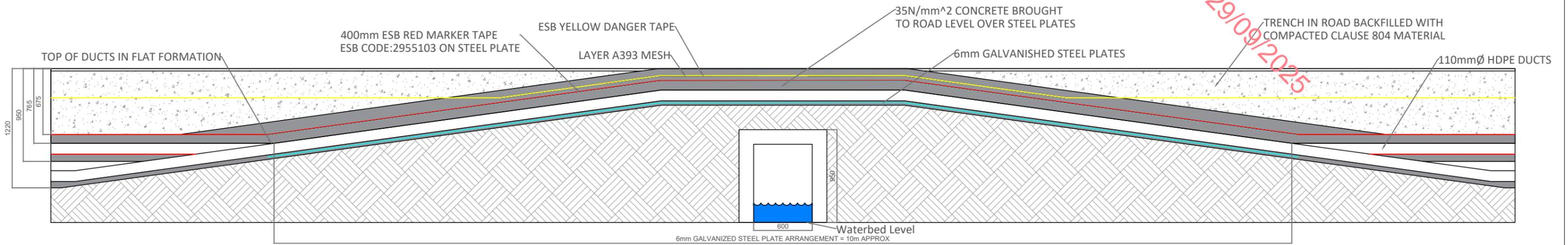


**Option B - Flatbed Under Existing Culvert 38kV**  
SCALE 1:20

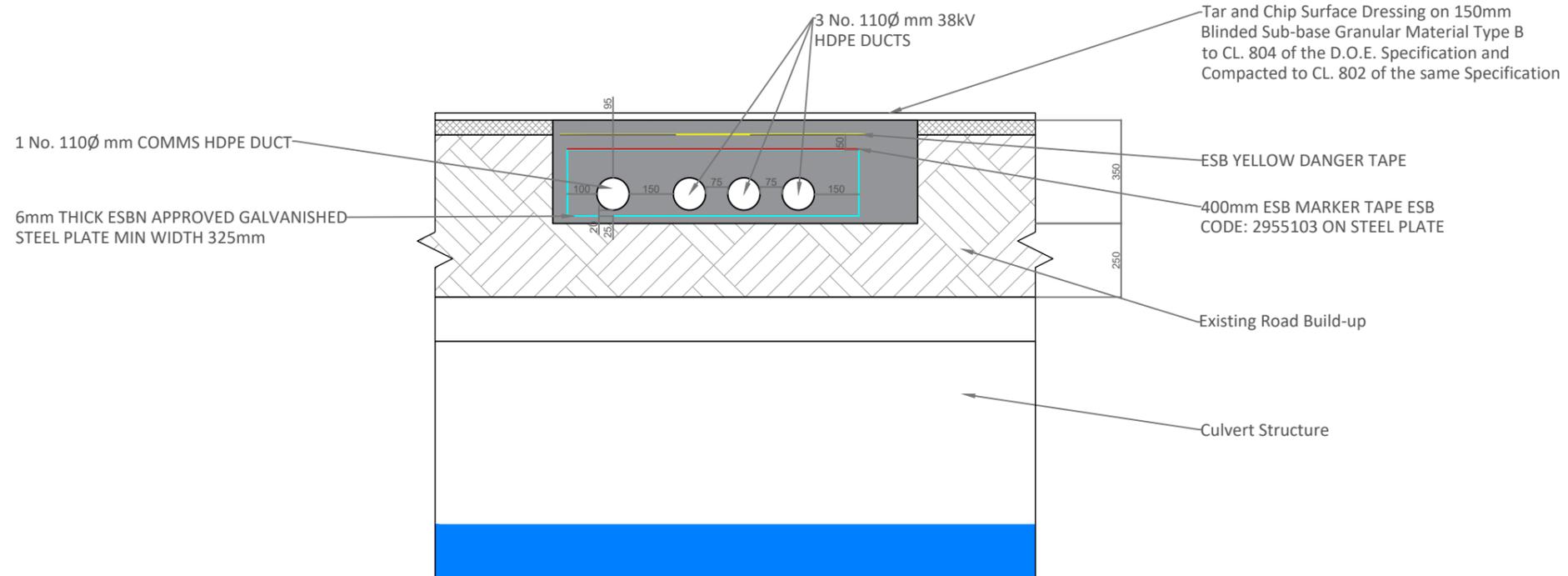
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DRAWING TITLE: <b>Standard 38kV Culvert Detail - Flatbed Under Existing Culvert</b>		
PROJECT No.: <b>240323</b>	DRAWING No.: <b>Figure 4-33</b>	SCALE: <b>As Shown @ A3</b>
DRAWN BY: <b>GO</b>	CHECKED BY: <b>AC</b>	DATE: <b>16.07.2025</b>
		REVISION.: <b>P01</b>



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**Option C - Flatbed Over Existing Culvert 38kV**  
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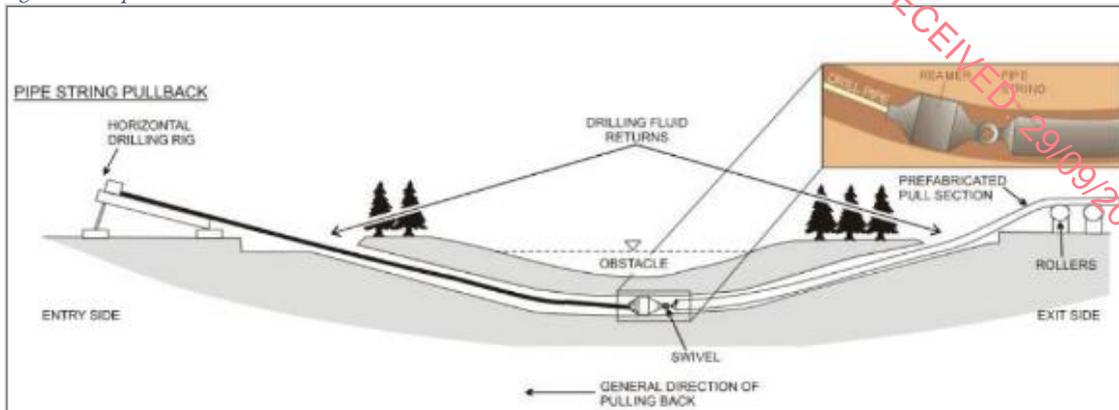


**Option C - Flatbed Over Existing Culvert 38kV**  
SCALE 1:20

PROJECT TITLE: <b>Gannow Renewable Energy Development, Co. Galway</b>			
DRAWING TITLE: <b>Standard 38kV Culvert Detail - Flatbed Over Existing Culvert</b>			
PROJECT No.: <b>240323</b>	DRAWING No.: <b>Figure 4-34</b>	SCALE: <b>As Shown @ A3</b>	
DRAWN BY: <b>GO</b>	CHECKED BY: <b>AC</b>	DATE: <b>16.07.2025</b>	REVISION: <b>P01</b>



Figure 4-35 Option D - HDD



#### 4.8.2.5 Site Preparations

Prior to beginning construction work the contractor will scan the proposed route with a cable avoidance tool (CAT) scanner, carry out visual inspection of the area and may carry out further below ground surveys if deemed necessary. If any previously unidentified services are discovered the site engineer, the appropriate crossing methodology identified in Section 4.8.2.4 above be implemented in consultation with the relevant service provider.

In some instances, it may be necessary to relocate existing underground services such as water mains or existing cables. In advance of any construction activity, the contractor will undertake additional surveys of the proposed route to confirm the presence or otherwise of any previously unidentified services. As stated above, if previously unidentified services are found, the relevant service provider will be consulted with in order to determine the appropriate crossing methodology as per Section 4.8.2.4 above.

In the event that water mains are encountered the water supply will be turned off by the utility so work can commence on diverting the service. The section of existing pipe will be removed and will be replaced with a new pipe along the new alignment of the service. The works will be carried out in accordance with the utility standards.

#### 4.8.2.6 Trenching and Ducting

The Proposed Grid Connection cabling will be installed in a series of ducting in an excavated trench. Trenching will be achieved using a mechanical excavator. The top layer of soil or road surfacing will be removed and stockpiled separately for reuse. Material stockpiles should be stored at least 15m back from drains and watercourses on level ground with a silt fence inserted at the base to prevent runoff.

The trench base will be graded and smoothed once the required depth and width is achieved. A layer of bedding material will be placed and compacted to the required specification on the trench floor prior to laying the ducts in trefoil formation.

The ducting surrounds will be carefully backfilled and compacted in accordance with the required specification. Cable protection strips will be placed on compacted material directly above the ducting. A secure cap will be placed at the end of each duct to prevent the ingress of dirt or water.

Ground water and surface water accumulating in the base of trenches will not be pumped directly to roadside drains or watercourses. Contaminated water will be either treated onsite prior to discharge or tankered offsite to a suitably licensed disposal facility.

For concrete and asphalt/bitumen road sections, surfaces will be permanently reinstatement in accordance with the specification and to the approval of the local authority and/or private landowners, unless otherwise agreed with local authorities. All trench works carried out in public roadways will be carried out in accordance with 'Guidelines for Opening, Backfilling and Reinstatement of Trenches in Public Roads' and any other conditions imposed by the relevant road authority.

For unsurfaced/grass sections, trenches will be backfilled with suitable excavated material to ground level leaving at least 100mm topsoil or match existing level at the top to allow for seeding or replace turves as per the specification of the local authority or landowner.

Ducting will be cleaned and tested in accordance with the specification by pulling through a brush and mandrel. A draw rope will be installed in each duct in preparation for cable installation at a later date.

## 4.9 Community Gain Proposal

### 4.9.1 Background

The Proposed Wind Farm has the potential to have significant benefits for the local economy, by means of job creation, landowner payments and commercial rate payments. An important part of a renewable energy development, which Gannow Ltd. (the Applicant) has been at the forefront of developing, is its Community Benefit Package. The concept of directing benefits from wind farms to the local community is promoted by the National Economic and Social Council (NESC) and Wind Energy Ireland (WEI) among others. While it may be simpler and easier to put a total fund aside for a wider community area, the Applicant is endeavouring to develop new ways to direct increased gain towards the local community with particular focus on those living closest to the Proposed Wind Farm.

The Applicant has given careful consideration to the issue of community gain arising from the Proposed Wind Farm, if permitted and constructed. Community gain from significant development proposals, including wind farms, whilst a relatively recent approach, is now a common consideration for developers and, indeed, planning authorities. This approach recognises that, with any significant wind farm proposal, the locality in which the Proposed Wind Farm is situated is making a significant contribution towards helping achieve national renewable energy and climate change targets, and the local community should derive some benefit from accommodating such a development in their locality.

Community gain proposals can take a number of forms, generally depending on the nature and location of the Proposed Wind Farm and the nature and make-up of the local community. The nature of the community gain proposal will be subject to discussions with and input from the local community. In some instances, funds are paid by the developer, either annually or as a one-off payment, to a community fund that is administered as agreed by the community. These funds may then be used for a variety of projects, such as environmental improvements, local amenities and facilities, voluntary and sporting groups and clubs, educational projects and energy efficiency improvement works, and direct payments could be made to nearby households.

### 4.9.2 Renewable Energy Support Scheme

The Renewable Electricity Support Scheme (RESS) is a Government of Ireland initiative that provides support to renewable electricity projects in Ireland. RESS is a pivotal component of the Programme for Government and Climate Action Plans 2021, 2023, 2024 and 2025, and is a major step in achieving Ireland's target of at least 80% renewable electricity by 2030. One of the key objectives of RESS is to provide an Enabling Framework for Community Participation through the provision of pathways and supports for communities to participate in renewable energy projects.

The RESS Terms and Conditions, published by the Department of Communications, Climate Action and Environment in February 2020 make some high-level provisions for how this type of benefit fund

will work. Any RESS project which wants to export electricity to the national grid must abide by these broad principles. The current T&C's include the following:

1. *A minimum of €1,000 shall be paid to each household located within a distance of a 1-kilometre radius from the Project;*
2. *In respect of Onshore Wind RESS 2 Projects, a minimum of €1,000 shall be paid to each household located within a distance of a 1-kilometre radius from the Onshore Wind RESS3 Project. The 1-kilometre distance specified is measured from the base of the nearest turbine of the RESS 3 Project to the nearest part of the structure of the household, the location of which is identified in the An Post's GeoDirectory;*
3. *A minimum of 40% of the funds shall be paid to not-for-profit community enterprises whose primary focus or aim is the promotion of initiatives towards the delivery of the UN Sustainable Development Goals, in particular Goals 4, 7, 11 and 13, including education, energy efficiency, sustainable energy and climate action initiatives;*
4. *A maximum of 10% of the funds may be spent on administration. This is to ensure successful outcomes and good governance of the Community Benefit Fund. The Generator may supplement this spend on administration from its own funds should it be deemed necessary to do so; and*
5. *The balance of the funds shall be spent on: (i) initiatives successful in the annual application process, as proposed by clubs and societies and similar not-for-profit entities; and (ii) in respect of Onshore Wind RESS 3 Projects, on "near neighbour payments" for households located outside a distance of 1 kilometre from the RESS 3 Project but within a distance of 2 kilometres from such RESS 3 Project. The distance specified is from the base of the nearest turbine to the nearest part of the structure of the occupied residence, the location of which is identified in the An Post's GeoDirectory.*

#### 4.9.3 Community Benefit Fund

Based on the current RESS guidelines it is expected that for each megawatt hour (MWh) of electricity produced by the wind farm, the Proposed Project will contribute €2 into a community fund for the first 15 years of operation of the Proposed Wind Farm. If this commitment is changed in upcoming Government Policy, the fund would be adjusted accordingly.

The Community Benefit Fund belongs to the local community. The premise of the fund is that it should be used to bring about significant, positive change in the local area. To make this happen, the first task will be to form a benefit fund development working group that clearly represents both the close neighbours to the project as well as nearby communities. This group will then work on designing the governance and structure of a community entity that would administer the Community Benefit Fund.

The types of projects and initiatives that could be supported by such a Community Benefit Fund could include youth, sport and community facilities, schools, educational and training initiatives, and wider amenity, heritage, and environmental projects.

Should the Proposed Project be developed under the current RESS T&C's, it would attract a community contribution in the region of €300,000/year for the local community (estimated based on an average energy yield) over the first 15 years of operation of the Proposed Project. The value of this fund would be directly proportional to the electricity generated by the wind farm. Under the current RESS T&Cs, the following is the recommended breakdown of the fund:

- **Direct payments** – to those living closest to the Proposed Wind Farm. A minimum €1,000 payment per annum for houses within 1km of the Proposed Project.
- **Energy Efficiency** – A minimum of 40% per year would be available for local groups, clubs and not for profit organisations that provide services in the local area. This

- would include services for the elderly, local community buildings, and the development of sporting facilities such as all-weather playing pitches etc.
- **Administration costs** – a maximum of 10% per year will be made available for the administration and governance costs of the fund.
  - **Support for Local Groups** – The remaining balance of this community benefit fund would be available for the development of energy initiatives to benefit people living in the local area. This is to be provided to not-for-profit community enterprises each year.

Should the Proposed Project not be developed under RESS, the Applicant is committing that for each megawatt hour (MWh) of electricity produced by the wind farm, the Proposed Project will contribute €1 into a community fund for the entire operational life of the Proposed Project. This would equate to an estimated annual fund of €150,000 (using the same formula as above), which across the 35-year operational lifespan would result in funding in the order of €5,250,000 to the local community which is a substantial contribution. The number and size of grant allocations will be decided by a Community Fund liaison committee with various groups and projects benefiting to varying degrees depending on their funding requirement. Please see Appendix 2-2 Gannow Renewable Energy Development Community Report for details.

## 4.10 Operation

As part of the Proposed Project planning application, permission is being sought for a 35-year operation period commencing from the date of full operational commissioning of the proposed turbines. During the operational period, on a day-to-day basis the wind turbines will operate automatically, responding by means of meteorological equipment and control systems to changes in wind speed and direction.

The wind turbines will be connected, and data relayed from the wind turbines to a central control unit at the proposed onsite 38kV substation which will facilitate off-site remote monitoring of the wind farm. Each turbine will be monitored off-site by the appointed Operations and Maintenance contractor (typically the wind turbine manufacturer) and a wind farm operations management company. The monitoring of turbine output, performance, wind speeds, and responses to any key alarms will be monitored off-site by both parties 24-hours per day. Regular on-site visual inspections will also be carried out by the wind farm operations management company.

### 4.10.1 Maintenance

Each turbine will be subject to a routine maintenance programme involving several checks and changing of consumables, including oil changes. The meteorological mast will be subject to a routine maintenance programme involving several checks and changing of instrumentation when required. In addition, there will be a requirement for unscheduled maintenance, which could vary between resetting alarms to major component changes requiring a crane. Typically, maintenance traffic will consist of four-wheel drive vehicles or vans. Maintenance of the internal site roads will involve filling potholes and maintaining road edge markers. Drainage maintenance will typically involve cleaning of drainage ditches when required to prevent water backing up.

The proposed onsite 38kV substation and internal access roads will also require periodic maintenance. The onsite 38kV substation would be operational 24 hours per day, 7 days a week throughout the year. Substations can be operated remotely and manually. Supervisory operational and monitoring activities will be carried out remotely using a SCADA system, with the aid of computers connected via a telephone modem link. The following maintenance procedures will also be adhered.

- Periodic service and maintenance works which include some vehicle movement.
- For operational and inspection purposes, substation access is required.
- Servicing of the substation equipment will be carried out in accordance with the manufacturer's specifications, which would be expected to entail the following:

- Six-month service – three-week visit
- Annual service – six-week visit
- Weekly visits as required.

Occasional technical problems may require maintenance visits by technical staff. During the six-month and annual service visits, some waste (lubricating and cooling oils, packaging from spare parts or equipment, unused paint, etc.) will arise. This will be recorded and removed from the Site and reused, recycled or disposed of in accordance with the relevant legislation in an authorised facility.

It is estimated that 1-2 daily visits will be made to the Site for authorised persons and vehicles to undertake minor routine maintenance and inspection, if and when required. Although the level of activity required for the maintenance of the Proposed Wind Farm and Proposed Grid Connection infrastructure is minimal, the impacts associated with traffic volumes for this period are assessed in Chapter 15 Material Assets: Traffic and Transport.

#### 4.10.2 Monitoring

Section 8 of the CEMP sets out a programme of monitoring required for the operational phase of the project. The CEMP should be consulted for detailed information on the monitoring requirements during the operational phase; however, a summary of the key information is provided below:

- Monthly water sampling and laboratory analysis will be undertaken for the first six months during the operational phase.
- The drainage system will be monitored in the operational phase until such a time that all areas that have been reinstated become re-vegetated and the natural drainage regime has been restored.
- Post-construction bird monitoring surveys will be completed in accordance with guidelines issued by the Scottish Natural Heritage (SNH, 2009). Please see Appendix 7-7 Bird Monitoring Programme for further details.
- Post-construction bat monitoring will be undertaken for at least three years' post construction of the Proposed Project. Please see Section 6.2 of Appendix 6-2 Bat Report for further details.
- Post-construction linear habitat restoration monitoring following the main growing season (i.e., in September) in a given year for the first three years of growth.
- Monitoring for shadow flicker at properties within the Shadow Flicker Study Area as outlined in Chapter 5.
- Post turbine commissioning noise monitoring will be commenced within 6 months of commissioning the wind farm.

#### 4.11 Decommissioning

The wind turbines proposed as part of the Proposed Project are expected to have a lifespan of approximately 35-years. Following the end of their useful life, the equipment may be replaced with a new technology, subject to planning permission being obtained, or the Proposed Wind Farm may be decommissioned fully.

Upon decommissioning of the Proposed Wind Farm, the wind turbines and the meteorological mast will be disassembled in reverse order to how they were erected. All above ground turbine and mast components would be separated and removed off-site for recycling. Turbine and mast foundations would remain underground and would be covered with earth and allowed to revegetate. Leaving the foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in significant temporary environment nuisances such as noise, dust and/or vibration. Site roadways will be used during the operational phase by farm machinery and will provide a useful means of extracting the commercial forestry crop which exists on at the Site and therefore will be retained post decommissioning to facilitate these activities.

The underground electrical cabling connecting the proposed turbines to the proposed onsite 38kV substation will be removed from the cable ducts. The cabling will be pulled from the cable ducts using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at the original cable jointing pits which will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance. The cable materials will be transferred to a suitable recycling or recovery facility.

The Proposed Grid Connection and onsite 38kV electricity substation will remain in place as it will be part of the Electricity Grid under the ownership and control of the ESB Networks.

A Decommissioning Plan has been prepared (Appendix 4-6). The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will agree with the competent authority at that time. The potential for effects during the decommissioning phase of the Proposed Wind Farm has been fully assessed in the EIAR.

As noted in the Scottish Natural Heritage report (SNH) *Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms* (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the Proposed Wind Farm, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is therefore:

*“best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm”.*