GAVIN & DOHERTY GEOSOLUTIONS

Illaunbaun Wind Farm - Environmental Impact Assessment Report

Chapter 5: Project Description

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS

CEMP	Construction Environmental Management Plan
ECoW	Environmental Clerk of Works
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
ESB	Electricity Supply Board
EU	European Union
GW	Gigawatt
HGV	Heavy Goods Vehicle
ITM	Irish Transverse Mercator
MW	Megawatt
oCEMP	outline Construction Environmental Management Plan
PRA	Peat Repository Area
RQD	Rock quality designation
TII	Transport Infrastructure Ireland
TMP	Traffic Management Plan
WMP	Waste Management Plan

5 PROJECT DESCRIPTION

5.1.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) describes the Proposed Development and its parts, which are the subject of the proposed application for planning permission to Clare County Council in accordance with the Planning and Development Act 2000, (as amended) ('the Proposed Development').

The Proposed Development comprises:

- Construction of six wind turbines with a maximum overall blade tip height of up to 150 metres and Hub height of 91.5 m;
- One permanent 38 kV electrical substation with one control building with welfare facilities, all associated electrical plant and equipment, security fencing, all associated underground cabling, drainage infrastructure and all ancillary works;
- All associated internal underground electrical and communications cabling connecting the wind turbines to the on-site Substation;
- Upgrade of existing tracks, roads and provision of new site access roads to facilitate construction & operation of the wind farm;
- Construction of an access track in the townlands to facilitate turbine delivery;
- Two borrow pits;
- Three peat repository areas for peat and spoil management;
- One temporary construction compound;
- Site Drainage;
- Forestry Felling;
- Signages; and
- All associated site development works.

This chapter describes all components of the proposed project, including grid connection, forestry felling and replanting, and any necessary road works to facilitate turbine delivery. The application seeks a 10-year planning permission, along with a 35 -year operational period commencing from the date the entire wind farm becomes operational.

Details of the project are further supported by the following documents:

- Outline Construction Environmental Management Plan
- Peat and Spoil Management Plan – Appendix A09-01
- Peat Stability Risk Assessment – Appendix A09-02

- Turbine Delivery Route Assessment – Appendix A19-01
- Planning Application Drawings

5.2 DEVELOPMENT LAYOUT

The layout of the Proposed Development has been carefully designed to minimise potential environmental impacts whilst optimising the energy generation from the wind resources available at the site. A constraints study was undertaken during the preliminary stage of this EIAR to ensure that the turbines and associated infrastructure are sited in the most suitable areas of the site. The design maximises the use of existing access roads and tracks within the site, thereby minimising the requirement for additional road and track construction or upgrade.

The overall layout of the Proposed Development is illustrated in Figure 5-1 which shows the proposed positions of the wind turbines, on-site substation, borrow pits, construction compounds, internal road network, and the main site entrance. Detailed layout drawings of the Proposed Development can be found planning drawings pack.

5.2.1 WIND FARM LOCATION

The Proposed Development is situated approximately 4.2 km northeast of Milltown Malbay in County Clare, within an area characterised by coniferous forestry and open peatland. The Proposed Development boundary encompasses ~150 hectares, with the surrounding landscape comprising a mix of agricultural land, low-density residential development and commercial forestry.

The site lies approximately 2.9 km from the west coast of County Clare and 5.2 km southeast of Lahinch, encompassing the townlands of Tooreen, Slievenalicka, Illaunbaun, Lackamore, and Drumbaun.

Topographically, the site elevation ranges from 115 m above Ordnance Datum (mOD) in the east, rising to just over 200 mOD in the west and north, where two distinct hills are present. Lough Keagh, located in the southern portion of the site, lies between 180 mOD and 185 mOD.

The Proposed Development is drained by four watercourses, identified by the Environmental Protection Agency (EPA) as Illaunduff, Ballinphonta, Drumbaun, and Derrymore. Additionally, historical mapping indicates the presence of Lough Abullaunduff, which is no longer apparent in the current landscape as observed in satellite imagery. It is likely that this waterbody was drained in the past.

5.2.2 LANDOWNERSHIP

The proposed wind farm development is located across multiple landholdings, comprising a combination of private and forestry lands. Land agreements have been secured with the relevant landowners to facilitate the construction, operation, and maintenance of the wind farm infrastructure, including turbine locations, access tracks, and associated grid connection works. The project design has taken into consideration existing land use practices, ensuring minimal disruption to agricultural activities where possible. Figuthe re 5-2 shows the folio boundaries and corresponding folio numbers.

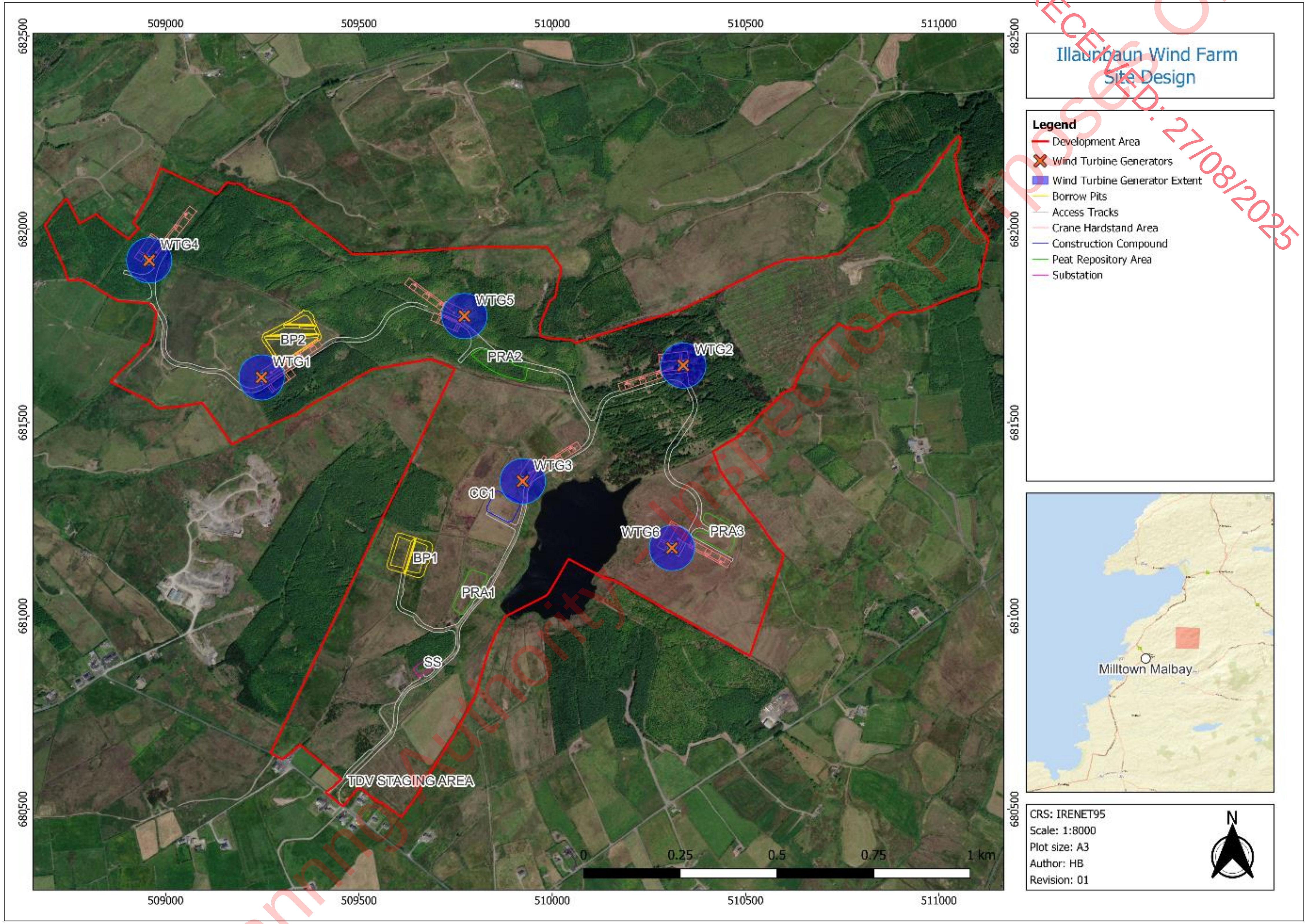
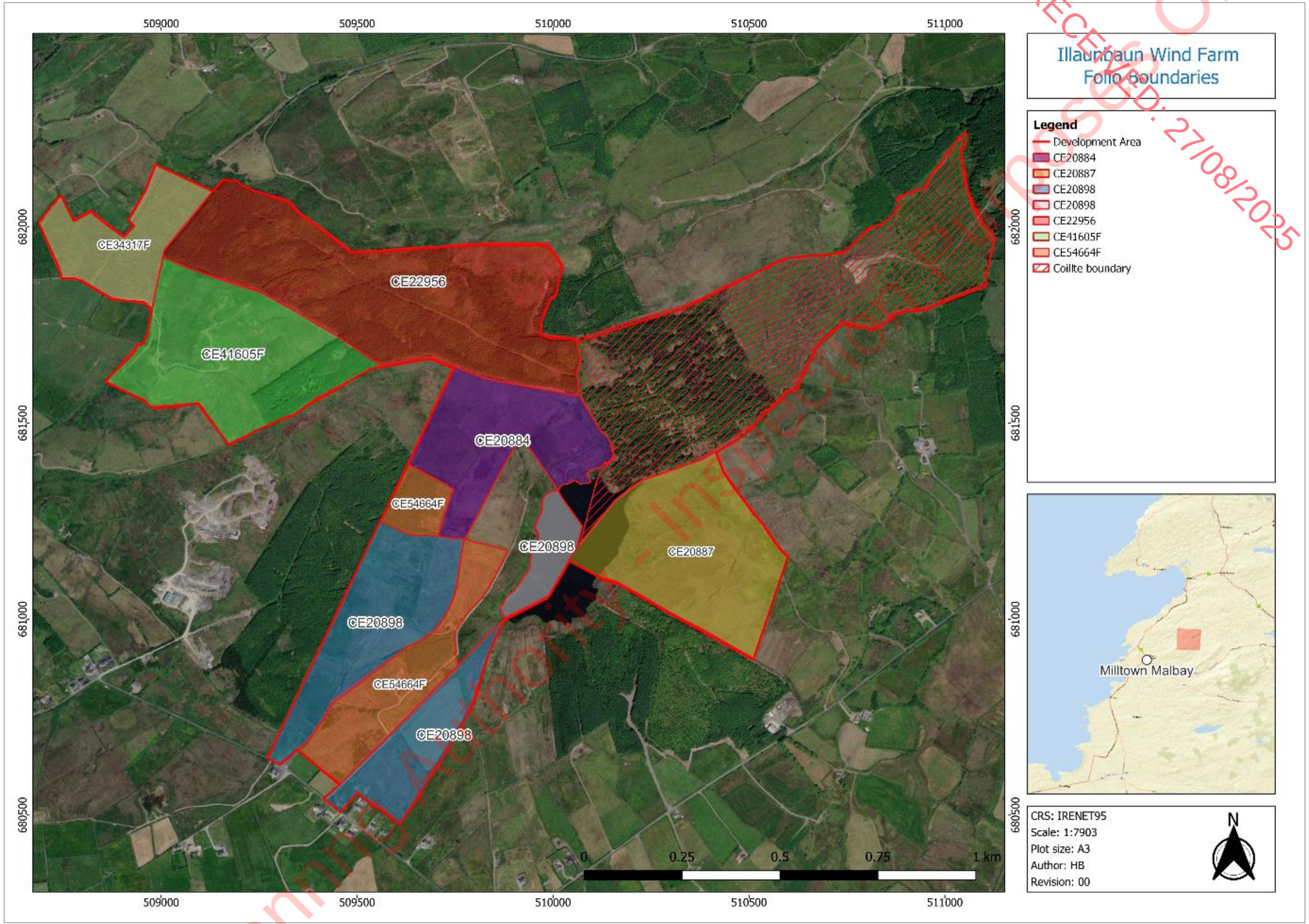


Figure 5-1: Site Layout



Figuthe re 5-2: Folio numbers and boundaries of the land designated for the Proposed Development Components

5.2.3 DEVELOPMENT COMPONENTS

This section of the EIAR details the components of the Proposed Development. The components of the Proposed Development are shown in Figure 5-3. Further information on the Site Drainage section 5.2.7.7, Construction Methodologies section 5.2.7.13 and Construction timeline section 5.2.8 are provided within this chapter.

5.2.3.1 ACCESS ROUTES

Access to the wind farm site will be via Slievenalicka Road, which connects to Ballard Road. This existing road will serve as the primary access route for construction and operation.

To accommodate the transportation of turbine components, the existing site entrance along Slievenalicka Road will require widening on its eastern side to facilitate vehicle turning movements as presented in Figure 5-4. Upon completion of the construction phase, a portion of the widened area will be reinstated.

During the operational phase, permanent access to the wind farm will be restricted to this entrance via Slievenalicka Road, with access limited to cars and light goods vehicles.

5.2.3.2 TURBINE LOCATIONS

The layout of the proposed wind turbines has been optimised using industry-standard wind farm design software to maximise energy yield while ensuring adequate spacing between turbines. This spacing is designed to mitigate turbulence and wake effects that could impact turbine performance. The grid reference coordinates for the proposed turbine locations are provided in Table 5-1.

According to Section 5.3 of the 'Wind Energy Development Guidelines for Planning Authorities' (Department of the Environment, Heritage and Local Government, 2006), the flexibility permitted in wind farm planning permissions regarding turbine locations should not exceed 20 metres.

Table 5-1: Proposed Wind Turbine Locations

Turbine ID	X (ITM)	Y (ITM)
T1	509248	681617
T2	510339	681648
T3	509924	681348
T4	508957	681920
T5	509773	681776
T6	510310	681176

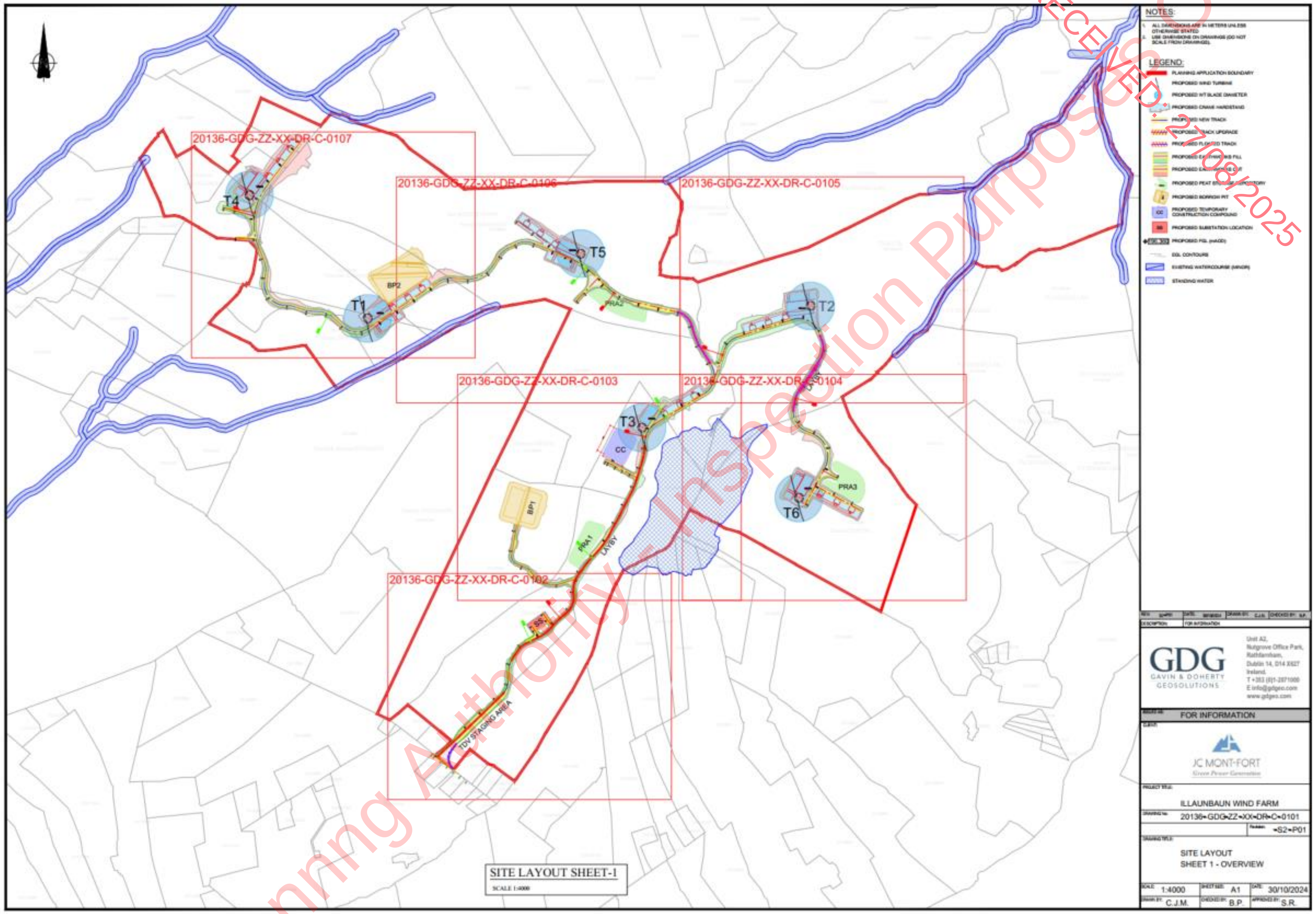
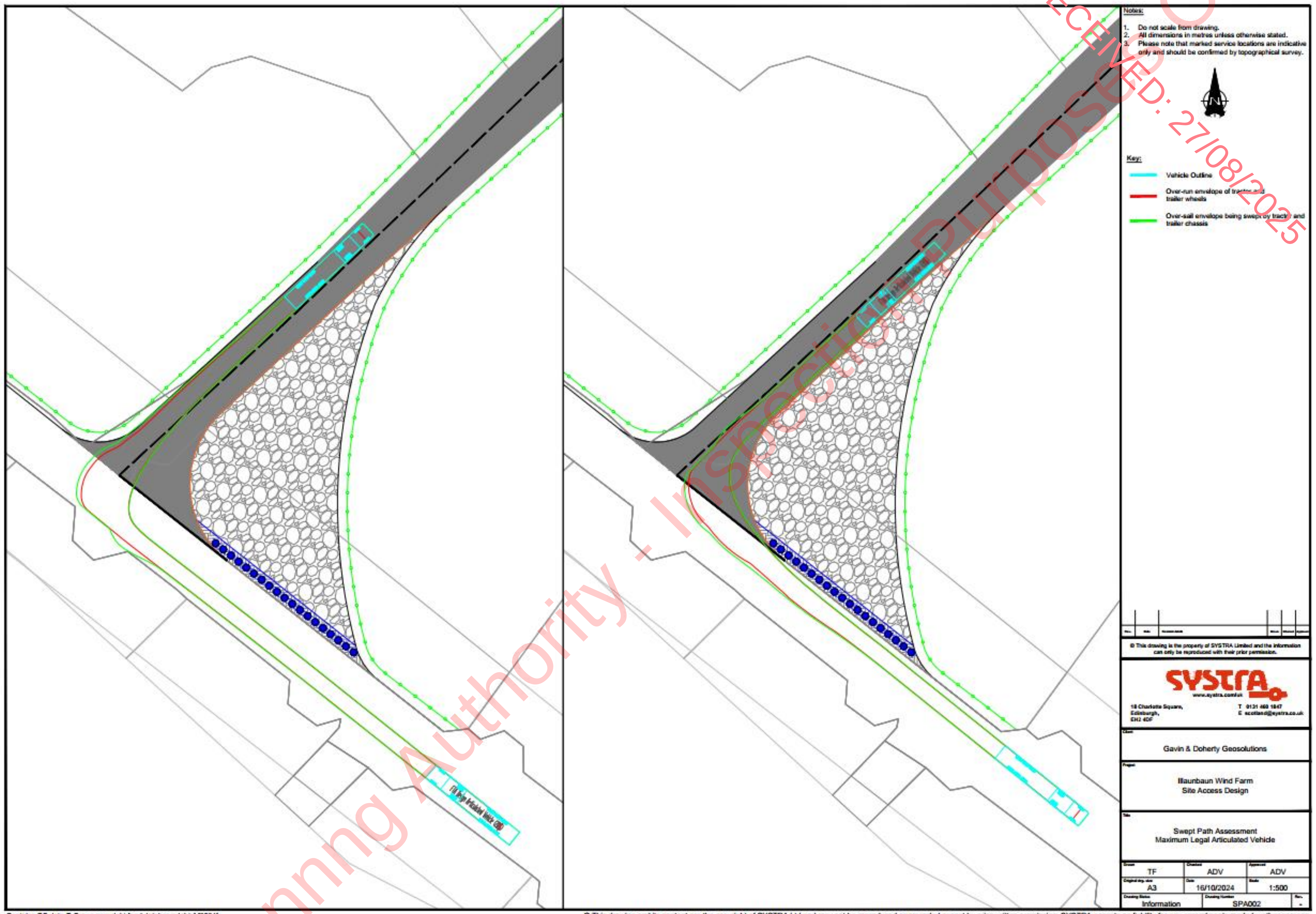


Figure 5-3: Site Layout and Development Components



Contains OS data © Crown copyright land database rights [2024]
© This drawing and its content are the copyright of SYSTRA Ltd and may not be reproduced or amended except by prior written permission. SYSTRA accepts no liability for any amendments made by other persons.

Figure 5-4: Site Access

5.2.3.3 TURBINE TYPE

- Each wind turbine is composed of four key components:
- Foundation unit
- Tower
- Nacelle (turbine housing)
- Rotor

Figure 5-5:Typical Wind Turbine Components

The proposed wind turbines will have a maximum tip height of 150 metres and a hub height of 91.5m. Within this height range, various configurations of rotor diameter, and ground-to-blade-tip height may be utilised. The specific make and model of the turbine will be determined through a competitive tender process, but the tip height will not exceed 150 metres. Modern wind turbines from leading manufacturers generally have similar appearances and characteristics, with only minor cosmetic differences. The turbines installed on the site will be conventional three-blade designs, all geared to ensure that the rotors rotate in the same direction.

For the purpose of this EIAR, the Vestas V117 turbine model has been selected and considered in the relevant sections of the EIAR to assess the different scenarios for different receptors. The design parameters of the turbines may affect the assessments of shadow flicker, noise, visual impact, traffic and transport, and ecological impacts (particularly on birds), as detailed in other sections of this EIAR.

5.2.3.4 TURBINE FOUNDATIONS

Each wind turbine will have a reinforced concrete foundation installed below the finished ground level; a typical construction of a wind turbine base is presented in Figure 5-6. The size and shape of the foundation will be determined by the turbine manufacturer based on the site's geotechnical conditions, with the final turbine selection being subject to a competitive tender process. Turbine foundations may vary in shape—ranging from circular to hexagonal or square—depending on the requirements of the selected turbine model. The EIAR has assessed a foundation area and material volume sufficient to accommodate these modern turbine models. The foundation will transmit the loads from the turbine to the ground.

Once the foundation level is established on competent strata or by using piling methods, the bottom section of the turbine tower, known as the "Anchor Cage," is levelled. Reinforcing steel is then installed around and through the anchor cage (Figure 5-6). The foundation is enclosed with demountable formwork for concrete pouring and is subsequently backfilled with appropriate granular fill or ballast up to the finished surface level. The reinstated ballast material will provide a stoned running surface for maintenance vehicle access.

Figure 5-6: Typical Construction of a Wind Turbine Base *(Source: www.windsystemsmag.com)*

5.2.3.5 HARD STANDING AREAS

Hard-standing areas, consisting of levelled and compacted hardcore, are necessary around each turbine base to support access, turbine assembly, and erection. These areas are typically used for crane operations involved in the assembly and erection of the turbine, as well as for the offloading and storage of turbine components, providing a safe and level working environment around each turbine location. The hard-standing areas extend to cover the turbine foundations once they are in place. A typical finished hardstand area is presented in Figure 5-7.

The dimensions, arrangement, and positioning of these hard-standing areas are determined by the turbine suppliers. Consequently, this EIAR assesses the total area within which the hard-standing areas will be located. The areas are designed to accommodate a crane for turbine assembly and erection. The proposed hard-standing areas, as shown in the layout drawings included in planning drawings pack, are indicative of the required sizes. However, the final extent of the hard standing areas at each turbine location may be refined on-site within the area assessed in this EIAR, based on factors such as topography, the location of site access roads, ground investigation, turbine positioning, and the specific requirements of the turbine supplier.

Figure 5-7: Typical finished Hardstand on a Wind Farm (*Source: www.windfarmbop.com*)

5.2.3.6 ASSEMBLY AREA

Levelled assembly areas will be positioned on either side of the hard-standing area. These assembly areas are essential for the offloading of turbine blades, tower sections, and hubs from trucks until they are ready to be lifted into place by cranes, and to support the main crane during turbine assembly. The precise location and number of these assembly areas will be determined by the chosen turbine manufacturer. Therefore, this EIAR assesses a designated area within which the assembly areas will be situated.

5.2.3.7 POWER OUTPUT

The proposed wind turbines are expected to have a rated electrical power output ranging from 3 to 5.0 Megawatts (MW) per turbine. Variations in power output may occur for turbines of the same make and model, depending on the capacity of the electrical generator installed in the turbine nacelle. For the purposes of this EIAR, a rated output of 4.2 MW per turbine has been used to estimate the power output of the proposed 6-turbine wind farm, resulting in an anticipated installed capacity of around 25.2 MW.

Assuming a minimum installed capacity of 25.2 MW, the Proposed Development has the potential to generate approximately 90,000 megawatt hours (MWh) of electricity annually.

5.2.3.8 SITE ROADS

5.2.3.9 ROAD CONSTRUCTION TYPES

To provide access within the site of the Proposed Development and to connect the wind turbines and associated infrastructure, existing tracks will need to be upgraded, and new access roads will need to be constructed.

The Proposed Development makes use of the existing road network as much as possible. It is proposed to upgrade approximately 880m of existing site roads and tracks and to construct 360m of floated track and 3,350m of founded track for the delivery of the windfarm components.

5.2.3.10 UPGRADE TO EXISTING ROADS OR TRACKS

The existing tracks onsite were constructed using the excavate and replace construction technique. The general construction methodology used for upgrading existing sections of excavated roads or tracks is set out in the following bullet points:

- Excavation will be required on one or both sides of the existing access track to a competent stratum.
- Granular fill will be placed in layers in accordance with the designer's specification.
- The surface of the existing access track will be overlaid with up to 300mm of selected granular fill.
- Access roads will be finished with a layer of capping across the full width of the road.
- A layer of geogrid/geotextile may be required at the surface of the existing access road in areas of excessive rutting, to be confirmed by the onsite engineer during construction.
- For excavations in spoil, side slopes shall be not greater than 1 (v): 2. This slope inclination will be reviewed during construction, as appropriate.
- The finished road width will be 5m.
- On side long sloping ground, any road widening works required will be done on the upslope side of the existing access road, where possible.

- A final surface layer shall be placed over the existing access track, as per design requirements, to provide a suitable road profile and graded to accommodate wind turbine construction and delivery traffic.

5.2.3.11 CONSTRUCTION OF NEW EXCAVATED ROADS

Due to the ground conditions, new access tracks proposed on site are to be founded. The typical make-up of the founded access tracks is a minimum stone thickness of 400mm. The requirement for a layer of geotextile and geogrid and the necessary stone thickness will be confirmed during site engineering. The following methodology will be used:

- Interceptor drains will be installed upslope of the access road alignment to divert any surface water away from the construction area.
- Excavation will take place to a competent stratum beneath the topsoil (as agreed with the site designer and resident engineer).
- Road construction will be carried out in sections of approximately 50m lengths i.e. no more than 50m of access road to be excavated without re-placement with stone fill.
- The surface of the excavated access roads will be overlaid with up to 400mm of selected granular fill. Granular fill will be placed in layers in accordance with the designer's specifications.
- Access roads will be finished with a layer of capping across the full width of the road.
- A layer of geogrid/geotextile may be required at the surface of the competent stratum.
- A final surface layer shall be placed over the excavated road, as per design requirements, to provide a suitable road profile and graded to accommodate wind turbine construction and delivery traffic.

5.2.3.12 CONSTRUCTION OF NEW FLOATING ROADS

Proposed Development will be necessary to construct floating roads over peat at a number of points within the Proposed Development Boundary. Where it is proposed to install floating access roads over the peat, a confirmatory stability analysis to affirm the conditions predicted in this EIAR will be carried out by the designer prior to any construction work commencing on site.

Floating roads minimise impacts on peat, particularly on peat hydrology, as no excavation is required and no peat arisings are generated. The following is the general construction methodology for the construction of floating roads/tracks shall be.

- Prior to commencing floating road construction, movement monitoring posts will be installed in areas where the peat depth is greater than 3m.
- Base geogrid will be laid directly onto the existing peat surface along the line of the road in accordance with the geogrid provider's requirements.
- The typical make-up of the new floated access road is a minimum of 800mm of selected granular fill with 2 no. layers of geogrid, with possibly the inclusion of a basal layer of tree trunks/brash.

- Granular fill will be placed in layers and compacted in accordance with the TII Specification for Road Works.
- During construction of the floated access roads, it may be necessary to include pressure berms on either side of the access road in some of the deeper/weaker peat areas. The inclusion of a 2 to 5m wide pressure berm (typically 0.5m in height) on either side of the access road at such locations will reduce the likelihood of potential bearing failures beneath the access road.
- The finished running width of the road will be 5m, with wider sections on bends and corners.
- Stone delivered to the floating road construction shall be end-tipped onto the constructed floating road. Direct tipping of stone onto the peat shall not be carried out.
- To avoid excessive impact loading on the peat due to concentrated end-tipping, all stone delivered to the floating road shall be tipped over at least a 10m length of the constructed floating road.
- Where it is not possible to end-tip over a 10m length of constructed floating road due to the presence of weak deep peat, then dumpers delivering stone to the floating road shall 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.
- Following end-tipping, a suitable bulldozer shall be employed to spread and place the tipped stone over the base geogrid along the line of the road.
- A final surface capping layer shall be placed over the full width of the floating road, as per design requirements, to provide a road profile and be graded to accommodate wind turbine construction and turbine delivery traffic.

5.2.3.13 BORROW PIT

Two on-site borrow pits have been identified as the primary sources of fill material required for the construction of internal access roads, passing bays, hardstands, foundations, and temporary compounds. It is estimated that 55,620 m³ of stone aggregate will be extracted from these borrow pits.

5.2.3.14 BORROW PIT DESIGN

- Rock extraction will be carried out using either breaking or blasting, depending on material suitability, confirmed through ground investigations including rotary core drilling, RQD assessment, and strength testing.
- Borrow pit bases will generally be below adjacent access roads, but levels may be adjusted based on site conditions, with localised deepening where required.
- Where feasible, intact rock segments will be retained within the borrow pit to act as engineered rock buttresses for spoil retention.
- Excavated rock slopes will be formed at stable inclinations, with exposed sections left irregular to encourage re-vegetation and blend with the landscape.

- Rock face stability will be inspected by competent personnel to identify and mitigate any unfavourable conditions, including the removal of loose rock.
- If intact rock segments cannot be retained, engineered rock buttresses will be constructed using rock fill from the excavation, with the founding stratum inspected and approved prior to placement.

Borrow Pit 1 (BP1) located approximately 280 metres to the southwest of T03, measures 10,263 m2 in area and is intended to supply hardcore materials for the construction of access roads, the grid connection, temporary construction compound and the handstand.

Borrow Pit 2 (BP2) located approximately 72 metres to the north of T01, measures 7,848 m2 in area and is intended to supply hardcore materials for the construction of access roads there, the grid connection, temporary construction compound and the handstand.

All borrow pits are shown in Figure 5-8 and Figure 5-9 and on the detailed site layout drawings included as part of the planning documentation pack. Figure 5-8 and Figure 5-9 show detailed sections through the proposed borrow pits. The borrow pits will, on removal of all necessary and useful rock, be reinstated with excavated subsoils. Post-construction, the borrow pits areas will be reinstated using spoil excavated onsite, leaving no excessive embankments, leaning edges or angles of repose. The reinstated borrow pits will be capped with a 3-500 mm layer of topsoil and replanted as appropriate to each location.

Hardcore materials required for construction will primarily be sourced from the borrow pits and, if necessary, from selected turbine locations. Rock extraction will be undertaken principally through rock breaking, with blasting considered as an alternative where larger volumes of material are required. If blasting is deemed necessary, it will be carried out as a more efficient extraction method, capable of generating significant volumes of rock within milliseconds. Local residents will be notified in advance of any blasting activities. Potential noise and vibration impacts associated with rock extraction, including both rock breaking and blasting, are assessed in Chapter 13: Noise & Vibration of this EIAR.

5.2.3.15 ROCK EXTRACTION METHODS

The extraction of rock from the borrow pits is a temporary activity within the overall construction phase of the Proposed Development, undertaken over a limited duration. Where present, overburden will be stripped and stockpiled using tracked excavators. Any stockpiled material will be shaped and sealed to a suitable height, with retaining bunds incorporated where necessary.

Two methods have been considered for rock extraction: *rock breaking* and *blasting*, as outlined below.

Rock Breaking

Rock breaking will be employed where weathered or fragmented rock can be extracted using a hydraulic excavator with a ripper attachment. This method allows for careful excavation in layers by a skilled operator. Where stronger, more intact rock is encountered and cannot be removed through standard excavation, a hydraulic rock breaker will be used. Typically, a 40–60 tonne hydraulic excavator with a rock breaker attachment will be deployed, supported by a smaller (20–40 tonne) excavator to break extracted material into manageable sizes.

Excavated rock will be loaded into a mobile crusher using a wheeled loading shovel, where it will be processed into graded stone for on-site civil works. The processed stone will then be transported and stockpiled for future use within the development.

Rock Blasting

Where required, blasting will be undertaken as an alternative extraction method to facilitate the efficient removal of competent rock. This process involves the use of a mobile drilling rig to bore vertical blast holes in accordance with the specifications determined by a qualified blast engineer. A single blast typically requires several days of drilling to prepare the necessary boreholes.

Once the drilling phase is complete, the blast engineer will coordinate the delivery of explosives to site and oversee the controlled detonation, ensuring compliance with all safety protocols. The blasting process is conducted under the supervision of A Garda Síochána, with all necessary precautions in place to manage safety and minimise disturbance. The detonation itself occurs within milliseconds, although blast noise may appear prolonged due to echo effects in the surrounding environment.

Properly executed blasting will produce rock fragments of a size suitable for direct loading into a mobile crusher, following the same processing method as rock extracted via rock breaking. Subsequent blasting operations will be prepared as required, ensuring a continuous cycle of drilling, blasting, and material processing.

The potential noise and vibration impacts associated with rock extraction are assessed in Chapter 13: Noise and Vibration of this EIAR.

Health and Safety Compliance

All rock extraction activities will be undertaken in compliance with relevant health and safety regulations, including:

- Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005)
- Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007), as amended
- Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013), as amended
- Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006)

A Health and Safety Plan will be developed covering all aspects of the construction process, detailing risk assessments, hazard identification, and appropriate mitigation measures. Further details on health and safety considerations throughout the project lifecycle are provided in Chapter 7: Population and Human Health of this EIAR.

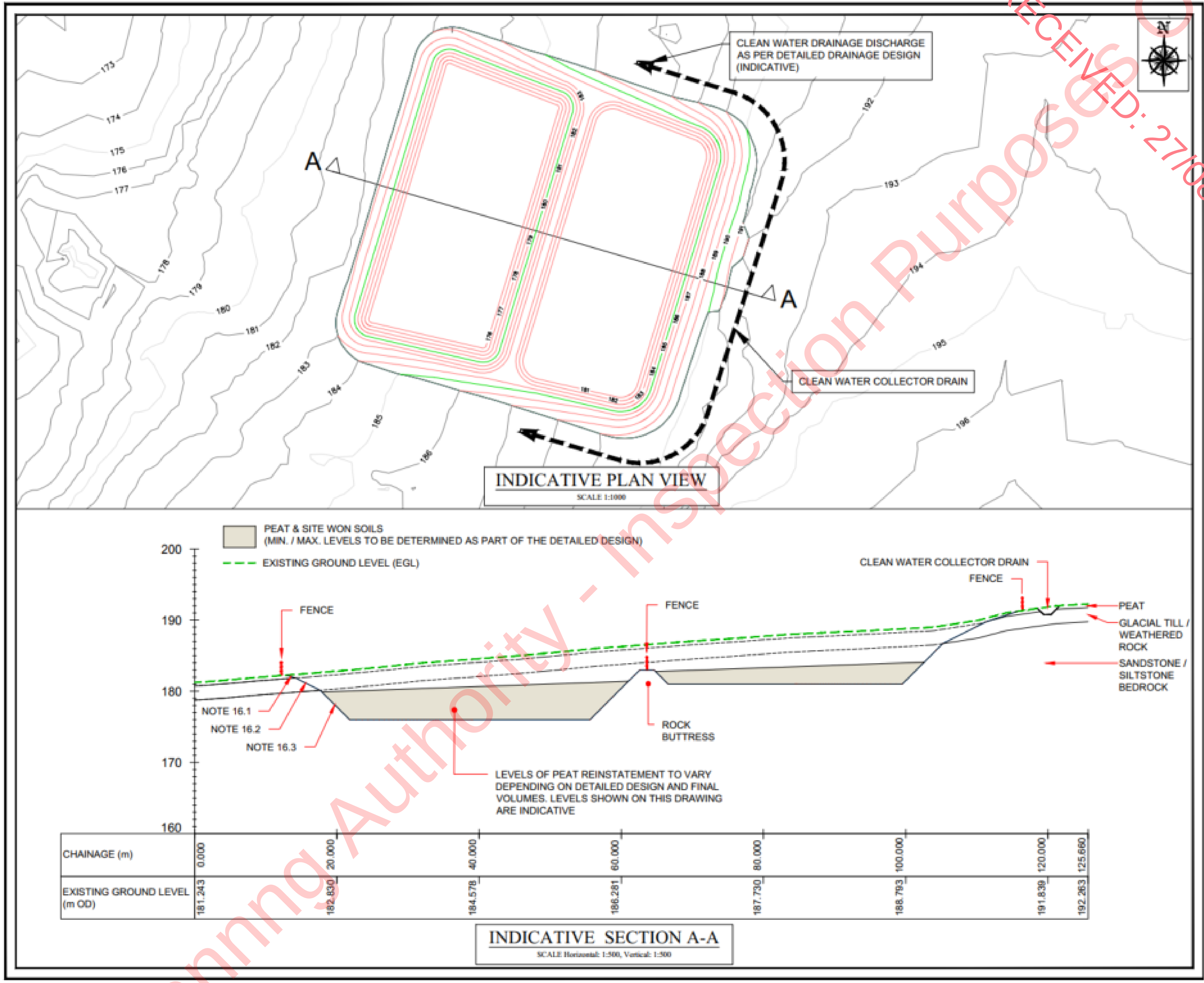


Figure 5-8:Plan and section view of Borrow Pit 1

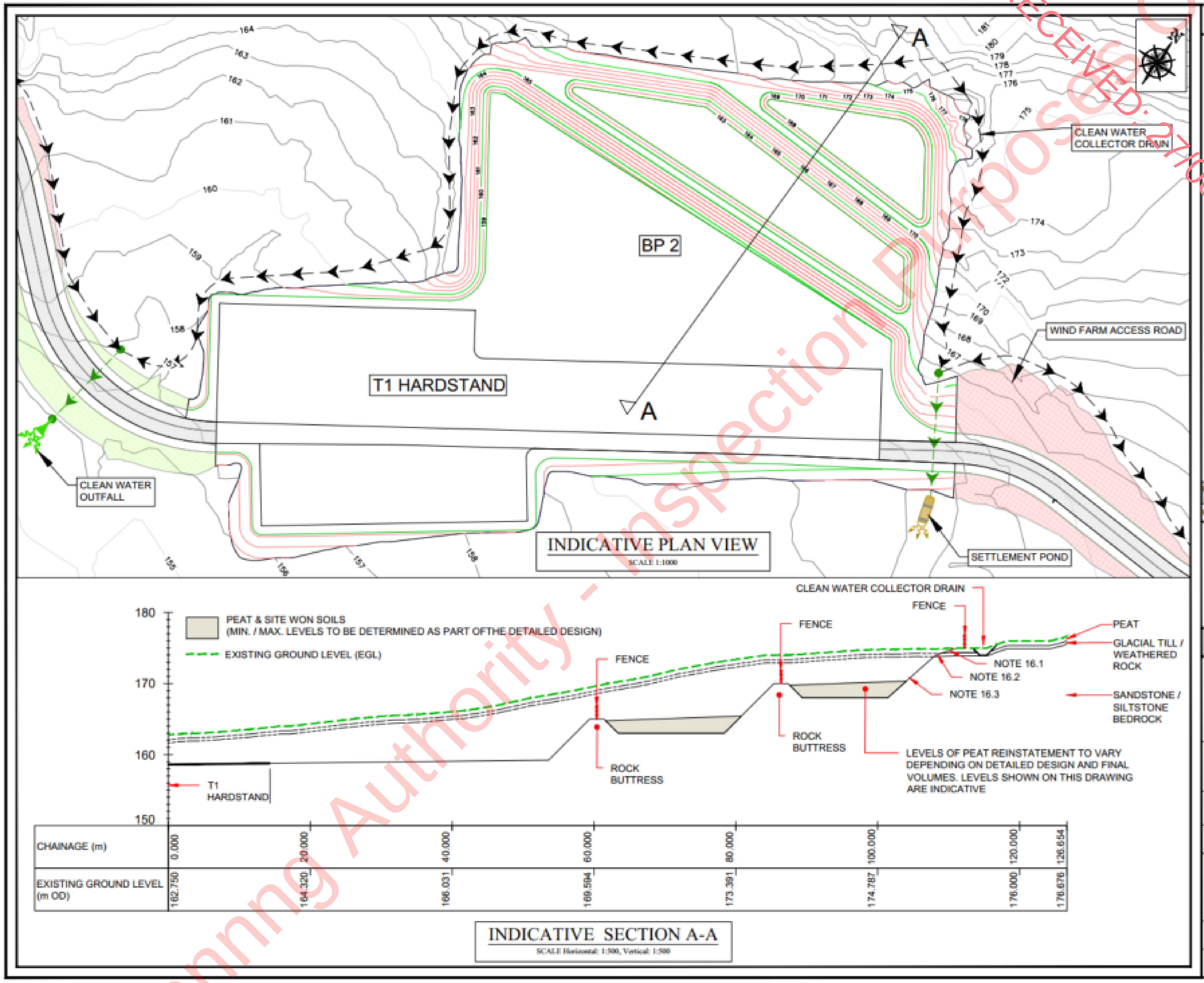


Figure 5-9: Plan and section view of Borrow Pit 2

5.2.3.16 OFFSITE MATERIAL

The majority of the rock and hardcore material required for the construction of the Proposed Development is intended to be sourced from the on-site borrow pits, as previously outlined. However, additional rock and hardcore material may need to be sourced off-site. It is also anticipated that a certain volume of finer, crushed stone, required for the final surface layer of site roads and hard-standing areas, will be imported from local, appropriately authorised quarries.

5.2.3.17 PEAT AND SPOIL MANAGEMENT

5.2.3.18 QUANTITIES

The quantity of peat and spoil, requiring management on the site of the Proposed Development, has been calculated, as presented in Table 5-2. These quantities were calculated as part of the Peat and Spoil Management Plan in Appendix A09-01 of this EIAR.

Table 5-2: Quantities of Peat, Spoil and Rock

Infrastructure Item		Excavated volume (m^3)					Fill Volume (m^3)		Reinstated Peat Volume (m^3)
		Total volume of Peat	Total volume of Glacial Till	Total Volume of Soft Silt/Clay	Total volume of Rock	Bulk Fill (Class 1/2 (m^3)	Stone Volume (Site Won) (m^3)	Stone Volume Imported (m^3)	
WTGs foundation		2670	-	1110	9260	-	-	8930	720
Floated Access Roads	New roads	-	-	-	-	-	1780	-	-
Founded Access roads	Existing roads	6680	-	-	-	1774	2170	1580	2200
	New roads	22260	11020	2990	-	19094	8350	-	4210
Hardstand		19390	26880	21880	11130	-	36220	22870	10030
Temporary compound		-	-	-	-	-	2920	-	600
Substation		1340	50110	-	-	-	-	1470	270
Borrow Pits		7100	-	-	54490	-	-	-	28980
Peat Repository Areas		-	-	-	-	-	4180	-	16140
Totals		59440	88010	25980	74880	20870	55620	34850	63150

5.2.3.19 SPOIL USAGE

Once the necessary volume of rock has been extracted from the borrow pit areas, these areas will be reinstated using overburden excavated from the development works.

During rock extraction, rock upstands will be left in place where feasible, based on the rock type, to act as intermediate retaining buttresses. If this is not possible, stone buttresses will be constructed within the borrow pit. These upstands or buttresses will create individual restoration cells within the pit, which will be filled once the required volume of rock has been removed from each section. The buttresses will be constructed wide enough to allow construction traffic to access and safely deposit spoil into each cell:

- As rock is extracted, upstands will be left in place, or where necessary, rock buttresses will be constructed on in-situ rock using rock fill from the borrow pit excavation. The foundation stratum for each buttress will be inspected and approved by a competent person.
- Buttress construction may need to be staged in line with spoil infilling. Selected rock fill will be placed and compacted in suitable layers to ensure the stability of the buttress in retaining the spoil.
- Spoil infilling will commence at the back of the borrow pit, progressing towards the entrance. The excavation process will be managed to ensure the safe placement of spoil.
- The height of the buttresses will exceed that of the placed spoil to prevent surface spoil run-off.
- Temporary access ramps and long-reach excavators may be used during spoil placement.
- The surface of the spoil will be contoured, where possible, to facilitate efficient surface water runoff.
- An interceptor drain will be installed upslope of the borrow pit to divert surface water away, preventing ponding on the restored area.
- Groundwater control measures, including temporary pumps and outfall locations, may be necessary during construction. Outfall control measures are detailed in the Drainage Design drawings included in the planning drawings pack of this EIAR.
- Stilling ponds may be required at the lower side or outfall of the borrow pit, with further details provided in the section 5.2.7.7
- The works will be supervised by a geotechnical engineer or other suitably qualified professional to ensure compliance with safety and design standards.

5.2.3.20 PLACEMENT OF PEAT AND SPOIL IN REPOSITORY AREA

Three suitable locations for peat and spoil repositories have been identified within the Proposed Development boundary, as presented in PRA1 is situated along the access track to the east of BP1, while PRA2 is located southeast of T05 along the access track. PRA3 is positioned along the access track to the north of T06. Further details on the peat landslide hazard risk assessment and peat management plan are provided in Appendices A09-01 and A09-02.

The repository area shall be constructed as follows:

- A maximum height of 1m of peat will be placed in the Repository.
- An interceptor drain will be installed around the perimeter of the Repository. The drain will divert any surface water away from the Repository and hence prevent water from ponding in the area.
- The surface of the stored peat will be shaped to allow efficient run-off of water from the stored peat.
- The edge of the stored peat shall be shaped at a slope of 1 (v): 5 (h). More intact peat (Acrotelm) will be used to form this slope.
- Low-bearing pressure machinery and bog mats will be required to place the peat in the Repository.
- Supervision by the project geotechnical engineer will be required for the construction of the Repository.

The management of excavated peat and overburden and the methods of placement and/or reinstatement are described in detail in the Peat and Spoil Management Plan in Appendix A09-01 of this EIAR.

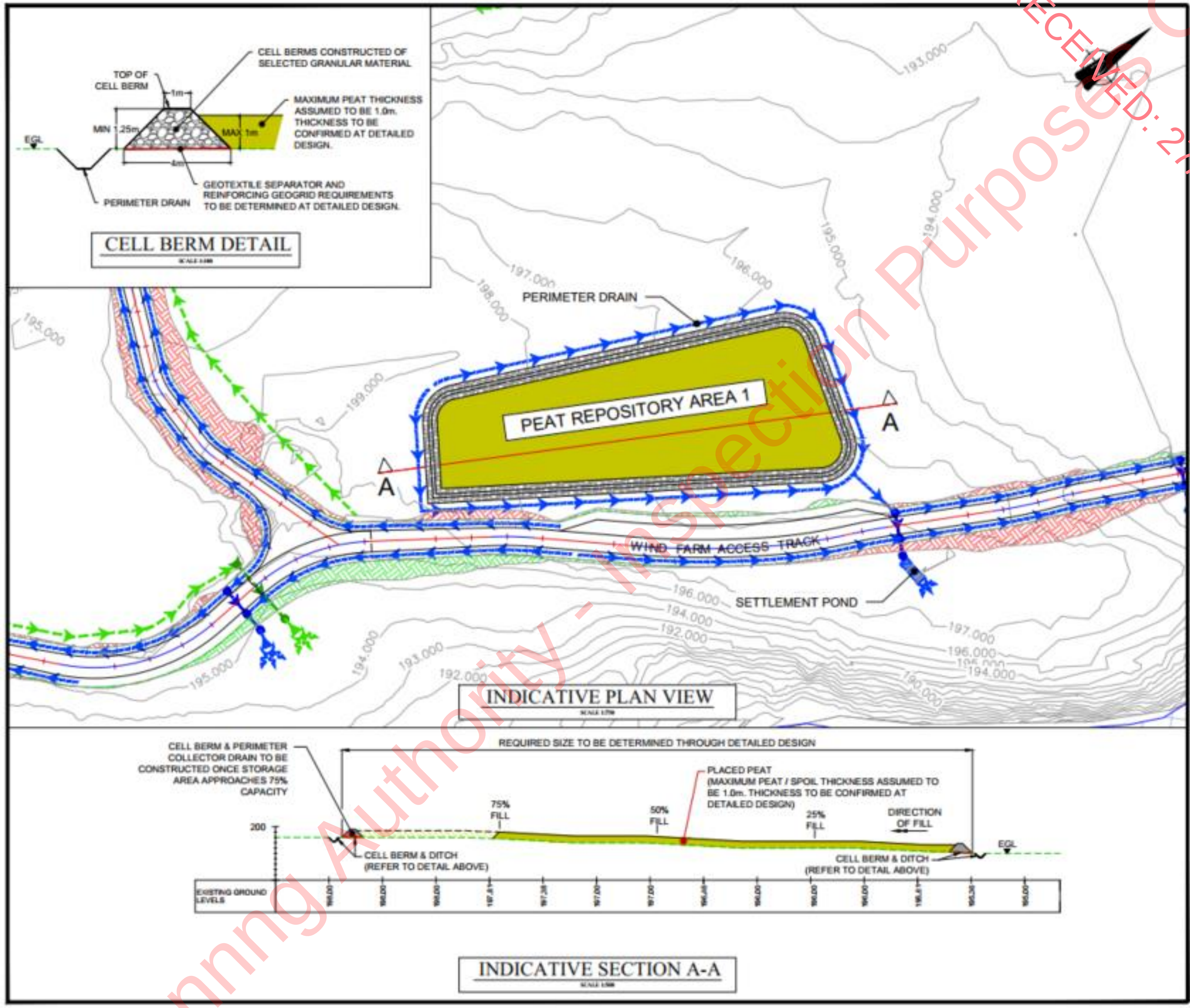


Figure 5-10: Plan view section of PRA 1

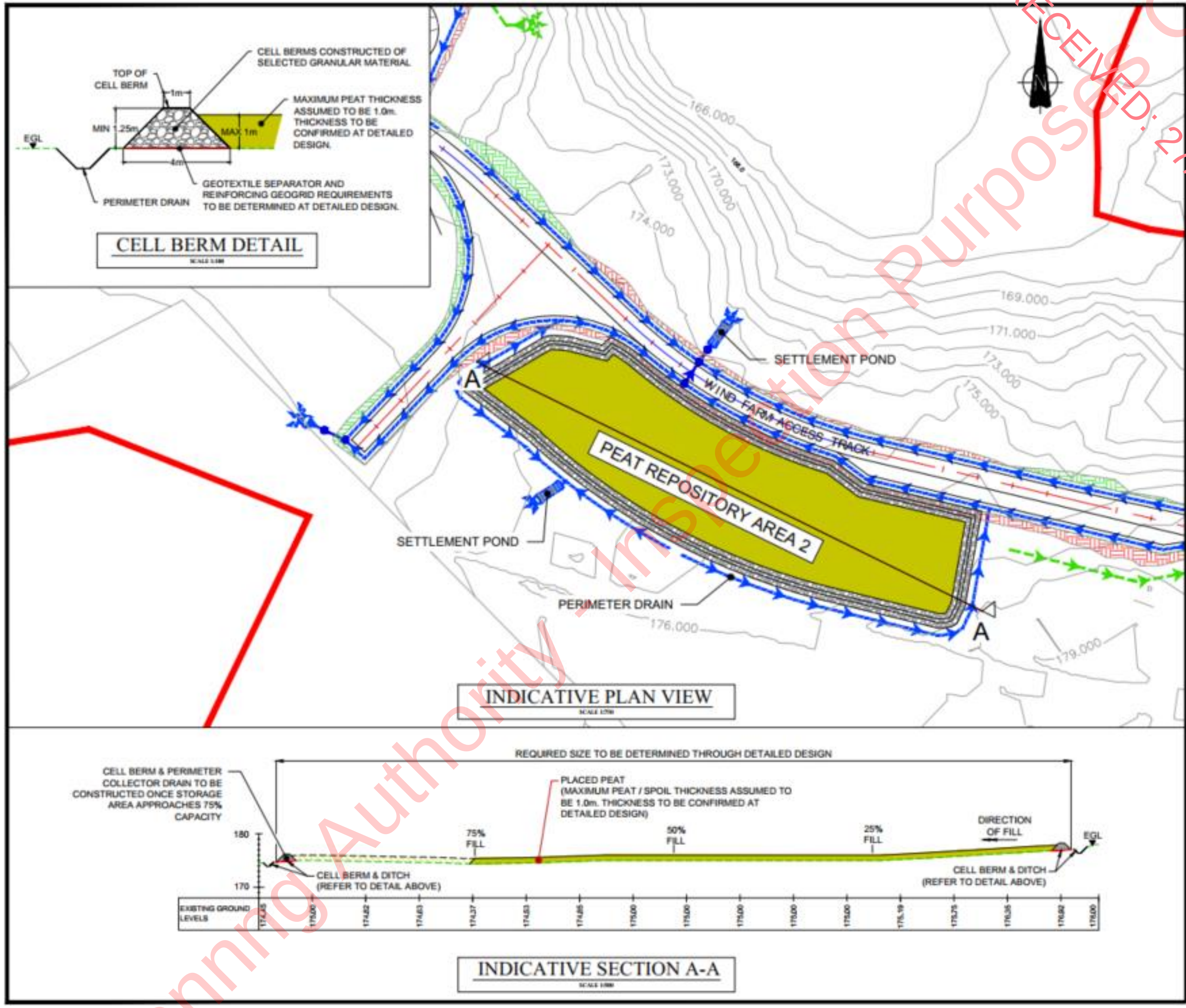


Figure 5-11: Plan view section of PRA2

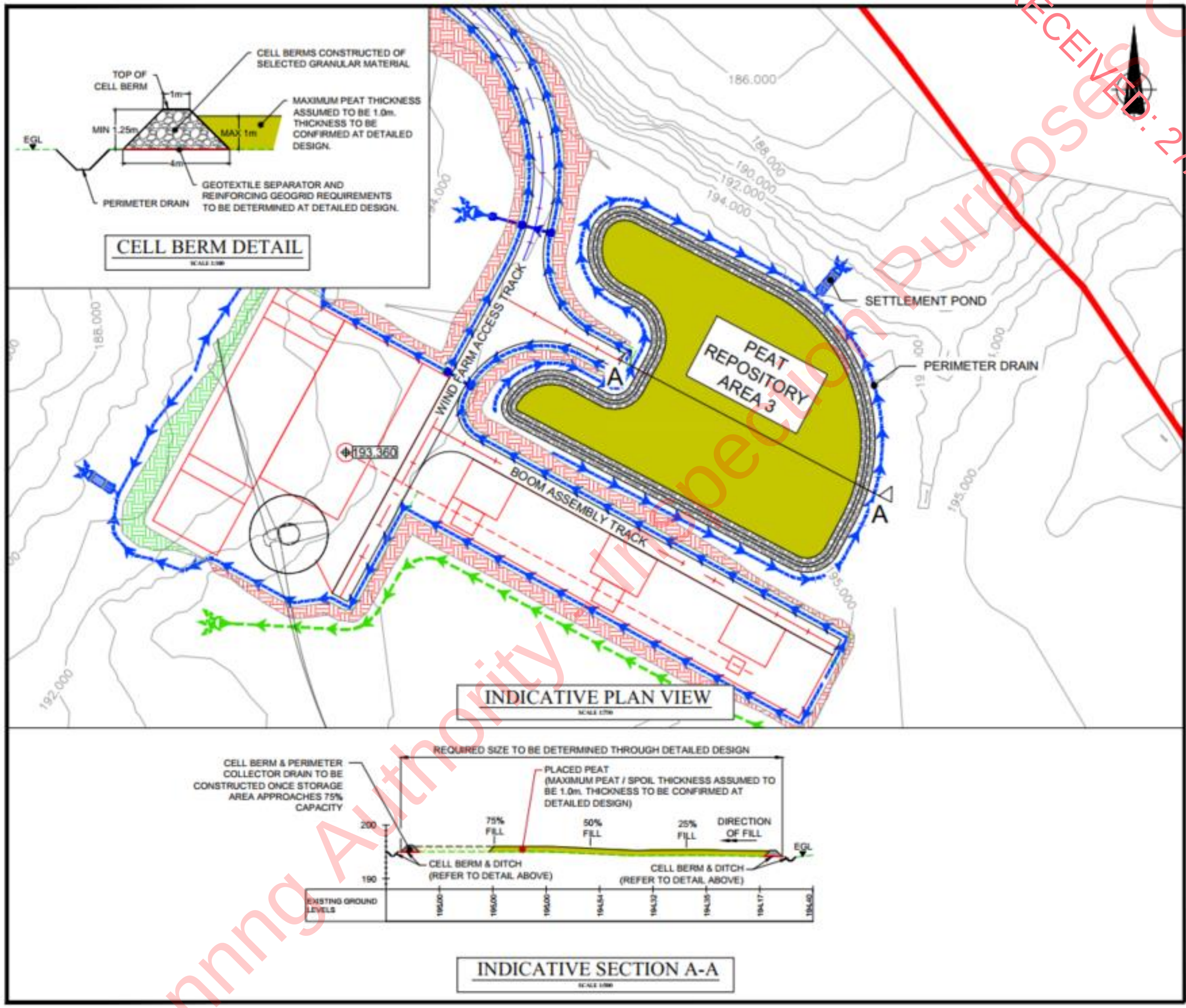


Figure 5-12: Plan view sections of PRA 1-3

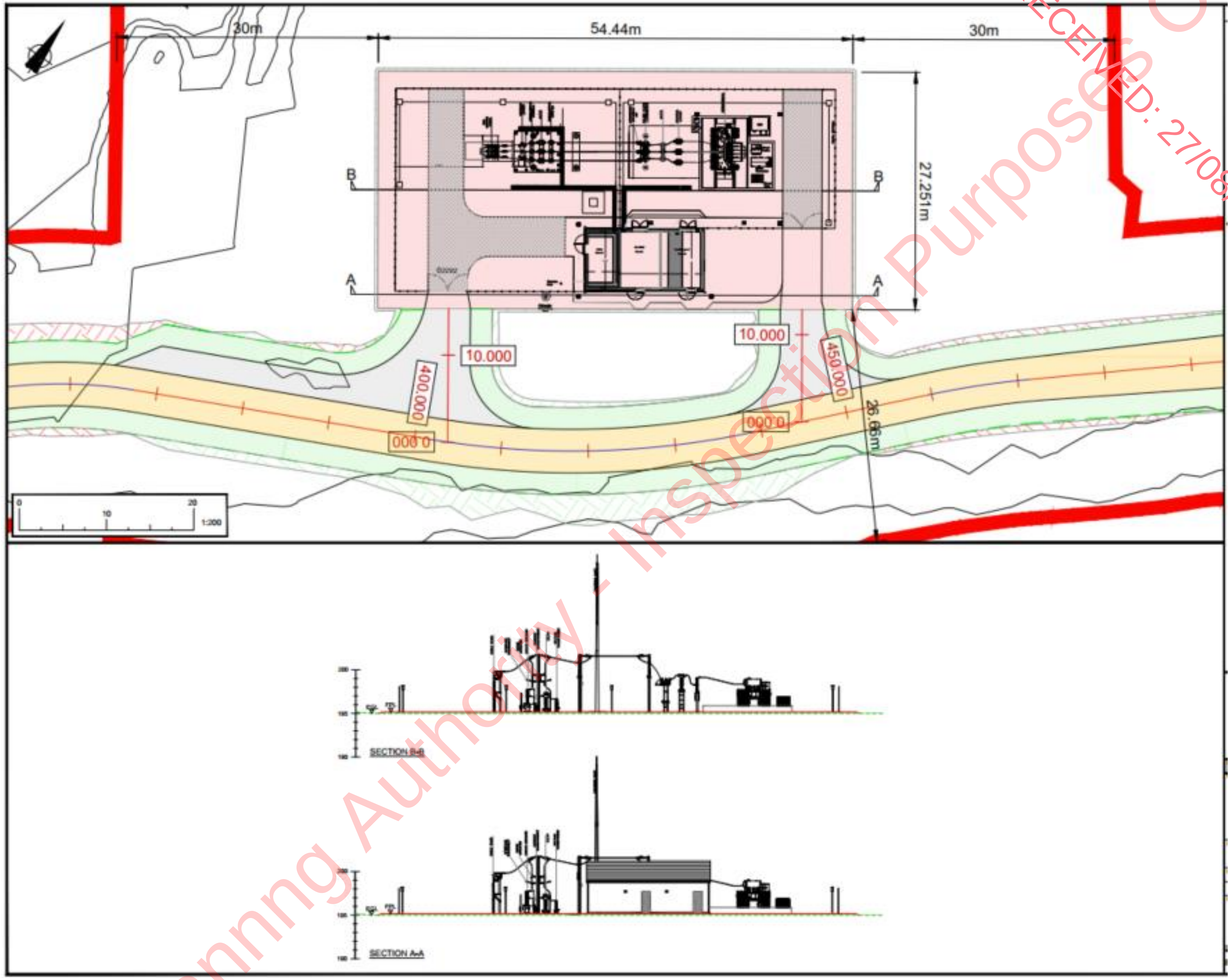


Figure 5-13: Proposed Onsite 38kV substation

5.2.3.21 ELECTRICAL SUBSTATION

The proposal includes the construction of a 38 kV electrical substation on-site, as shown in Figure 5-13 and will be located adjacent to an existing access road.

The substation compound will cover an area of approximately 0.45 hectares. It will accommodate one control building and the essential switchgear equipment needed to consolidate and transmit the power generated by the wind turbines to the national grid. The layout and elevations of the substation are detailed in Figure 5-13. The design and installation of the electrical equipment will comply with the specifications of ESB Networks.

The substation will be enclosed by a 2.6-metre-high steel palisade fence, following standard ESB guidelines. Internal fencing will also be used to segregate different areas within the compound.

5.2.3.22 WIND FARM CONTROL BUILDINGS

The wind farm control building will be situated within the substation compound and will cover an area of 100.1 square metres with a roof ridge height of 6.035metres.

The control building will include staff welfare facilities for personnel Proposed Development during the Proposed Development's operational phase. The facilities will feature low-flush toilets and low-flow wash basins, reflecting the minimal water usage required for occasional flushing and hand washing. Consequently, the project does not require a potable water source. Instead, rainwater harvesting from the roofs of the buildings will be employed, and bottled water will be provided for drinking if necessary.

Wastewater from the staff welfare facilities will be managed via a sealed storage tank. All wastewaters will be removed from the site by a licensed waste collector and transported to a wastewater treatment plant. On-site wastewater treatment is not proposed, and thus, the EPA's 2009 *Code of Practice: Wastewater Treatment and Disposal Systems Serving Single Houses (p.e. 10)* and the EPA's 1999 manual on *Treatment Systems for Small Communities, Business, Leisure Centres and Hotel* are not applicable. These documents address scenarios involving on-site treatment, which is not part of this proposal.

Managing wastewater through off-site treatment has become a standard practice at wind farm sites, particularly in areas where on-site treatment would be difficult due to percolation challenges. This approach is widely accepted by Planning Authorities and An Coimisiún Pleanála.

The proposed wastewater storage tank will be equipped with an automated alarm system to signal when the tank needs emptying. This alarm will be integrated into a continuous monitoring system for the Proposed Development's turbines, wind measurement devices, and electricity substation, which will be monitored remotely 24/7. Only waste collectors with valid permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended) will be employed to transport wastewater to licensed facilities.

5.2.3.23 SITE CABLING

Each turbine will be connected to the on-site electrical substation via underground cables with a voltage level of 38kV. Additionally, fibre-optic cables will link each wind turbine to the wind farm control building within the substation compound. These cables will be installed in ducts approximately 1.5 metres below the ground surface, running along the edges of roadways. The cable ducts will follow the access tracks to each turbine location, as shown in the site layout drawings included in the planning application drawings pack. Figure 5-14 illustrates two types of cable trenches: one for off-road trenches, installed in soft ground areas not subjected to vehicle traffic, and one for on-road trenches, used where trenches cross or run under roadways.

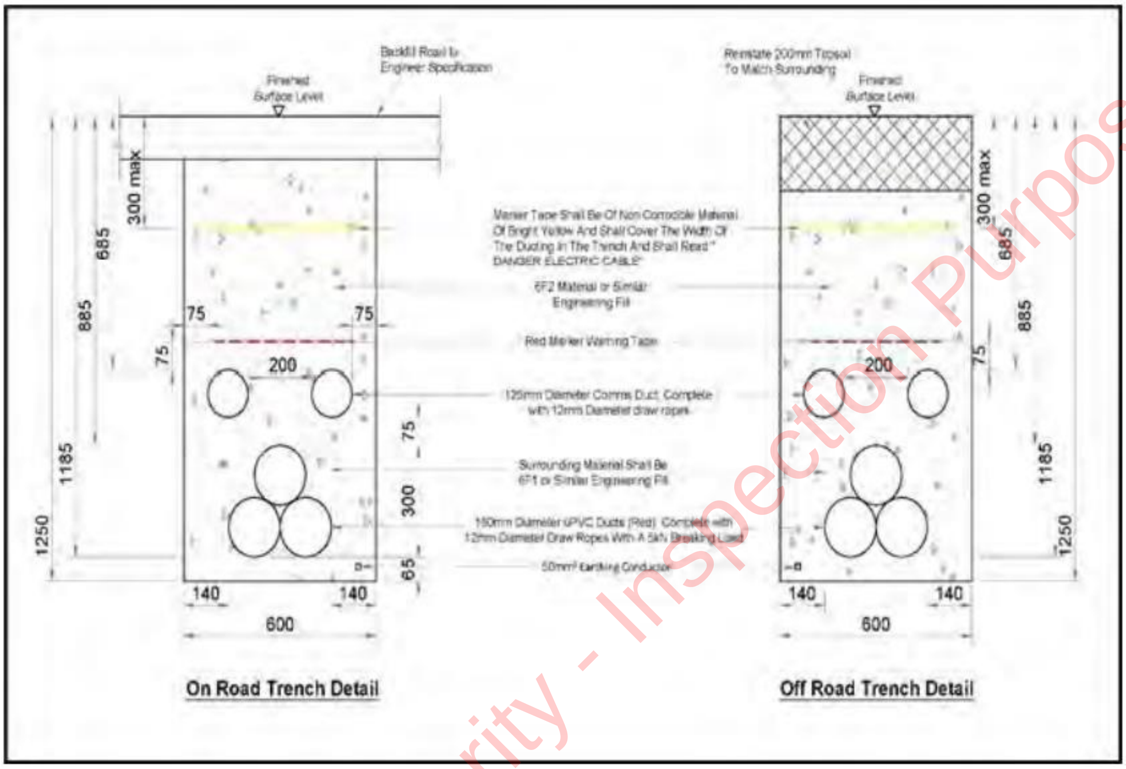


Figure 5-14: Typical Cable Trench Cross section

Clay plugs will be placed at intervals not exceeding 50 metres along the trenches to prevent water runoff. Most cable trenches will be backfilled with native material, but clay subsoils with low permeability will be used where necessary to prevent conduit flow in the backfilled trenches. If the excavation phase does not yield sufficient clay subsoils, additional material will be imported to the site. The cable, ducting, and trenching specifications provided in this chapter adhere to ESB Networks standards.

5.2.4 GRID CONNECTION

A connection to the national electricity grid is required to facilitate the export of electricity from the proposed wind farm. The development includes the construction of a 38 kV on-site substation, which is expected to connect to the 110 kV Slievecallan Substation via an underground cable. The assessment of the final grid route will be undertaken at later stages of the project and a planning application submitted at the appropriate time. The proposed grid connection route is illustrated in Figure 5-15

5.2.5 TEMPORARY CONSTRUCTION COMPOUND

The Proposed Development includes a single temporary construction compound, located south of Turbine 3. The compound will measure 80 metres by 50 metres, with a total area of 4,000 m^2. Its location is shown in the site layout drawing.

The compound will feature temporary site offices, staff facilities, and car parking areas for staff and visitors. Construction materials and turbine components will be transported directly to the turbine locations following their delivery to the site.

During the construction phase, temporary port-a-loo toilets within a staff portacabin will be used. Wastewater from these toilets will be collected in a sealed storage tank and removed from the site by a licensed waste collector for treatment at a wastewater treatment facility.

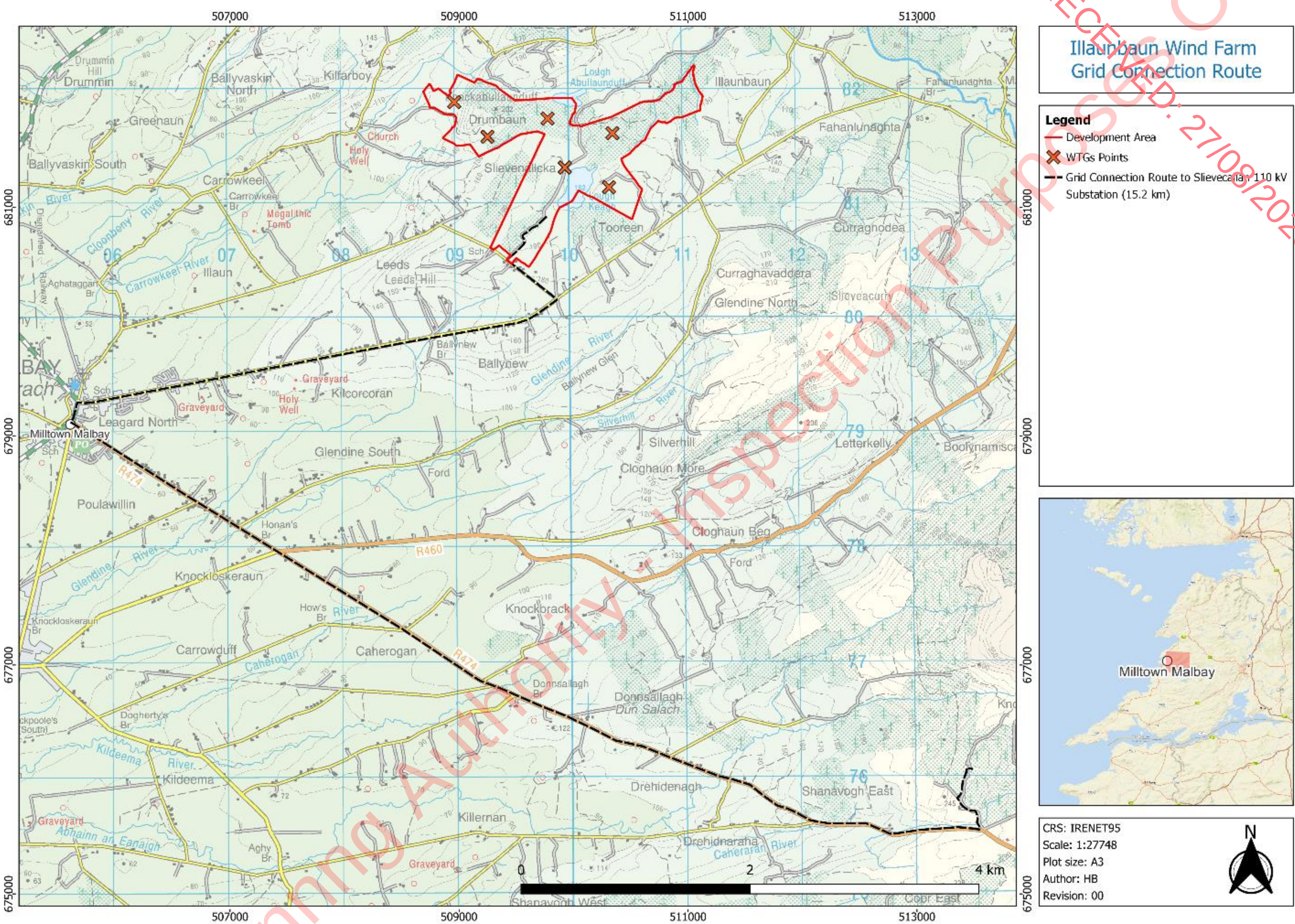


Figure 5-15:Proposed Grid Connection Route

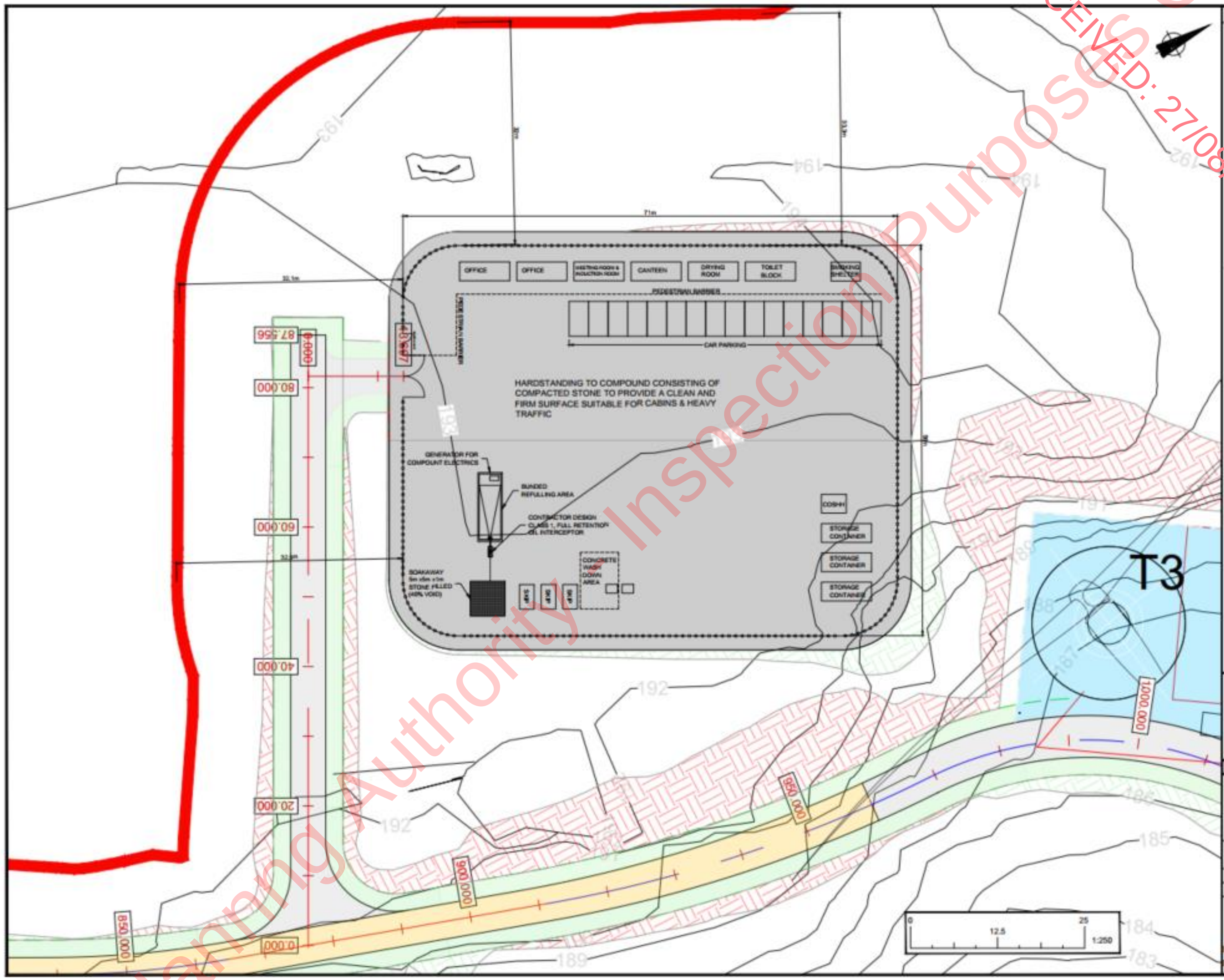


Figure 5-16: Temporary Construction Compound Layout

5.2.6 TREE FELLING AND REPLANTING

5.2.6.1 TREE FELLING

The majority of the proposed wind farm site is currently used for commercial forestry. To facilitate the construction of turbine bases, access roads, and other associated infrastructure, tree felling will be necessary within and around the development footprint.

It is important to highlight that the forestry on the proposed wind farm site is a commercial crop that will be felled in the future, regardless of whether the wind farm proceeds or not.

In total, 11.59 hectares of forestry will need to be permanently felled within and around the development area. The areas designated for felling as part of the Proposed Development are further discussed in detail in Chapter 20: Forestry.

The tree felling activities required for the Proposed Development will be subject to a Felling Licence application to the Forestry Service, in line with the Forestry Act 2014 and the Forestry Regulations 2017 (SI 191/2017). This will follow the Forest Service's policy on issuing felling licences for wind farm developments, which stipulates that a copy of the planning permission for the wind farm must be included with the felling licence application. Consequently, the felling licences cannot be applied for until planning permission for the Proposed Development has been granted.

5.2.6.2 FORESTRY REPLACEMENT

In accordance with the Forestry Service's established policy on issuing felling licences for wind farm developments, any areas cleared of forestry for turbine bases, access roads, or other wind farm-related purposes must be compensated by replanting at an alternative location.

The estimated 11.59 hectares of forestry that will be permanently felled for the development of turbines and infrastructure will be reforested on a hectare-for-hectare basis, as required by any felling licence issued for the proposed wind farm. Replanting is a statutory requirement under the Forestry Act and is primarily managed through the statutory licensing process overseen by the Forest Service.

Details of the proposed replanting sites will be available following the approval of the forestry licence. An assessment of the replanting lands, including potential and cumulative impacts associated with afforestation in the identified locations, will be carried out at later stages of the project. The development works will not be commenced until felling & afforestation licences are secured to ensure alternative afforestation land is identified and assessed suitably.

5.2.7 SITE ACTIVITIES

5.2.7.1 ENVIRONMENTAL MANAGEMENT

All activities within the Proposed Development Boundary will be governed by an environmental management plan. An outline Construction and Environmental Management Plan (oCEMP) has been prepared for the Proposed Development and is included in Volume V of this EIAR. The oCEMP outlines the key environmental considerations that the contractor must address during the construction phase. It also details the mitigation measures required to meet the environmental commitments specified in this EIAR, with which the contractor will be contractually bound to comply. Additionally, the oCEMP includes a Waste Management Plan and an Emergency Response Plan, with further details on waste management provided in Section 5.2.7.10 of this chapter.

Should planning permission be granted for the development, the oCEMP will be updated prior to construction to incorporate any relevant planning conditions, including additional mitigation measures required, and will be submitted to the Planning Authority for written approval in advance of the commencement of activities.

5.2.7.2 REFUELLING

Wherever possible, vehicles will be refuelled off-site, particularly for standard road vehicles. However, for construction machinery that will remain on-site throughout the project, a limited quantity of fuel will need to be stored on-site within bunded areas.

Only designated, trained, and competent personnel will be authorised to refuel machinery on-site. During all refuelling activities, mobile measures such as drip trays, spill kits, and fuel absorbent mats will be employed to mitigate any potential environmental impacts.

5.2.7.3 CONCRETE DELIVERIES

Only ready-mixed concrete will be utilised during the construction phase, with all concrete being supplied from offsite batching plants in sealed delivery trucks. The existing concrete suppliers within a 25-kilometre radius of the Proposed Development boundary are located in Cappagh and Midleton. The final selection of suppliers will be determined through procurement agreements ahead of construction.

The use of ready-mixed concrete will mitigate any potential environmental risks associated with on-site batching. Upon delivery, only the chute of the concrete truck will be cleaned using the minimal amount of water necessary before leaving the site. The cleaning areas will be covered when not in use to prevent rainwater accumulation. During dry periods, these areas may be uncovered to allow water to evaporate. After the concrete pours, any remaining liquid will be taken off-site by tanker. Any solid residue from the chute will solidify and will be broken up and disposed of with other construction waste.

Due to the volume of concrete required for each turbine foundation and the need for continuous pours, deliveries may occur outside of normal working hours. This approach helps to minimise traffic disruptions, particularly during peak school and work commuting times. These activities will be limited to the day of the turbine foundation concrete pour, which is typically completed in a single day per turbine.

The risk of pollution from concrete deliveries will be further mitigated through the following measures:

- Concrete trucks will not be washed out on-site, except for the chute, as described above. Instead, they will return to the batching plant for a full washout.

- Site roads will be constructed to a high standard, ensuring that concrete trucks can access all necessary areas. No concrete will be transported around the site in open trailers or dumpers, avoiding spillage during transport.
- Concrete will be pumped directly into the shuttered formwork from the delivery truck. If this is not feasible, the concrete will be transferred via a hydraulic pump or an excavator bucket to the required location.
- Concrete delivery arrangements, including route planning and emergency procedures, will be coordinated with suppliers before work commences. On-site washout will be prohibited.
- Prominent signage will be displayed near concrete pour areas, clearly indicating that washout of concrete lorries is not permitted on-site.
- Concrete trucks will be fully washed out at the batching plant, where facilities are already in place.

Any small volume of water generated from the washing of the concrete lorry's chute will be directed into a temporary, lined, impermeable containment area, located on flat ground at least 50 metres from any watercourses, or into a Silt buster-type concrete wash unit or equivalent. This type of unit captures solid concrete and filters the wash liquid for pH adjustment and further solids separation. Residual liquids and solids will be disposed of off-site at an appropriate waste facility.

Where temporary lined impermeable containment areas are used, these are typically constructed using straw bales and lined with an impermeable membrane.

5.2.7.4 CONCRETE POURING

Given the scale of the primary concrete pours necessary for the Proposed Development, these pours will be meticulously planned well in advance, often days or even weeks ahead. To minimise the risk of pollution, special procedures will be implemented both before and during all concrete pours. These may include:

- Utilising weather forecasts to plan large concrete pours, avoiding such activities during predicted prolonged periods of heavy rain.
- Prohibiting concrete pumps and machine buckets from slewing over watercourses while placing concrete.
- Ensuring excavations are thoroughly dewatered before concreting commences and that dewatering continues as the concrete sets.
- Having covers readily available to protect freshly poured concrete from being washed away by heavy rain.
- Directing the small volume of water generated from washing the concrete lorry chutes into a temporary, lined, impermeable containment area, or a Silt buster-type concrete wash unit or equivalent.

- Disposing of any surplus concrete after the completion of a pour in inappropriate off-site locations, away from watercourses or sensitive habitats.

5.2.7.5 DUST SUPPRESSION

During prolonged dry spells, dust suppression may be required along haul roads to prevent dust from becoming a nuisance. If needed, water will be sourced from stilling ponds within the site's drainage system and pumped into a bowser or water spreader for dampening haul roads and site compounds to minimise dust generation. Water containing silt or oil will not be utilised for dust suppression, as this would spread pollutants onto haul roads, resulting in contaminated runoff or increased dust. The movement of water bowsers will be closely managed to ensure that excessive water application does not lead to increased runoff.

5.2.7.6 VEHICLE WASHING

Vehicle wheels and underbodies are typically washed before exiting construction sites to prevent the accumulation of mud on public and site roads. However, it is not expected that vehicle or wheel washing will be necessary during the construction phase of the Proposed Development. This is because site roads will be constructed before road-going trucks, such as those delivering steel or concrete, begin frequent or regular site access. The site roads will be well-prepared with compacted hardcore, ensuring that vehicles do not traverse soft or muddy surfaces that could lead to the accumulation of mud or dirt.

A road sweeper will be on standby to clean any sections of public roads that may become dirty due to construction traffic associated with the Proposed Development.

5.2.7.7 SITE DRAINAGE

A detailed desk study has been undertaken to assess the existing drainage features and inform the design of the Proposed Development. The layout has been carefully planned to ensure that natural drainage routes remain unaltered, with turbine locations and infrastructure elements selected to avoid natural watercourses. There will be no direct discharges to natural watercourses, and all discharges from proposed works areas or interceptor drains will be directed over vegetated ground at an appropriate distance from watercourses and lakes. Buffer zones around existing drainage features have been incorporated into the design of the Proposed Development and are reflected in the drainage design drawings in the planning drawings pack.

5.2.7.8 DRAINAGE DESIGN PRINCIPLES

Two distinct drainage management methods will be implemented within the site. The first aims to maintain the quality of clean water by avoiding disruption to natural drainage features, limiting works near artificial drains, and diverting surface water away from excavations and construction areas. The second method involves capturing drainage water from works areas where sediment may be present, facilitating attenuation and settlement before controlled diffuse release.

The drainage design has been developed to prioritise erosion control, reducing the need for sediment management during periods of heavy rainfall. This approach also minimises maintenance requirements and limits the extent of exposed ground. Measures will be in place to prevent runoff from adjacent areas from entering works zones, thereby reducing the volume of sediment-laden water requiring treatment. Any discoloured runoff from construction areas will be isolated from natural clean runoff to protect downstream water quality

5.2.7.9 DRAINAGE MANAGEMENT MEASURES

- Clean Water Cut-offs:

Clean water cut-offs will be installed upslope of work areas to capture and divert surface runoff, preventing it from entering excavations and construction zones. These drains will direct clean water around works areas and redistribute it as sheet flow over vegetated ground, minimising the volume of potentially sediment-laden runoff requiring management. Drains will be installed before construction begins, and where necessary, some may be retained post-construction, particularly along sloped road sections.

- Dirty Water Ditches:

Dirty water drains will be constructed downgradient of works areas to intercept and channel runoff from construction zones, preventing direct discharge to natural watercourses. These shallow drainage channels will collect potentially silt-laden water and direct it to sediment-trapping facilities. Swales will remain in place during the operational phase to manage runoff from roads and hardstanding areas.

- Check Dams:

Check dams will be installed at intervals along interceptor drains and swales to control flow velocity, prevent erosion, and promote sediment deposition. These structures, constructed from stone or straw bales, will be retained post-construction to manage flow in drainage channels, particularly in steep sections where erosion risks are higher.

- Outfall Spreaders:

Level spreaders will be used at the outlet of interceptor drains to convert concentrated flow into diffuse sheet flow across vegetated ground. These features will ensure that clean water is discharged without causing erosion or channelling, with locations selected based on ground conditions and slope gradients.

- Vegetation Filters:

Vegetated areas will be utilised to filter and diffuse clean surface runoff, allowing for natural infiltration and sediment capture. These filters will be strategically located downgradient of level spreaders, ensuring that water is dispersed effectively without re-concentrating into flow channels.

- Settlement Ponds:

Stilling ponds will be installed to slow runoff velocity, allowing sediment to settle before water is released as diffuse flow. Constructed as a two-stage system with primary and secondary ponds, they will be designed to accommodate peak storm flows. Settlement ponds are primarily a construction phase requirement, which may be kept or replaced with simpler outfall spreaders once vegetation is established and silts in run-off are reduced.

- Siltbuster Units:

Mobile siltbuster units will be available on-site to filter water pumped from excavation areas, ensuring the effective removal of fine particles before discharge. These temporary units will be deployed by the Contractor during the Construction as needed, particularly in areas with higher sediment loads.

- Silt Bags:

Silt bags will be used as a secondary filtration method, capturing fine sediment from water discharged via drainage channels. Located downgradient of stilling ponds, these geotextile bags will passively trap suspended solids before clean water is released. As with the above item Silt Bags are temporary measures, deployable during the Construction phase of the project.

- Sedimats:

Sediment entrapment mats, placed at discharge points, will provide an additional level of treatment by filtering residual fine particles from runoff. These biodegradable mats will be secured in place to prevent scouring and will complement other sediment control measures.

- Silt Fences:

Silt fences will be deployed at construction perimeters to capture sediment before it enters drainage systems. Installed in single or multiple stages depending on site conditions, these barriers will be maintained regularly to ensure effective sediment retention.

This structured approach to drainage management will ensure that runoff is effectively controlled, erosion risks are minimised, and water quality is protected throughout the construction and operational phases of the development.

Further details on drainage, water quality management, and flood risk are provided in Chapter 10: Hydrology, Water Quality, & Flood Risk.

5.2.7.10 WASTE MANAGEMENT

The outline Construction Environmental Management Plan (oCEMP), included in Volume V of this EIAR, contains a Waste Management Plan (WMP) detailing best practice procedures for waste management during the construction phase of the Proposed Development. The WMP outlines methods for waste prevention and minimisation through recycling, recovery, and reuse at each stage of construction, with disposal viewed as a last resort.

The Waste Management Act 1996, as amended, establishes measures to enhance performance in waste management, recycling, and recovery. It also establishes a regulatory framework to meet higher environmental standards required by national and EU legislation. The Act mandates that any waste-related activity must have all necessary licences and authorisations. It will be the responsibility of the Waste Manager on-site to ensure that all contractors engaged in waste removal possess valid Waste Collection Permits and that waste is delivered to a licensed or permitted facility. Both waste contractors and receiving facilities must comply with the terms of their respective permits and authorisations.

Before construction begins, the Contractor will appoint a Construction Waste Manager who will be responsible for implementing the WMP's objectives, ensuring all waste contractors have the required authorisations, and uphold the waste management hierarchy. The designated individual must have sufficient authority to ensure compliance with the management plan by all personnel working on the development.

The WMP will implement systems to record all movements, treatments, and origins of construction waste, allowing the Contractor to measure and document the volume of waste generated. This system will identify the primary sources of waste and allow performance tracking against targets, enabling the WMP to be adapted based on findings from the recorded data.

5.2.7.11 TURBINE AND CONSTRUCTION MATERIALS TRANSPORT ROUTE

For the Proposed Development, turbine components are expected to be delivered via either Foynes Port or Galway Harbour, with both route options assessed to determine the most suitable transport corridor to the site. The delivery routes for general HGV construction traffic will depend on the locations of suppliers for concrete and other essential materials required for construction. Further details on both the turbine delivery route and construction material transport, including necessary road widening and street furniture removal requirements, are provided in Chapter 19: Traffic & Transport of this EIAR.

5.2.7.12 TRAFFIC MANAGEMENT

The transportation of turbine components on public roads near the Proposed Development Boundary is not a routine activity. However, established procedures are in place for transporting abnormal loads on the country's roads. While each abnormal load transport operation is unique and requires careful planning, common measures include escort vehicles, traffic management plans, trial runs, road marshals, and convoy escorts from the Garda Traffic Corps to ensure safe passage from origin to destination. With over 350 wind farms operational across Ireland (both Republic and Northern Ireland)[1], the wind energy and specialist transport sectors have become highly skilled in overcoming transport challenges.

Should planning permission be granted for the Proposed Development, a Traffic Management Plan (TMP) will be prepared and address any relevant planning conditions, including additional mitigation measures if required.

The TMP will include:

- A delivery schedule;
- Details of required works or minor alterations; and
- A trial run of the route using vehicles of similar dimensions to those carrying turbine components.

Convoys will be escorted at both the front and rear using a "stop and go" system. While turbine delivery vehicles are large, they will not obstruct other road users or emergency vehicles if access is

[1] https://windenergyireland.com/about-wind/the-basics/facts-stats

required. Escort vehicles will ensure that the transport of turbine components is carried out safely and efficiently, minimising delays and inconvenience to other road users.

It is not anticipated that any sections of the public road network will need to be closed during turbine transport, although minor delays at pinch points may occur. Local traffic diversions may be implemented as needed during these times. All deliveries of abnormal loads will take place outside of peak traffic periods, predominantly at night, to minimise disruption to work and school-related traffic.

Before finalising the TMP, a full trial run of the proposed transport route will be conducted using vehicles with attachments simulating the dimensions of the turbine transport vehicles. This trial run will inform the TMP, which will be submitted for agreement with Clare and Limerick or Galway County Councils ahead of turbine delivery. The finalised TMP, prepared in advance of the construction stage, will outline the exact transport arrangements, confirmed delivery dates, and escort proposals. It will be submitted to the Planning Authority for approval before any abnormal loads use local roads and will include all necessary safety measures such as convoy and Garda escorts, off-peak manoeuvres, and any required safety controls.

5.2.7.13 CONSTRUCTION METHODOLOGIES

5.2.7.14 TURBINE FOUNDATIONS

Each turbine to be installed on the site will have a reinforced concrete base. Should piling be necessary at any turbine base, this will be determined by geotechnical investigations. The specific dimensions and types of foundations will be confirmed through pre-construction structural design calculations, incorporating appropriate safety factors.

For turbines founded on competent strata, the overburden will be removed using a 360-degree excavator, and the material will be stored nearby for later use in landscaping. A five-metre-wide working area will be required around each turbine base, with the excavated sides sloped to prevent slippage. The excavated material will be stored locally for future backfilling around the turbine foundation and sealed with the back of the excavator bucket, surrounded by silt fences to control sediment-laden runoff.

The formation material will be approved by an engineer to ensure it meets the turbine manufacturer's specifications. If the formation level is deeper than the foundation depth, the ground will be raised using Clause 804 or similar hardcore material compacted in 250 mm layers with a 12-tonne roller, making seven passes. Drainage measures, including an interceptor drain around the base perimeter, will be installed to protect the formation and direct runoff to a level spreader or settlement pond.

If a piled foundation is required, piles will be constructed by coring and inserting a steel sleeve, which will be filled with reinforced concrete before the sleeve is removed.

An embankment will be constructed around the perimeter of each turbine base, and a fence will be erected to prevent construction traffic from entering the excavation and to delineate the working area. Health and safety signage will be installed to warn of deep excavations. Access to the excavated bases will be facilitated by creating a pedestrian walkway.

A minimum of 100 mm of blinding concrete will be laid on the formation material using a concrete skip and 360-degree excavator to protect the ground and provide a safe working platform.

The anchor cage, delivered in two or more parts depending on the turbine type, will be unloaded using a 360-degree excavator or crane with appropriate lifting equipment. The anchor cage will be positioned in the centre of the turbine base and assembled. It will be checked and levelled with appropriate instruments, positioned 250 mm to 300 mm above the formation level using adjustable legs. Reinforcement bars will be placed around the anchor cage, including radial, concentric, shear bars, and superior groups, with earthing material attached during the steel build-up. The level of the anchor cage will be checked again before and during the concrete pour.

Formwork for the concrete bases will be adequately propped and supported to prevent failure. Concrete will be poured in three stages using a concrete pump: Stage 1 will involve pouring and vibrating concrete in the centre of the anchor cage to the required level; Stage 2 will focus on pouring and vibrating the centre of the steel foundation; Stage 3 will involve pouring the remaining concrete around the steel foundation to reach the finished level. Once the concrete has set sufficiently, the top surface will be finished with a power float.

After curing, the base will be filled with suitable material up to the existing ground level, and the working area around the foundation perimeter will be backfilled with the original excavated material.

5.2.7.15 SITE ROADS AND CRANE PAD AREAS

Access roads will be constructed to each turbine base, with crane hard standings built at each location according to the turbine manufacturer's specifications. Excavation for the roads will be carried out by tracked excavators equipped with suitable attachments. The excavation will proceed along a logical route, working away from the borrow pit locations, with excavated material transported back to the pits using haul trucks.

A working area of two to three metres around each hard standing will be required, with the sides of the excavated areas sufficiently sloped to prevent slippage. Material excavated from the working area will be stored locally for later use in backfilling around the turbine foundations. This material will be sealed with the back of the excavator bucket and surrounded by silt fences to prevent sediment-laden runoff.

Once the formation layer is reached, stone from the on-site borrow pit will be placed to form the road foundation. If large clay deposits are encountered along sections of the road, a geotextile layer will be laid at the sub-base level. The sub-grade will then be compacted using a roller.

The final wearing course will not be laid until all turbine bases have been poured to avoid damage from stone and concrete truck movements. The roads will be upgraded as needed before the first turbine delivery. All site roads will be maintained for the entire operational lifespan of the Proposed Development.

5.2.7.16 SUBSTATION AND CONTROL BUILDINGS

The construction of the proposed electrical substation will follow this methodology:

- The area designated for the on-site substation will be marked out using ranging rods or wooden posts. The soil and overburden will be stripped and removed to a nearby temporary storage area for use in later landscaping. Any excess material will be sent to one of the proposed borrow pits for reinstatement.
- The substation area will meet ESB Network specifications and will accommodate the necessary equipment required for the safe and efficient operation of the wind farms.
- One control building will be constructed within the substation compound. The foundations will be excavated to the required depth as specified by the designer, and shuttered reinforced concrete, incorporating an anti-bleeding admixture, will be poured.
- The blockwork walls will be built from the footings up to the damp-proof course level. The floor slab will then be constructed, ensuring all necessary ducts or trenches for mechanical and electrical contractors are in place.
- The blockwork will be raised to wall plate level, with gables and internal partition walls formed. Scaffolding will be erected around the building to facilitate these works.
- Concrete roof slabs will be lifted into place using a suitably sized mobile crane, followed by the installation of timber roof trusses using either a telescopic handler or a mobile crane, depending on site conditions. The roof will then be felted, battened, tiled, and sealed against weather conditions.
- The electrical equipment will be installed and commissioned, and perimeter fencing will be erected. All construction elements and substation components are designed in accordance with ESB/EirGrid specifications.

5.2.7.17 TEMPORARY CONSTRUCTION COMPOUND

The temporary construction compound will be constructed as follows:

- The compound area will be marked out at the corners using ranging rods or timber posts. Drainage channels and settlement ponds will then be installed around the perimeter.
- The compound platform will be formed using a similar method to that used for constructing the substation platform, as previously described.
- A geo-grid layer will be laid down, followed by compacted layers of well-graded granular material spread and lightly compacted to create a hard surface suitable for site offices and storage containers.
- Areas within the compound will be constructed to the same standard as site roads and will be used as hardstanding for vehicles during deliveries and for parking.
- The compound will be fenced off and secured with locked gates.
- Upon completion of the Proposed Development, the temporary construction compound will be decommissioned. This will involve backfilling the area with material excavated during construction, followed by landscaping with topsoil as required.

5.2.7.18 EXISTING GROUND SERVICES

Any underground services encountered along the cable routes will be surveyed for their levels. The ducting will be installed to pass over these services, provided there is adequate cover. A minimum clearance of 300 mm must be maintained between the bottom of the ducts and the service. If this clearance cannot be achieved, the ducting will be installed below the service, ensuring a 300 mm clearance between the top of the communications duct and the bottom of the service.

In deeper excavations, an additional layer of marker tape will be installed between the communications duct and the top-level yellow marker tape. If the required separation distances cannot be met, alternative methods will be employed. These include laying steel plates across the trench width and using 35N concrete around the ESB ducts where adjacent services are within 600 mm, with marker tape on the side of the trench. Backfill around utility services will be done using dead sand or pea shingle where appropriate.

5.2.8 CONSTRUCTION TIMELINE

The construction phase of the Proposed Development is expected to last approximately 12 to 18 months, from the start of onsite activities to the commissioning of the electrical system.

5.2.9 CONSTRUCTION MONITORING

5.2.9.1 CONSTRUCTION ENVIRONMENTAL MONITORING PLAN

The requirement for a Construction and Environmental Management Plan (CEMP) to be prepared before commencing any construction works on a wind farm site and submitted for approval to the Planning Authority is well-established. The implementation and effectiveness of the mitigation measures outlined in the CEMP are typically assessed through a Construction and Environmental Management Plan Audit Report.

The CEMP Audit Report systematically lists all mitigation measures prescribed in the planning documentation and any conditions attached to the planning permission, allowing for regular and systematic auditing. The initial assessment is a simple Yes/No question: Has the mitigation measure been implemented on site? Once confirmed, the effectiveness of the mitigation measures is subject to ongoing review and audit throughout the construction phase. If any issues arise that require remedial action, these will be communicated to site staff immediately during the audit visit and in writing via the audit report. The construction site manager will be given a timeframe to complete the required remedial actions, depending on their importance and urgency.

An Outline Construction Environmental Management Plan (oCEMP) has been prepared for the Proposed Development, detailed in Volume V of this EIAR. This oCEMP includes provisions for drainage, overburden management, waste management, and describes the functioning and presentation of the Audit Report. Should planning permission be granted, the CEMP will be updated prior to the commencement of development to address any relevant planning conditions and additional mitigation measures. The updated CEMP will be submitted to the Planning Authority for written approval.

On-site construction staff will be responsible for implementing the mitigation measures specified in the EIAR and outlined in the Audit Report. Their implementation will be overseen by the Environmental Clerk of Works (ECoW), fulfilled as appropriate by a supervising hydrogeologist, environmental scientist, ecologist, or geotechnical engineer. This auditing system ensures that mitigation measures are upheld throughout the construction phase and, where necessary, into the operational phase.

5.2.9.2 BREEDING BIRD MITIGATION AND MONITORING

To protect breeding birds, if construction is scheduled to begin during the breeding season (April to July inclusive), an early breeding season survey will be conducted by a qualified ornithologist. If the survey confirms that no nesting or breeding activity is present in the areas where work is planned, construction can proceed. However, ongoing monitoring will be implemented to ensure adherence to protection protocols throughout the breeding season. Cutting of hedgerows and disturbance of any confirmed nesting habitats will be prohibited during this period, in accordance with legislation and best practice. The removal of woody vegetation will comply with Section 40 of the Wildlife Act 1976 – 2018, and any necessary vegetation removal will be carried out only after inspection by a qualified ornithologist to ensure that no nesting birds are affected.

5.3 OPERATION & MAINTENANCE PHASE

The Proposed Development is anticipated to have an operational lifespan of approximately 30-35 years, and a 10 year planning permission and 35 year operational life of the wind farm is being sought beginning from the date of the wind farm's full commissioning. During the operational phase, the wind turbines will function automatically on a daily basis, adjusting to changes in wind speed and direction through anemometry equipment and control systems.

The turbines will be connected to and monitored by an off-site control centre, with data on their performance relayed continuously. Additionally, the wind turbine supplier will monitor each turbine remotely. Key metrics, including turbine output, performance, wind speeds, and responses to critical alarms, will be observed 24 hours a day from the control centre.

Routine maintenance will be carried out for each turbine, involving scheduled visits for inspections, checks, and the replacement of consumables such as oil. Unscheduled maintenance may also be required, ranging from resetting alarms to more significant repairs, including the replacement of major components that may necessitate the use of cranes. Maintenance traffic is typically expected to consist of four-wheel-drive vehicles or vans. The on-site electrical substation and site tracks will also undergo periodic maintenance as needed.

5.4 DECOMMISSIONING

The wind turbines proposed as part of the Development are expected to have a lifespan of approximately 30-35 years, with ongoing research suggesting that this may extend further due to advancements in turbine technology, site design, and maintenance practices. After reaching the end of their operational life, the turbines may be replaced with new models, subject to the planning requirements in effect at that time, or the Proposed Development may undergo full decommissioning. The on-site substation will remain as it will be owned by ESB and integrated permanently into the electricity grid.

Upon decommissioning, the wind turbines will be dismantled in reverse order to their installation. All above-ground components will be separated and removed from the site for recycling. Turbine foundations will remain underground, covered with soil, and reseeded as appropriate. Retaining the foundations in site is considered the more environmentally responsible option, as extracting the reinforced concrete would likely result in significant environmental disturbances, including noise, dust, and vibration. Where possible, the electrical and turbine components will be sent for recycling or will be disposed of appropriately as per legislation in force at the time.

Site roads will generally be left in place unless determined otherwise. Should the roads be deemed unnecessary for future use, they could be removed if required. Underground internal cables will be removed, but the ducting will remain. A detailed decommissioning plan will be developed and agreed upon with local authorities three months prior to the decommissioning of the Proposed Development. The guiding principles for this plan are outlined in the oCEMP.

GLOBAL PROJECT REACH

Offices

Dublin (Head Office)
Gavin & Doherty Geosolutions
Unit A2, Nutgrove Office Park
Rathfarnham
Dublin 14, D14 X627
Phone: +353 1 207 1000

Cork
Gavin & Doherty Geosolutions
First Floor, 12 South Mall
Cork
T12 RD43

London
Gavin & Doherty Geosolutions (UK) Limited
85 Great Portland Street, First Floor
London
W1W 7LT

Utrecht
Gavin & Doherty Geosolutions
WTC Utrecht, Stadsplateau 7
3521 AZ Utrecht
The Netherlands

Belfast
Gavin & Doherty Geosolutions (UK) Limited
Scottish Provident Building
7 Donegall Square West
Belfast
BT1 6JH

Edinburgh
Gavin & Doherty Geosolutions (UK) Limited
22 Northumberland Street SW Lane
Edinburgh
EH3 6JD

Rhode Island
Gavin & Doherty Geosolutions Inc.
225 Dyer St, 2nd Floor
Providence, RI 02903
USA

GDG
GAVIN & DOHERTY
GEOSOLUTIONS

Website: www.gdgeo.com
Email: info@gdgeo.com

A Venterra Group Plc
Member Company