Total Proposed Grid Connection	3,450	15,250
Total	34,300 m^3	59,900m^3
Total Peat and spoil volume generated by the Proposed Project	94,200m^3	

Note: A factor of 10% (bulking factor of 10%) has been applied to the excavated peat and spoil volumes to allow for expected increase in volume upon excavation and to allow for a variation in ground conditions across the Site.

It is considered that any spoil generated by the proposed infrastructure will be removed and accommodated within the peat and spoil management areas within the Site. Any access track material containing tar will be managed separately and taken to a licensed facility. Further detail on this can be found in Chapter 15: Traffic and Transport.

Tree felling is proposed at various locations across the Site; however, this will not involve the excavation of tree stumps, outside of the Proposed Project infrastructure footprint, and as such does not affect the excavation volumes.

The surplus peat and spoil material generated will all be managed locally within the site, as outlined below in Section 4.4.4.3.

4.4.4.2 Peat and Spoil Usage in Restoration of Borrow Pits

Once the required volume of rock has been extracted from the onsite borrow pit, it is intended to reinstate this area with any surplus peat and overburden excavated from the works areas of the Proposed Project.

Further details on construction methodologies, including recommendations and best practice guidelines for the management of peat and spoil in the onsite borrow pit, are detailed in Section 4.9.1.3 below, and in FTC's *Peat & Spoil Management Plan* in Appendix 4-3 of this EIAR.

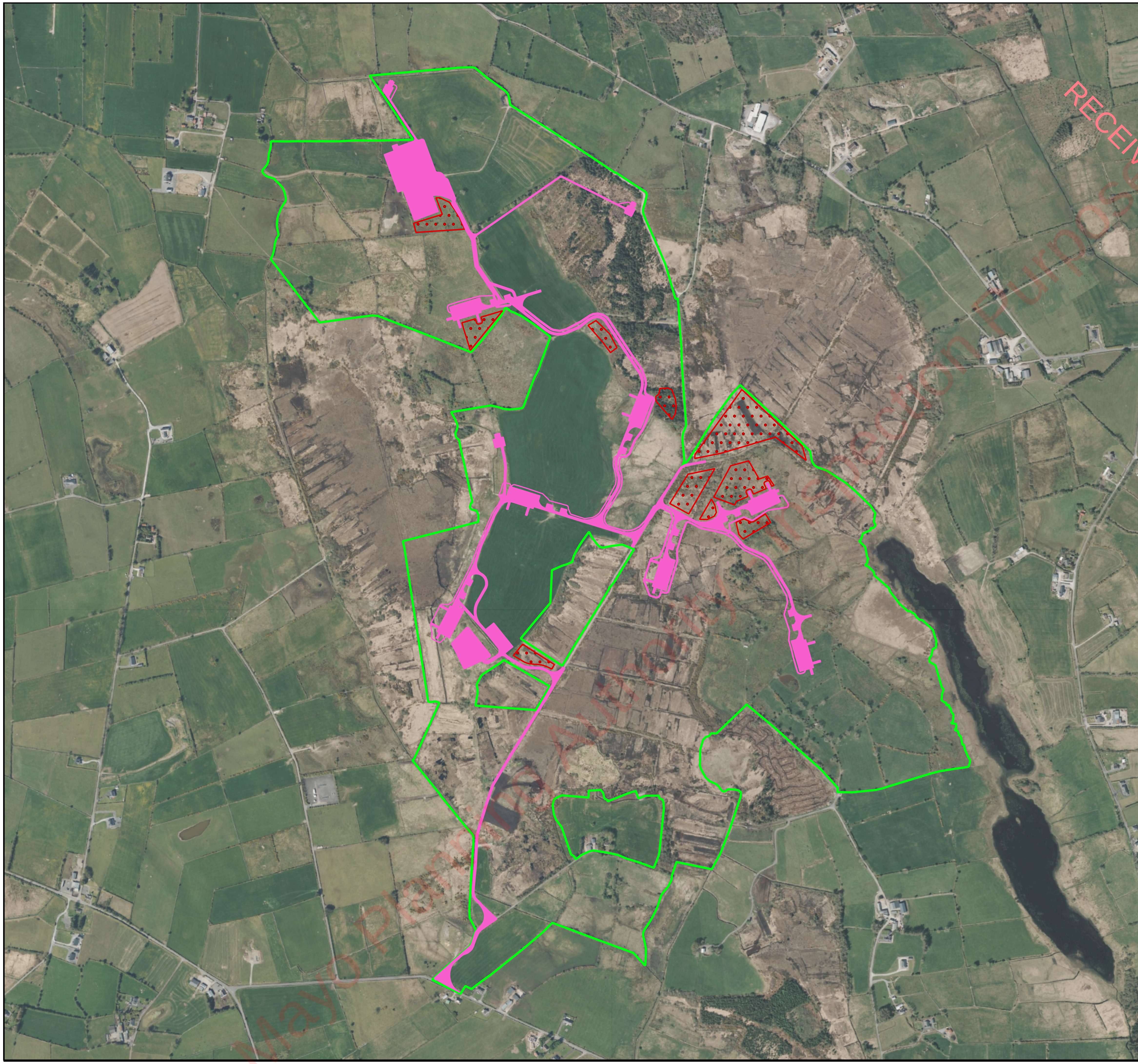
4.4.4.3 Peat and Spoil Management Areas

It is proposed to manage any excess overburden generated through construction activities locally within the Site, in identified peat and spoil management areas, as shown in Figure 4-28. The total capacity of the peat and spoil management areas within the Site is approx. 59,400m^3 while the borrow pit has a storage capacity of 27,000m^3 along with approximately 15,500m^3 required for landscaping purposes, providing enough capacity for the total volume of peat and spoil requiring management for the Proposed Project.

The peat and spoil management areas have been selected based on the locations of spoil generation, areas suitable for spoil management and environmentally or ecologically constrained areas, with any sensitive environmental or ecological areas being avoided.

Please see Section 4.9.3.4 for construction methodology of the placement of peat and spoil.

Plan view and section drawings of the peat and spoil management areas within the Site are shown in Figure 4-29 and Figure 4-30. The volumes of granular fill (sand and stone) required for the construction of the Proposed Wind Farm and Proposed Grid Connection areoutlined in Table 4-3 below.



Map Legend

- EIAR Site Boundary
- Peat and Spoil Management Areas
- Proposed Project Footprint

Drawing Title Peat and Spoil Management Areas	
Project Title Proposed Cunlaghfadda Green Energy Project	
Drawn By JA	Checked By NS
Project No. 220825	Drawing No. Figure 4-28
Scale 1:9,000	Date 2026-04-16

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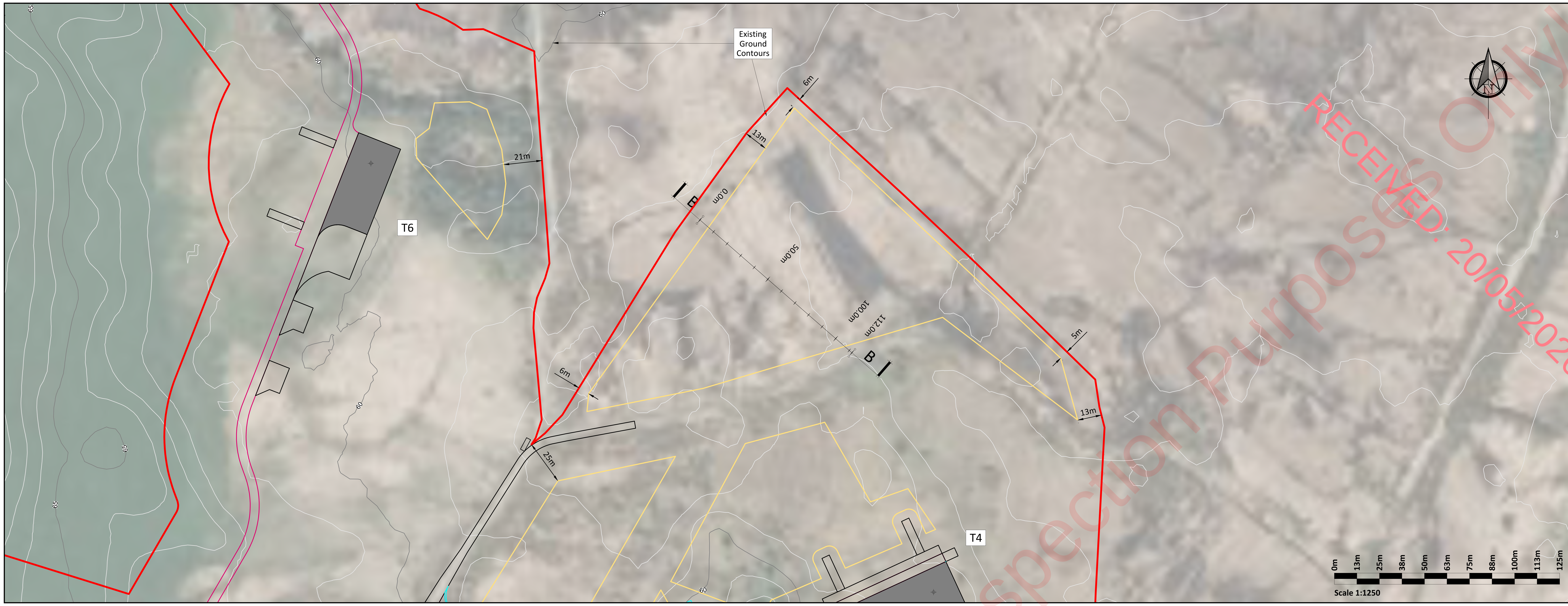


Legend:

- Planning Boundary
- Turbine / Hardstand
- Turbine / Hardstand Temporary Areas
- Upgrade to Existing Track
- New Track
- Temporary Construction Track
- Upgrade to Public Road
- Proposed Construction Compound
- Proposed Substation
- Proposed Borrow Pit
- Peat and Spoil Management Areas
- Turbine Delivery Route

Construction Notes Peat and Spoil Management Area:

(1) An interceptor drain will also be installed upslope of the peat deposition areas.

(2) A silting pond will be required at the lower side of the peat deposition areas.

(3) It is important that the surface of the stored peat be shaped to allow efficient run-off of water from the stored spoil.

(4) Supervision by a geotechnical engineer or appropriately competent person is recommended for the construction of the peat deposition area.

(5) All the above-mentioned general guidelines and requirements will be implemented during construction.

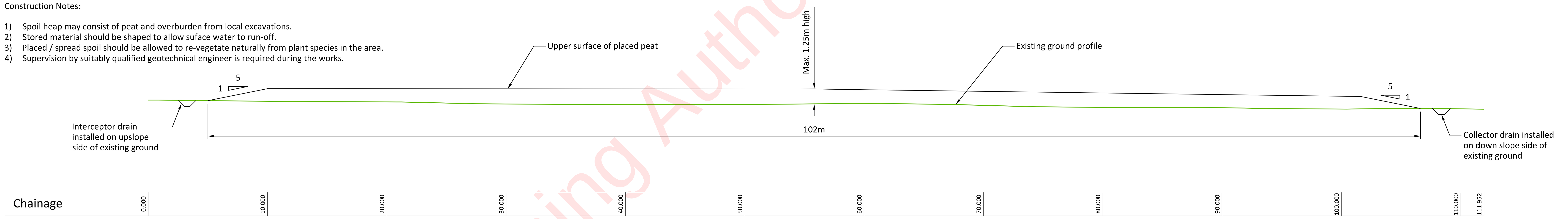
(6) Further guidelines on the construction of the peat storage area are included within Section 6.5 of the Peat & Spoil Management Plan.

PLAN

Scale 1:1250

Construction Notes:

1) Spoil heap may consist of peat and overburden from local excavations.
2) Stored material should be shaped to allow suface water to run-off.
3) Placed / spread spoil should be allowed to re-vegetate naturally from plant species in the area.
4) Supervision by suitably qualified geotechnical engineer is required during the works.



SECTION B - B

Scale 1:200

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Rev.	Description	App By	Date
A	FOR INFORMATION	BDH	27.04.26

PROJECT: CUNLAGHFADDA GREEN ENERGY PROJECT	CLIENT: MKO			
SHEET: PEAT PLACEMENT ALONGSIDE ACCESS ROADS	Date: 27.04.26	Project number: P23-270	Scale (@ A1): 1:1250	
	Drawn by: POR	Drawing Number: Figure 4-29		Rev: A
	Checked by: IH			

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27 April 2026

PLAN

Scale 1:1250

Legend:

- Planning Boundary
- Turbine / Hardstand
- Turbine / Hardstand Temporary Areas
- Upgrade to Existing Track
- New Track
- Temporary Construction Track
- Upgrade to Public Road
- Proposed Construction Compound
- Proposed Substation
- Proposed Borrow Pit
- Peat and Spoil Management Areas
- Turbine Delivery Route
- Proposed Grid Connection - Subject to Separate Planning Application

Construction Notes Peat and Spoil Management Area:

(1) An interceptor drain will also be installed upslope of the peat deposition areas.

(2) A silting pond will be required at the lower side of the peat deposition areas.

(3) It is important that the surface of the stored peat be shaped to allow efficient run-off of water from the stored spoil.

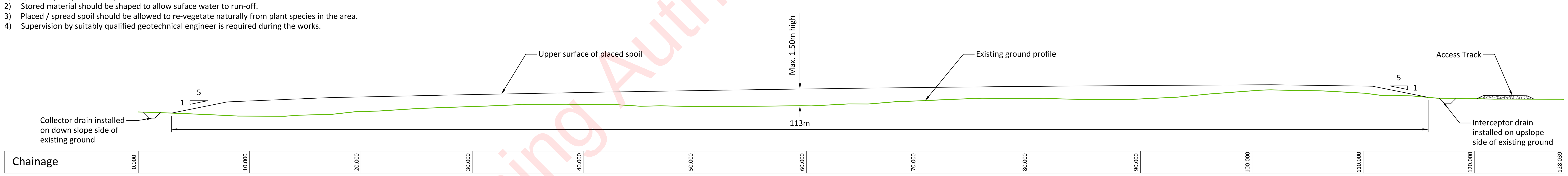
(4) Supervision by a geotechnical engineer or appropriately competent person is recommended for the construction of the peat deposition area.

(5) All the above-mentioned general guidelines and requirements will be implemented during construction.

(6) Further guidelines on the construction of the peat storage area are included within Section 6.5 of the Peat & Spoil Management Plan.

Construction Notes:

1) Spoil heap may consist of peat and overburden from local excavations.
2) Stored material should be shaped to allow suface water to run-off.
3) Placed / spread spoil should be allowed to re-vegetate naturally from plant species in the area.
4) Supervision by suitably qualified geotechnical engineer is required during the works.



SECTION C - C

Scale 1:200

FEHILY TIMONEY

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Rev.	Description	App By	Date
A	FOR INFORMATION	BDH	27.04.26

PROJECT: CUNLAGHFADDA GREEN ENERGY PROJECT

CLIENT: MKO

SHEET: SPOIL PLACEMENT ALONGSIDE ACCESS ROADS

Date	Project number	Scale (@ A1)	
27.04.26	P23-270	1:1250	
Drawn by: POR	Drawing Number		Rev
Checked by: IH	Figure 4-30		A

O:\ACAD\2023\P23-270\P23-270-0600-0015

28 April 2026

4.4.4.4 Stone Requirements

The volumes of stone required for the construction of the Proposed Wind Farm and Proposed Grid Connection, outlined in Table 4-3 below, have been estimated based on the Proposed Project footprint, the anticipated excavation levels to suitable formation or suitable subgrade, and the proposed final levels for the infrastructure components. Approximately 54,000m^3 of material will be required for the Proposed Wind Farm footprint, and approximately 23,200m^3 of material being required for the Proposed Grid Connection footprint. An estimated 16,000m^3 will be provided by the onsite borrow pit and the remaining 61,200m^3 will be imported from nearby licenced quarries.

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 Volumes Required for the Proposed Project

Project Component	Typical Dimensions	Crushed Stone Requirement (m^3)
Proposed Wind Farm		
7 no. Turbines and Hardstanding Areas (including foundations. Also includes for temporary construction areas, i.e. temporary hardstand areas)	25m diameter excavation footprint for turbine foundation with 75 x 35m finished hardstand surface.	33,000
Access Tracks (including cabling. Also includes for temporary access tracks, i.e. widening at bends and turning heads))	Assumed 5m running surface with 6m wide development footprint	16,500
Met Mast including hardstand	10 x 10m foundation footprint and 25 x 30m hardstanding area	500
Temporary Construction Compound	Hardstanding area of 25 x 75m	2,000
Borrow Pit	85m x 65m	2,000
Sub Total- Proposed Wind Farm		54,000
Proposed Grid Connection		
Onsite 110kV Substation	Hardstanding area of 105 x 125m	18,200
Access Tracks (including temporary construction tracks)	Assumed 3m running surface with 4m wide development footprint	2,000
Substation Temporary Construction Compound	Hardstanding area of 40 x 60m	3000
Sub Total- Proposed Grid Connection		23,200
Totals (m^3) (including 10% contingency factor)		77,200

Note (1) A contingency factor of 10% has been applied to the volumes to allow for expected bulking upon excavation and to allow for a variation in ground conditions across the Site.

Note (2) It should be noted that the volumes given in Table 4-3 are subject to confirmatory design

4.5 Site Activities

4.5.1 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.

4.5.2 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 bowsers. The fuel bowser will be parked on a level area on-site 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 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.

4.5.3 Concrete Deliveries

Only ready-mixed concrete will be used during the construction phase, with all concrete being delivered from local batching plants in concrete delivery trucks.

The use of ready-mixed concrete deliveries will eliminate any potential environmental risks of on-site batching. 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[6]-type concrete wash unit or equivalent. This type of Siltbuster 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 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 4-5 below.

[6] https://www.siltbuster.co.uk/sb_prod/siltbuster-roadside-concrete-washout-rcw/

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.

Due to the volume of concrete required for each turbine foundation, and the requirement for the concrete pours to be continuous, deliveries may be carried out outside normal working hours 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 completed in a single day per turbine.

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

- Concrete trucks will not be washed out on the site but will be directed back to their batching plant for washout.
- Site access tracks 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 access tracks 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.
- 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 on the Site.

4.5.3.1 Concrete Pouring

The main concrete pours for turbine foundations will be planned approximately one week in advance.

Specific 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 while placing concrete.
- Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets.
- Ensuring that covers are available 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 concrete wash unit.

4.5.4 Dust Suppression

In periods of extended dry weather, dust suppression may be required within the Site and associated haul roads to prevent dust from causing a disturbance. If necessary, water will be taken from stilling/settlement ponds in the Site's drainage system and will be pumped into a bowser or water spreader to dampen down public haul roads and temporary construction compounds to prevent the generation of dust. Silty or oily water will not be used for dust suppression, because this would transfer the pollutants to the public haul roads/access tracks and 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.

4.5.5 Vehicle Washing

Wheels or vehicle underbodies will be washed before leaving the Site to prevent the build-up of mud on public (and site) roads. Internal access tracks will be constructed before other road-going trucks begin to make regular or frequent deliveries to the site (e.g., with steel or concrete). The internal access tracks will comprise granular fill, and so the public road-going vehicles will not be travelling over soft or muddy ground where they might pick up mud or dirt.

However, in the interest of best practice, wheel wash facilities will be provided. Figure 4-31 includes details of a proposed self-contained wheel wash system for use during the construction phase of works. A wheel wash will be located at 2 no. locations within the Site as indicated on the site layout drawings included as Appendix 4-1.

The contractor will be responsible for ensuring that all vehicles egressing the site have used the wheel wash facilities. However, a road sweeper will be made available by the contractor for the cleaning of public roads in the event that they are dirtied by trucks associated with the Proposed Project.

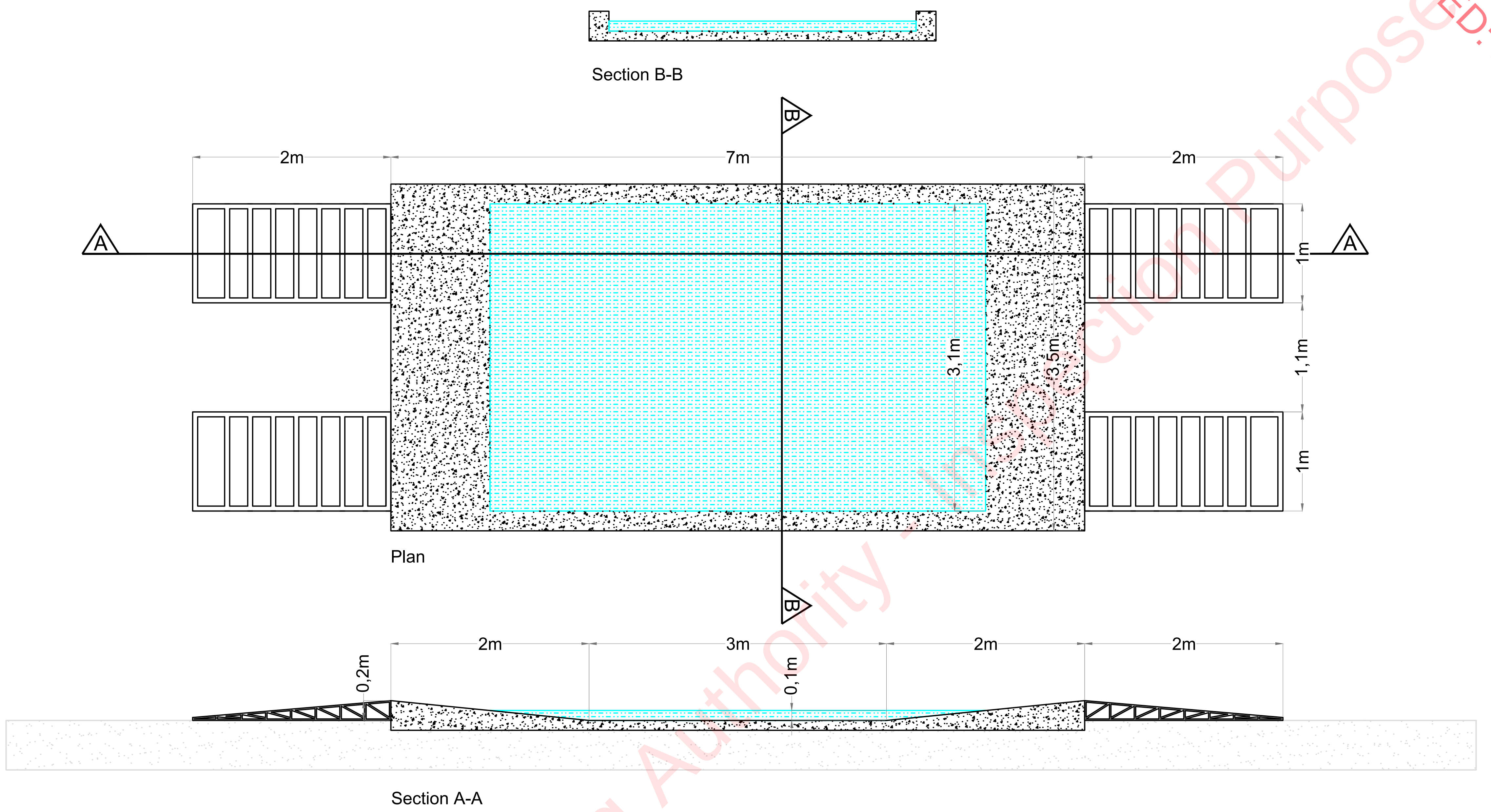
Note:

All dimensions are in meters, unless noted otherwise.

All dimensions to be checked on site and any discrepancy to be reported to the engineer.

Figured dimensions only to be used, drawings not to be scaled. If in doubt ask.

For illustration purposes only. Exact size and appearance of unit subject to manufacturer selection.



PROJECT TITLE: Cunlaghfadda Green Energy Project			
DRAWING TITLE: Wheel Wash Detail			
PROJECT No.: 220825		DRAWING No.: Figure 4-31	SCALE: 1:50 @ A3
DRAWN BY: FB	CHECKED BY: GO	DATE: 14.05.2026	REVISION.: P01

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4.5.6 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)[7]. 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 of 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 must 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 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 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 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. This system will enable the contractor to measure and record the quantity of waste being generated. 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.

The Applicant commits to compliance with Circular Economy requirements. Waste generated on site will be prevented as much as possible. Any potential waste will be treated as a by-product as much as possible and where it is possible, materials removed off-site will be re-used in accordance with the Article 27 notification procedure or treated to comply with Article 28 if practicable (under the European Union (Waste Directive) Regulations 2011 as amended). Other materials will be recycled where possible.

Any materials containing invasive species will be appropriately managed and sent to authorised facilities.

4.6 Site Access and Transportation

[7] *EPA 2021 [Best practice guidelines for the preparation of resource & waste management plans for construction & demolition projects](). Available at: [https://www.epa.ie/publications/circular]() economy/resources/CDWasteGuidelines.pdf*

4.6.1 Site Entrances

The location of construction phase and operational phase site access points are shown in Figure 4-32. These access and egress points are also shown on the site layout drawings in Appendix 4-1, with detail on access also being described in detail in Chapter 15, Section 15.1 of this EIAR. The proposed site entrances for the Proposed Project were subject to Autotrack assessment to identify the turning area required and to ensure the safe egress of traffic, as described in Section 15.1 of Chapter 15 of the EIAR.

A Traffic Management Plan (Appendix 15-2) is included within 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.

Temporary Construction and Turbine Component Entrance

A temporary site entrance will be constructed adjacent to the L-1505, in the southeast of the Site for the duration of the construction phase. See Figure 4-32 for further detail. This entrance will facilitate the delivery of the turbine components, abnormal loads and construction traffic. Traffic management measures will be implemented for the duration of the construction phase. This new entrance measures approx. $480m^2$ and was subject to autotrack assessment to identify the turning area required, as described in Chapter 15, Section 15.1 of the Traffic and Transport Assessment. Appropriate sightlines will be established to the east and west of the proposed turbine component entrance for the safe egress of traffic.

This temporary entrance will only be used for the construction phase, with it being reseeded or allowed to revegetate naturally, as appropriate, following the completion of construction. Should this entrance be required during the operational phase for any maintenance works, this entrance can be reinstated, as required.

Operational Entrance

As can be seen in Figure 4-1, the L15053 is located within the Site and will be upgraded during the construction phase of the Proposed Wind Farm. Operational traffic will travel on the L1505, turning on to the L15053 towards the Site for approximately 800m before reaching the proposed operational site entrance in the townland of Cloonbaul, please see Figure 4- 32 for further detail.

This operational entrance will be gated using a steel barrier or stock-proof fencing and will be constructed with appropriate sight lines (as detailed in Section 15.1 of this EIAR) in order to safely facilitate the egress and ingress of traffic.

During the operational phase this entrance will be used to facilitate maintenance and monitoring activities on the Site. This operational access will also be used by Eirgrid for maintenance access to the 110kV substation.

4.6.2 Turbine Delivery 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. Vehicles delivering large turbine components and other abnormal loads to the Site will depart from Galway Port and travel northwest through Galway City along the R339 and R336 Regional Roads before reaching the N6 National Road at the Bothar na dTreabh/Tuam Road junction. The delivery vehicles will continue west along the N6/M6 Motorway before merging onto the M17 at the M6/M17/M18 intersection through the Rathmorrisy Interchange. From here, the delivery vehicles will continue north on the M17 and N17 Tuam bypass. The delivery vehicles will continue on the N17, travelling through Claremorris town on the L1519 before turning east onto the L1506. The delivery vehicles will travel on the L1506 for approximately 2.5 km before turning north onto the L1505, followed by taking a turn on to the L15053 towards the proposed Site entrance. The proposed route is shown on Figure 4-33.

There are no significant turbine delivery route accommodation works required to facilitate the delivery of components to the Site. Please see Section 4.6.2.1 below for further detail.

4.6.2.1 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, as shown on Figure 4-33, 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 of this EIAR and summarised below.

It is noted that a dry run involving a vehicle adapted to replicate the geometry of the extended transport vehicles will be undertaken over the entire turbine delivery route prior to the construction stage of the Proposed Project.

A swept path analysis was undertaken using Autotrack in order to establish the locations where the wind turbine transporter vehicles will be accommodated, and the locations where some form of remedial measure may be required.

To facilitate the transportation of turbine components off the L-55512 and onto the L-1519, minor accommodating works are required along the L-55512 which involves temporary road widening and wall removal. A similar degree of works will be required on the L-5531, L-1505 and L1506 where temporary road widening, vegetation clearance and extension of an existing culvert along a small stream will be required to provide the necessary clearance of the turbine delivery vehicle. All works are minor and have been assessed as part of this EIAR. Once the turbines have been delivered, road widening areas will be reseeded/reinstated.

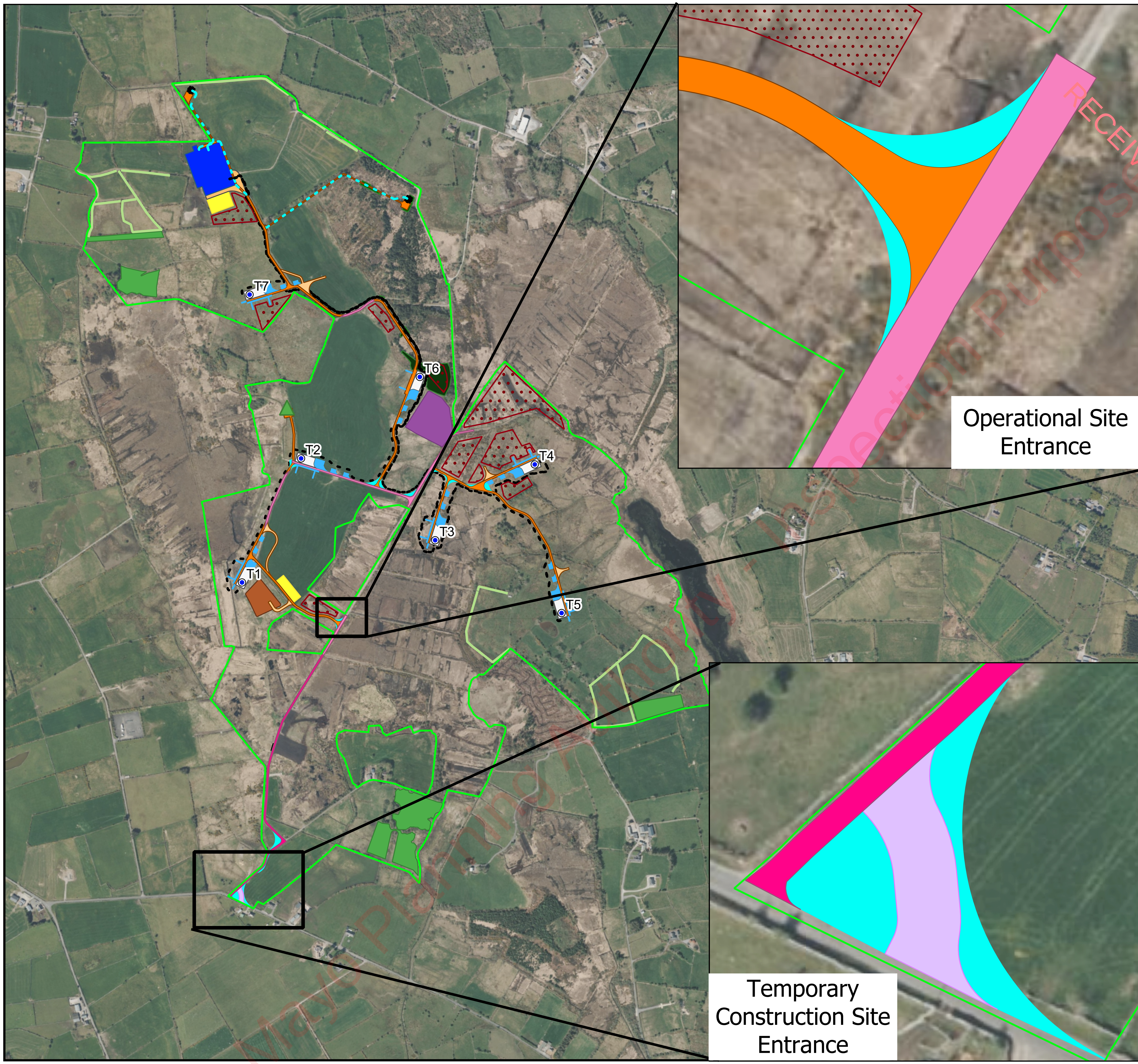
The locations of the accommodation areas are shown in Appendix 15-2.

Full details of the assessment are included as part of the traffic impact assessment set out in Chapter 15 Section 15.1 of this EIAR.

4.6.3 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. Traffic movements generated by the Proposed Project are discussed in Section 15.1 of Chapter 15, Material Assets.

It is also envisaged that general construction traffic (including materials and staff) will travel to the Site via the public road network to the temporary construction 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.



Map Legend

- EIAR Site Boundary
- Proposed Turbines
- Proposed Turbine Hardstands
- Temporary Hardstand Areas
- Proposed Borrow Pit
- Peat and Spoil Management Areas
- Proposed Met Mast
- Proposed Internal Cables
- Proposed Felling
- Proposed Upgrade to Existing Access Tracks
- Proposed New Access Tracks
- Proposed Upgrade to Public Road
- Temporary Construction Tracks
- Temporary Site Entrance
- Temporary Widening Areas
- Proposed Passing Bay
- Proposed Marsh Fritillary Enhancement Areas
- Proposed Woodland Planting
- Linear Planting and Enhancement
- Separate S182a Infrastructure

N

Drawing Title: Proposed Project Site Entrances	
Project Title: Proposed Cunlaghfadda Green Energy Project	
Drawn By: NS	Checked By: ÓM
Project No.: 220825	Drawing No.: Figure 4-32
Scale: 1:10,000	Date: 2026-05-05

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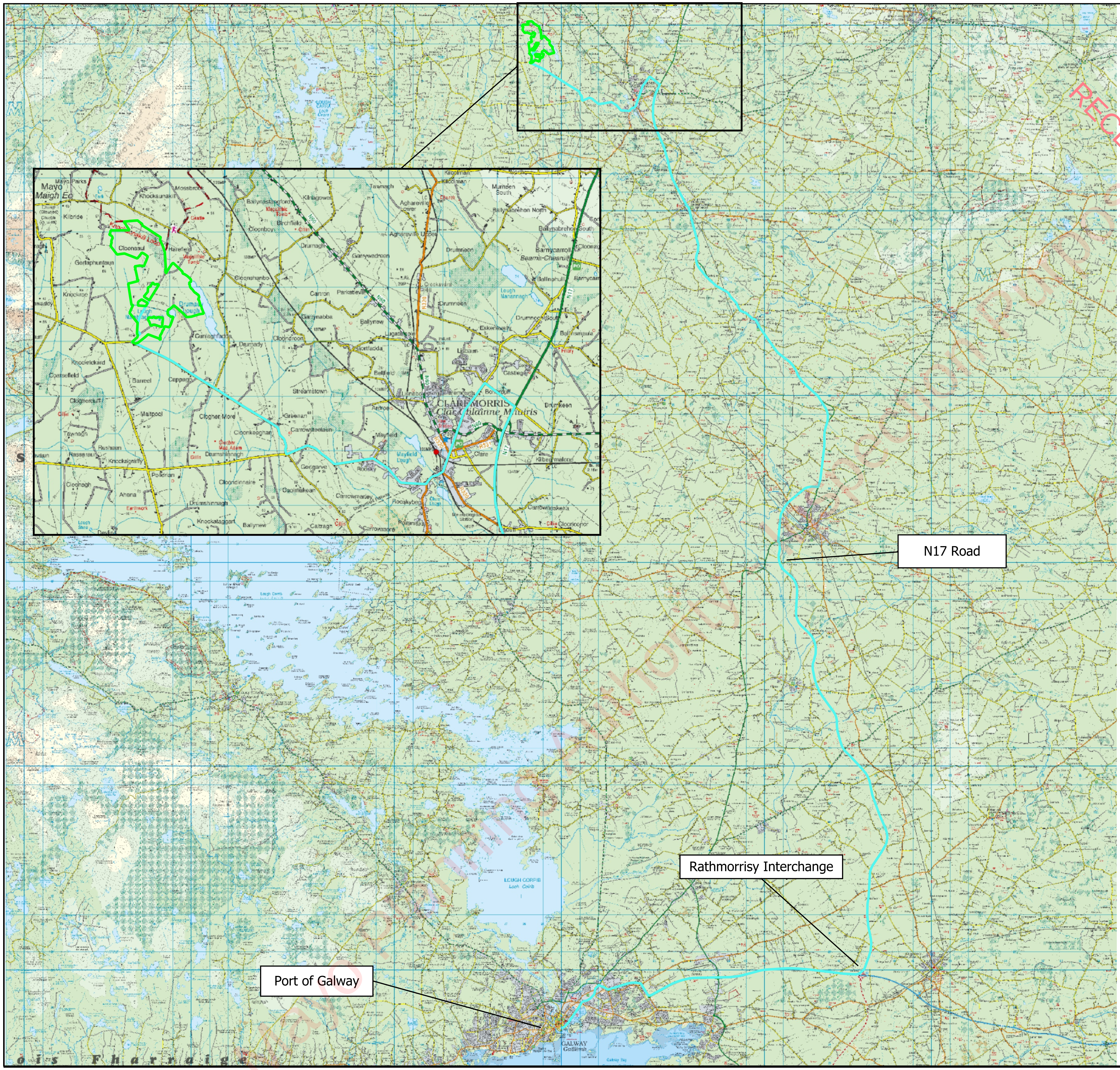

Map Legend

- EIAR Site Boundary
- Turbine Delivery Route

Drawing Title Proposed Turbine Delivery Route	
Project Title Proposed Cunlaghfadda Green Energy Project	
Drawn By JA	Checked By NS
Project No. 220825	Drawing No. Figure 4-33
Scale 1:200,000	Date 2026-04-02

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4.6.4 Traffic Management

A turbine with a blade length of 68m has been used in assessing the traffic impact of the Proposed Project. The blade transporter for such a turbine blade (Blade adaptor) would have a total vehicle length of 84.51m, including the blade which overhangs the back of the vehicle. The total length of the tower transporter is 47.25m 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 Site. However, the procedures for transporting abnormal size loads on the country's roads are well established. Escort vehicles, traffic management plans, test runs, road marshals and convoy escorts from the Garda Traffic Corps will be used to transport the components from the delivery port to the Site.

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 Site will be made in convoys of three to five vehicles and mostly 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 local 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.

Prior to the construction of the Proposed Project, a full dry run of the proposed transport operation along the potential route will be completed using vehicles with attachments to simulate the dimensions of the turbine components. 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.

4.7 Site Drainage

4.7.1 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 EIAR.

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 effect on the water quality of the Site and its associated rivers, and consequently no effect on downstream catchments and ecological ecosystems. The closest watercourse to any proposed infrastructure is the Meander River, which is located c.372m southwest of T5. There are no EPA mapped watercourses located within the planning application boundary. 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 access tracks were designed to avoid natural watercourses with existing tracks 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.

4.7.2 Existing Drainage Features

The routes of any natural drainage features will not be altered as part of the Proposed Project. Turbine locations have been selected to avoid natural watercourses. No new crossing of natural watercourses is required within the Site as part of the Proposed Project. However 1 no. existing culvert crossings will require upgrading and 2 no. new culvert crossings will be required for the Proposed Project. Please see Appendix 4-4 Drainage Design for exact locations of new culvert crossings and location of upgrade to existing culvert. It is important to note that all identified drains within the Site are man-made field drains which run along hedgerows and field headlands.

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 tracks 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 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 Project 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 access tracks 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 access track widening or improvement works are necessary along the existing tracks, where possible, the works will take place on the opposite side of the track to the drain.

4.7.3 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:

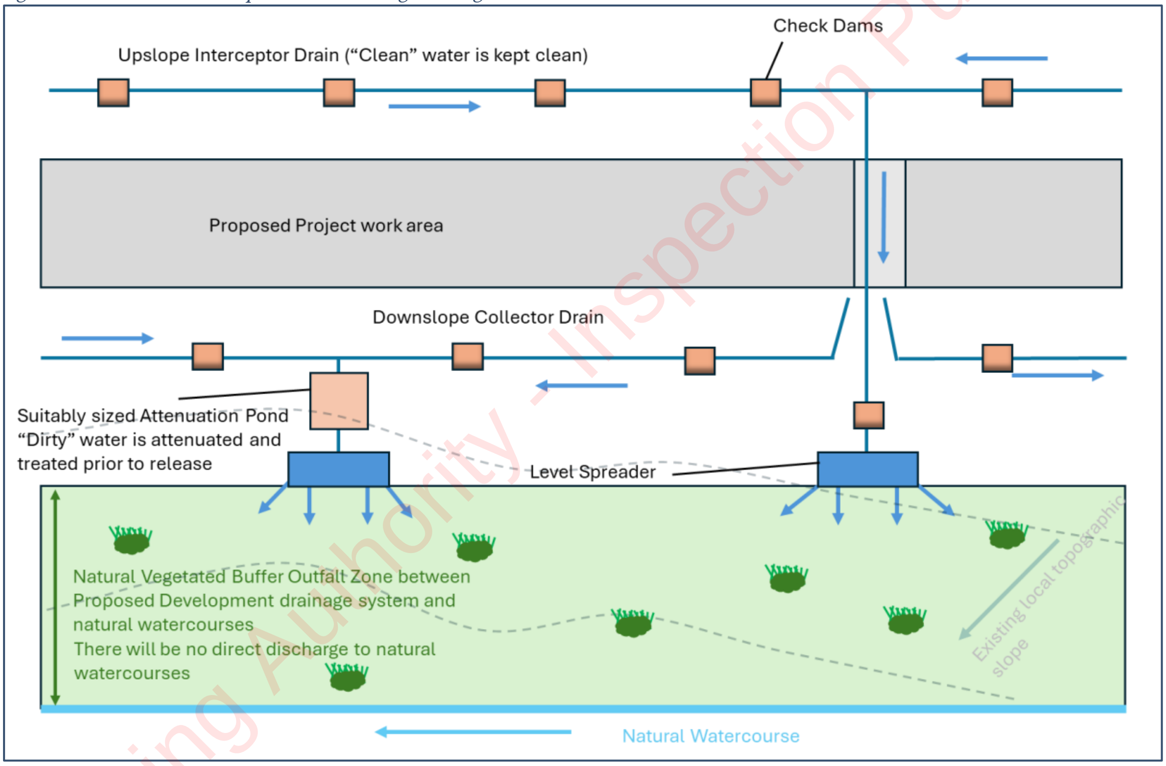
- Keep clean water clean by intercepting it where possible, upgradient of works areas, and divert it around the works areas for discharge as diffuse overland flow or for rewetting of land.
- Collect potentially silt-laden runoff from works areas via downgradient collector drains and manage via series 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.
- Maintain 50-metre watercourse buffer zones for the wind turbines (closest watercourse to existing infrastructure is located c.372m away) .
- 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.

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 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 line drawing of the proposed drainage design is presented in Figure 4-34 below.

Figure 4-34 Schematic of Proposed Site Drainage Management



4.7.4 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 4-4 to this EIAR. 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;
- Coillte Forest (2013): Operations and Water Protection Guidelines;
- Forest Service (Draft) Forestry and Freshwater Pearl Mussel Requirements – Site Assessment and Mitigation Measures;
- Forest Service (2000): Forestry and Water Quality Guidelines. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford;

- COFORD (2004): Forest Road Manual – Guidelines for the Design, Construction and Management of Forest Roads;
- Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Watercourses;
- Scottish Natural Heritage, 2019 Good Practice During Wind Farm Construction;
- UK Guidance Note 2020 GPP1 - General Guide to Prevention of Pollution (UK Guidance Note);
- UK Guidance Note 2018 GPP5 – Works or Maintenance in or Near Watercourses;
- Construction Industry Research and Information Association (CIRIA) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006); and,
- Construction Industry Research and Information Association (CIRIA) 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006.

4.7.4.1 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 access tracks, turbine bases 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 access tracks 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 access tracks are to be installed on slopes, to prevent the access tracks acting as conduits for water that might infiltrate the access track sub-base. In these cases, interceptor drains would be maintained in localised areas along the access track with culverts under the access track, which would allow the intercepted water to be discharged to vegetation filters downgradient of the access track. 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 4-35 below shows an illustrative drawing of an interceptor drain.

The velocity of flow in the interceptor will be controlled by check dams (discussed further 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 (discussed 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.

4.7.4.2 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 access tracks and hardstanding areas of the Proposed Project 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 4-35 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.

4.7.4.3 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 4-35, below, 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 be used in 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.

4.7.4.4 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 levels 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 4-35, 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 (discussed 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 four metres and a maximum length of 25 metres, 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.

4.7.4.5 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 1.5 metres, 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 4-35, 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.

4.7.4.6 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.

4.7.4.7 Stilling Ponds (Settlement Ponds)

Stilling or settlement ponds will be used to attenuate runoff from works areas of the Site during the construction phase and will remain in place to handle runoff from access tracks 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 4-35 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 settlement ponds will be designed for 11hr and 24hr retention times used to settle out medium silt (0.006mm) and fine silt (0.004mm) respectively (EPA, 2006)[8]. 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.

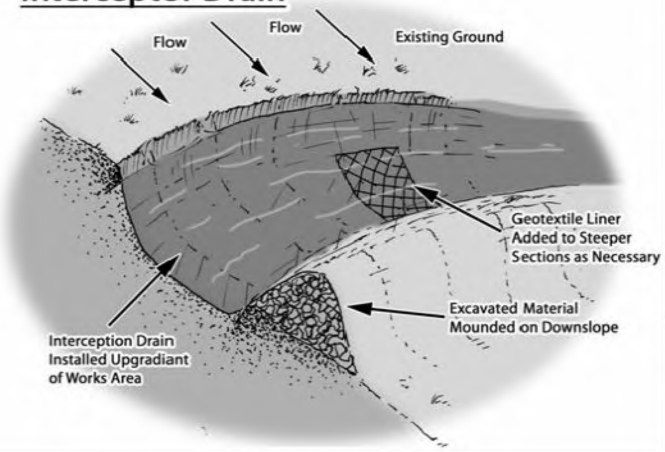
[8] Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006)

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.

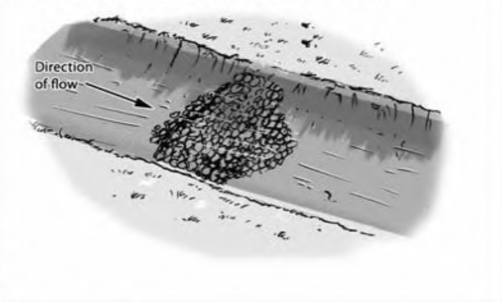
Stilling ponds will be located towards the end of swales, close to where the water will be reconverted to diffuse sheet flow. Upon exiting the stilling pond system, water will be immediately reconverted to diffuse flow via a fan-shaped rock apron if adequate space and ground conditions allow. Otherwise,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

A water level indicator such as a staff gauge will be installed in each stilling pond with marks to identify when sediment is at 10% of the stilling pond capacity. Sediment will be cleaned out of the stilling pond when it exceeds 10% of pond capacity. 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. An illustration of a stilling pond is shown in Figure 4-35.

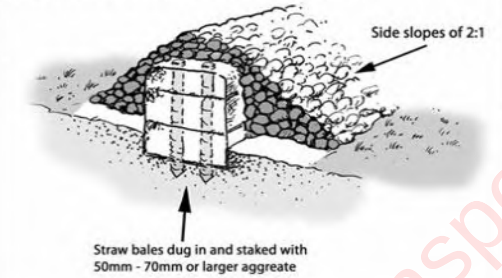
Interceptor Drain



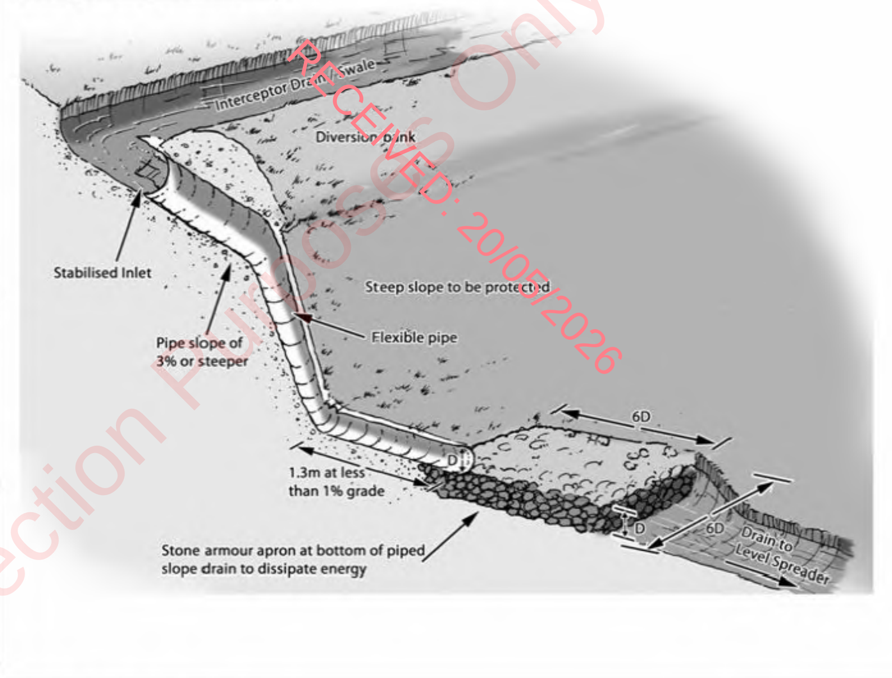
Check Dam (Stone Dam in Drain)



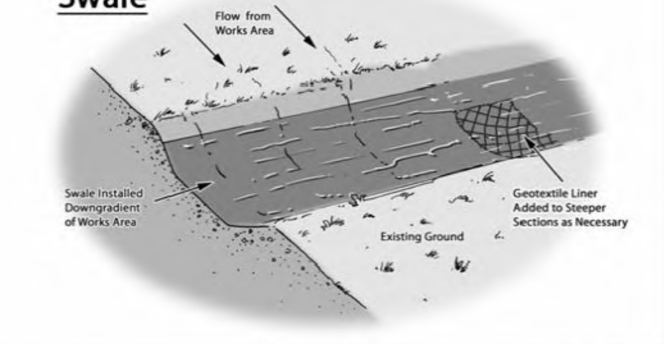
Check Dam
(Straw Bale & Stone Dam - Cross Section)



Slope Pipe Drain

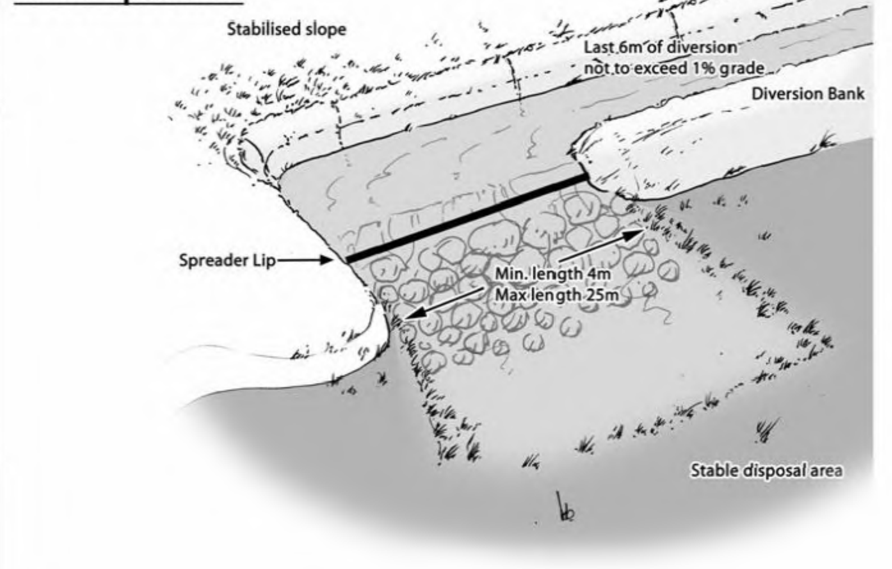


Swale

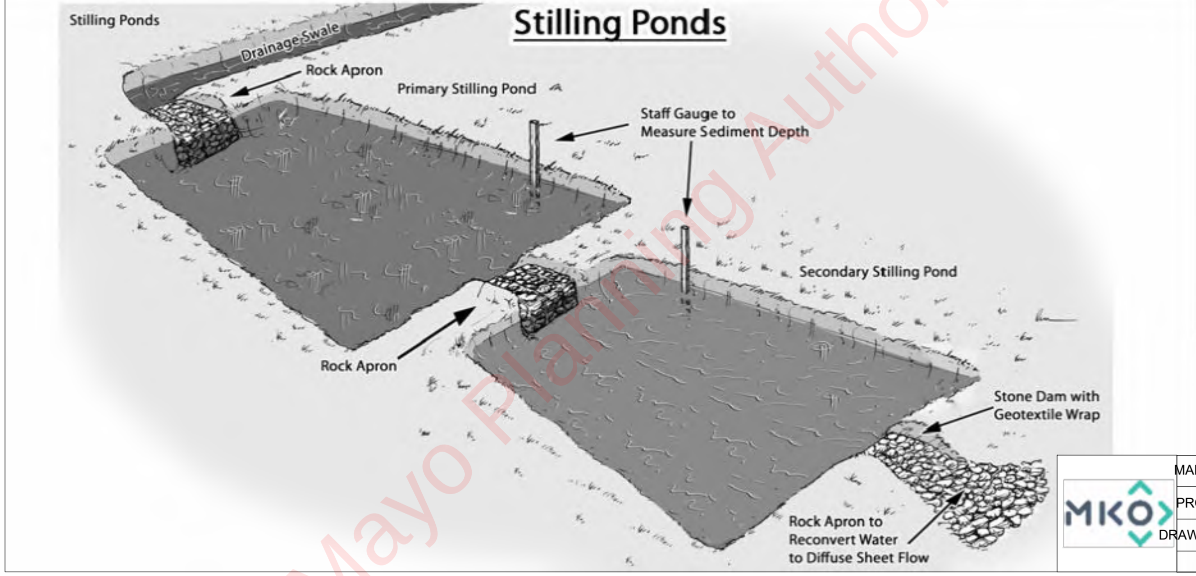


Drainage Design Measures

Level Spreader



Stilling Ponds



MAP TITLE: Drainage Design Measure Illustrations		MAP NO.: Figure 4-35	SCALE: NTS
PROJECT TITLE: Cunlaghfadda Green Energy Project			DATE: 05.05.2026
DRAWING BY: Natalia Stolarska	CHECKED BY: Órla Murphy	ISSUE NO.:220825	

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4.7.4.8 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 on site and making it highly mobile. Figure 4-36 below 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.

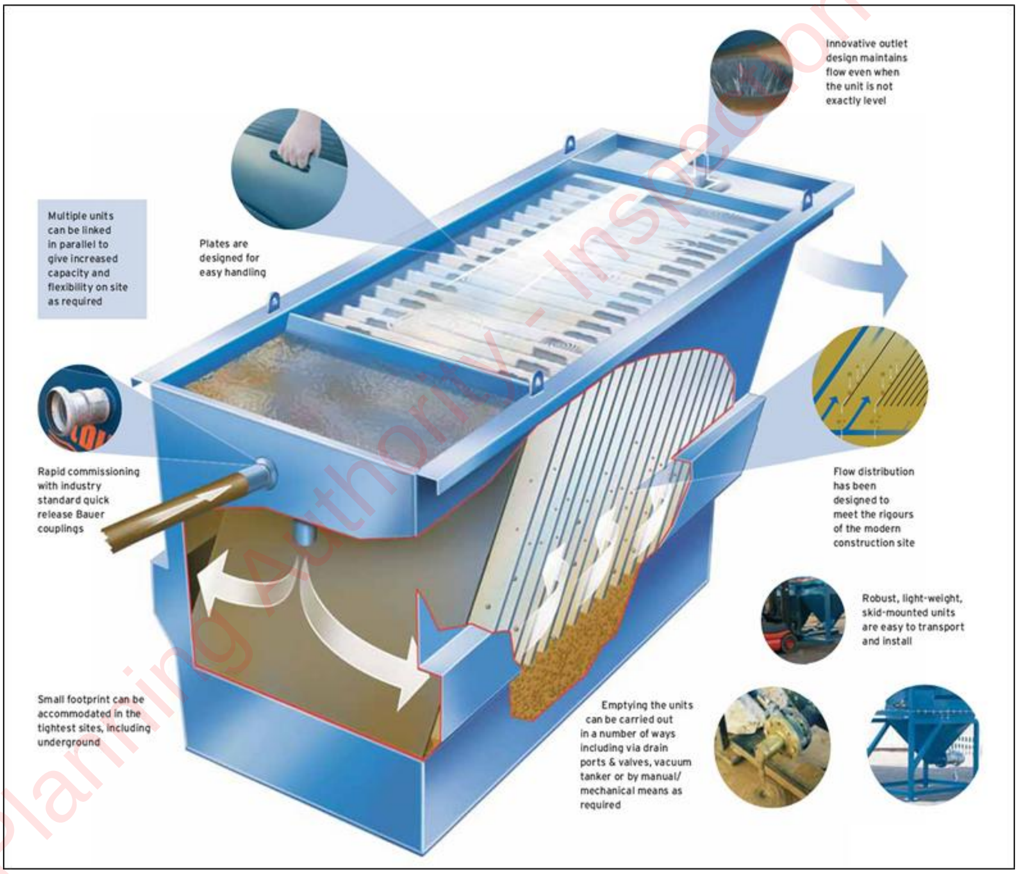

Figure 4-36 Siltbuster (Source: https://www.siltbuster.co.uk/sb_prod/siltbuster-fb50-settlement-unit/)

4.7.4.9 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 outflow.

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 with water being pumped through

Plate 4-8 Silt bag under inspection

4.7.4.10 Sedimats

Sediment entrapment mats (see Plate 4-9 and Plate 4-10 below), 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.

Plate 4-9 Typical Sedimat Details (Source: https://www.hy-tex.co.uk/)

Plate 4-10 Typical Sedimat Details (Source: https://www.hy-tex.co.uk/)

4.7.4.11 Culverts

1 no. existing culvert crossings will require upgrading as part of the Proposed Project, this being along the upgrade of the L15053 public road section within the Site. 2 no. new culvert crossings will also be required for the Proposed Project, the first being at the operational site entrance and the second new culvert crossing being along the new access track north of T3. Please see Appendix 4-4 Drainage Design for exact locations of new culvert crossings and location of upgrade to existing culvert.

Furthermore, as part of the accommodation works required for the turbine delivery route, an extension of an existing culvert along a small stream on the junction between the L1505 and L1506 will be required.

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 access track to the other for discharge. The size of culverts will be influenced by the depth of the track sub-base. In some cases, two or more smaller diameter culverts may be used where this depth is limited, though this will be avoided as they will have a higher associated risk of blockage than a single, larger pipe. 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 access track 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.

4.7.4.12 Silt Fences

Silt fences will be installed as an additional water protection measure around existing culverts, natural and / or man-made drainage features where required and the proposed locations are indicated on the drainage design drawings included in Appendix 4-4 of this EIAR.

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.

4.7.4.13 Hydrocarbon Interceptors

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 compound and substation compound) or where it is proposed to park vehicles during the construction and operational phases of the Proposed Project (i.e., construction compound and substation compound).

4.7.4.14 Tree Felling Drainage

Tree felling will be required within and around the Proposed Project footprint to allow for the construction of the proposed turbines, access tracks, 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.

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 to surface water quality protection for this activity which is summarised below. Also, prior to the commencement of tree felling for subsequent access track 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 trackside 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 agree the positioning by the Operator of the required Aquatic Buffer Zones (ABZs) i.e., 10m drainage and 50m watercourse where required, 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 operations 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 downstream 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 access tracks and culverts will be inspected prior to any machinery being brought on Site to commence the felling operation. Vehicles will only use existing access track infrastructure.
- 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 ensure 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 brash is required to form brash mats, it is to be laid out at harvesting stage to prevent soil disturbance by machine movement.
- Brash 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 will be planned to minimise the number of machine passes in any one area.
- Extraction routes, and hence brash mats, will be aligned parallel to the ground contours where possible.
- Harvested timber will be stacked in dry areas, and outside any watercourse buffer zones. 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.

4.7.5 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. This operation normally occurs over a period of 2-4 hours.

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. Excess subsoil is removed from the cable trench works area immediately upon excavation, and in the case of the Proposed Project, would be transported to one of the on-site designated spoil management areas or used for landscaping and reinstatement of other areas elsewhere on-site.

4.7.1 Site Drainage Management

4.7.1.1 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 above will be installed prior to, or at the same time as the works they are intended to drain.

4.7.1.2 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.

4.7.1.3 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 the most appropriate situation on the ground as a particular time.

4.7.2 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.

4.8 Construction Management

4.8.1 Construction Timing

It is estimated that the construction phase of the Proposed Project will take approximately 12-18 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 occur outside the bird breeding season (1st of March to 31st of August) to avoid any potentially significant effects on nesting birds. Construction 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) or as otherwise conditioned as part of the consent. 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 could be necessary on occasion to work outside of these hours. Any such out of hours working will be agreed in advance with the Mayo County Council.

Works along public roads will be from 7.00 a.m. to 7.00 p.m. Monday to Friday and 9.00 a.m. to 2.00 p.m. on Saturdays. A permit for moving abnormal loads will be sought from An Garda Síochána for the nighttime movement and delivery of oversized wind turbine components (i.e. blades, nacelles and towers). There will be no work on Sunday or bank holidays unless pre-approved with Mayo County Council.

4.8.2 Construction Sequencing

The construction phase can be broken down into three main overlapping phases and will take approximately 12-18 months to complete 1) civil engineering works - 8 months, 2) electrical works including grid connection works – 7-10 months, and 3) turbine erection and commissioning - 6 months. The main task items under each of the three phases are outlined below.

Civil Engineering Works

- Erect all necessary safety signage.
- Create new entrance(s) and hardcore existing entrances (where required).
- Clear and hardcore area for temporary site offices. Install same.
- Construct bunded area for oil storage.
- Construct new site permanent and temporary access tracks, hard-standings and crane pads.
- Construct drainage ditches, culverts etc. integral to access track construction.
- Excavate/pile for turbine bases where required. Place blinding concrete to turbine bases. Fix reinforcing steel and anchorage system for tower section. Construct shuttering. Fix any ducts etc. to be cast in. Pour concrete bases. Cure concrete. Remove shutters after 3-5 days.
- Backfill tower foundations and cover with previously stored granular material.
- Excavate trenches for site cables, lay cables and backfill. Provide ducts at access track crossings.
- Complete site works, reinstate site.
- Remove temporary site offices. Provide any gates, landscaping, signs etc. which may be required.

Electrical Works

- Construct the substation compound hardcore footprint, including ancillary temporary construction compound.
- Establish the temporary construction compound.
- Construct bases/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.
- Establish traffic management.
- Excavate and install pre-cast concrete joint bays.

- Excavate trench for ducting & place ducting, backfill with graded granular fill material, reinstate temporary surface.
- Install cable, including jointing.
- Test installation and carry out permanent reinstatement of carriageway.
- Commission the substation.

Turbine and Met Mast Erection and Commissioning

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

All relevant Site Health & Safety procedures, in accordance with the relevant Health and Safety Legislation and guidance (listed in Section 5.5.2.2.1 of this EIAR), including the preparation of the Health & Safety Plan, erection of the relevant and appropriate signage on site, 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 1st January has been selected as an arbitrary start date for construction activities.

Table 4-4 Indicative Construction Schedule

		Year 1				Year 2			
ID	Task Name	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Site Health and Safety								
2	Grid Connection								
3	Site Compounds								
4	Site Access Tracks								
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								

4.8.3 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 Project Developer, in an 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 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 the mitigation measures must be the subject of regular review and audit during the full construction stage of the project. If some 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 findings of the audit. 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, peat and spoil 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 compiled in the Audit Report which is included in Section 6 of the CEMP. The implementation of the mitigation measures 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 ensures that the mitigation measures are maintained for the duration of the construction phase, and into the operational phase where necessary.

4.9 Construction Methodologies

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 are included in Section 2.3 of the CEMP, included as Appendix 4-5 of this EIAR.

4.9.1 Proposed Wind Farm

4.9.1.1 Turbine and Met Mast Foundations

Each of the turbines to be erected at the Site will have reinforced concrete foundations that are installed below the finished ground level. It is anticipated that the turbine foundations will be formed on competent strata (i.e. bedrock or subsoil of sufficient load bearing capacity). As detailed above in Section 4.4.1.1.2, numerous intrusive site investigations were undertaken across the Site, to provide detail and clarity on the nature and extent of subsoils and bedrock as a means of characterising the Site. This assisted in providing additional information on the most suitable location for turbines and associated infrastructure.

Please note, confirmatory ground investigative works will take place prior to construction of turbine foundations. As identified in Appendix 8-1 Geotechnical & Peat Stability 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 gravity foundations.

For gravity type turbine foundations, where the depth of excavation exceeds the required founding depth for the proposed turbine base, up-fill material consisting of granular fill (6N) shall be used to backfill the excavation to the required founding depth.

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 be raised with Clause 6F2 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 to an adjacent settlement pond.

An embankment approximately 600mm high will be constructed around the perimeter of each turbine 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 100mm of blinding 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 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 4.4.1.1.4 above, 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.

4.9.1.2 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 track 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 4-11 below illustrating an example of a single 33kV cable trench and Plate 4-12 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 EIAR. The cabling may be placed on either side of the access track footprint, on both sides of the track and/or within the track. The exact configuration of the underground cabling will be set by the requirements of the electrical designers at detailed design stage.

Plate 4-11 Typical Single Cable Trench View

Plate 4-12 Typical Trefoil Cable Trench View

4.9.1.3 Borrow Pit

The estimated volume of stone material to be extracted from the borrow pit for the construction of the Proposed Wind Farm is up to 16,000m^3. This figure presented is the anticipated maximum volume; however, the actual volume to be removed from the borrow pit will be confirmed at the time of construction and following detailed pre-construction site investigation works.

The borrow pit will be excavated and backfilled as follows:

i. *It is proposed to construct the borrow pit so that the base of the borrow pit is below the level of the adjacent section of access track.*
ii. *Slopes within the excavated granular material formed around the perimeter of the borrow pit will be formed at stable inclinations to suit local conditions, at an angle of 45 degrees.*
iii. *The stability of the slopes within the borrow pit will be inspected by the Project Geotechnical Engineer upon excavation to ensure stability during construction works and in the long term. This inspection will allow unfavourable conditions to be identified and suitable mitigation measures to be applied.*
iv. *It will be necessary to construct a buttress along the perimeter of the borrow pit to maximise the storage capacity. The buttress will be constructed of selected granular fill and placed and compacted in suitable layers to form a buttress of sufficient stability to retain the placed peat and spoil. The founding stratum for the buttress will be inspected and approved by the Project Geotechnical Engineer.*
v. *The height of the buttress constructed will be greater than the height of the reinstated peat and spoil to prevent any surface peat and spoil run-off. Buttresses up to 3m in height are likely to be required.*
vi. *Infilling of the peat and spoil will commence at the back edge of the borrow pit and progress towards the borrow pit entrance/rock buttress, allowing the borrow pit to be developed and infilled in cells. The contractor excavating the rock will be required to develop the borrow pit in a way which will allow the excavated peat and spoil to be reinstated safely.*
vii. *In order to prevent water retention occurring behind the buttress, the buttress will be constructed of coarse boulder fill with a high permeability. The buttress will be constructed of well graded granular rock fill of about 100mm up to typically 500mm in size.*
viii. *The use of temporary access ramps and long reach excavators during the placement of the excavated peat and spoil will be required.*
ix. *The surface of the placed peat and spoil will be shaped following backfill using excavators to allow efficient run-off of surface water from the placed arisings towards the perimeter of the borrow pit.*
x. *As the berms are slightly higher than the retained peat and spoil, drains will be provided at regular intervals through the berms, at the same level as the top of the peat surface, to prevent ponding of water around the edges of the repositories. These drains will be 150mm diameter flexible plastic drainage pipe or equivalent.*
xi. *A layer of geogrid to strengthen the surface of the placed peat and spoil within the borrow pit will be required.*
xii. *An interceptor drain will also be installed upslope of the borrow pit. This drain will divert any surface water away from the borrow pit and hence prevent water from ponding and lodging during construction and also when reinstated.*
xiii. *Temporary control of groundwater within the borrow pit will be required and exact measures will be determined as part of the confirmatory ground investigation programme. A temporary pump and suitable outfall locations will be required during construction.*

xiv. *A settlement pond will be constructed at the lower side/outfall location of the borrow pit.*
xv. *The acrotelm will be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the peat and spoil within the borrow pit.*
xvi. *Supervision by the Project Geotechnical Engineer will be carried out for the development of the borrow pit.*
xvii. *All the above-mentioned requirements will be implemented by the Contractor during construction.*

Upon removal of the sand and gravel from the borrow pit, it is proposed to reinstate the borrow pit using excavated peat and spoil. The majority of the material backfilled into the borrow pit will be non-peat spoil. The excavated granular material from the borrow pit will be used in the construction of the infrastructure elements (turbine bases, tracks, etc.) for the Proposed Project.

Two extraction methods have been assessed for breaking out the useful rock below: rock breaking and blasting.

4.9.1.3.1 Rock Breaking

Weathered or brittle rock can be extracted by means of a hydraulic excavator and a ripper attachment. This is a common extraction methodology where fragmented rock is encountered as it can be carefully excavated in layers. In areas where stronger rock is encountered and cannot be removed by means of excavating then a rock breaking methodology may be used. Rock breaking equipment comprises a large hydraulic 360-degree excavator with a rock breaker attachment. Given the power required to break out tight and compact stone at depth, the machines are generally large and in the 40-60 tonne size range. Even where rock might appear weathered or brittle at the surface, the extent of weathering can quickly diminish with depth resulting in strong rock requiring significant force to extract it at depths of only a few metres.

A large rock breaking excavator progressively breaks out the solid rock from the ground in the borrow pit area. A smaller rock breaker, in the 30-40 tonne size range, then breaks the rocks down to a size that can then be fed into a crusher.

The extracted, broken rock is loaded into a mobile crusher using a wheeled loading shovel and crushed down to the necessary size of graded stone required for the on-site civil works. The same wheeled loader takes the stone from the crusher conveyor stockpile and stockpiles it elsewhere within the borrow pit, away from the immediate area of the crusher, until it is required elsewhere within the Site.

4.9.1.3.2 Rock Blasting

Where blasting is used as an extraction method, a mobile drilling rig is used to drill vertical boreholes into the area of rock that is to be blasted. A drilling rig will drill the necessary number of boreholes required for a single blast in approximately 3 to 4 days. The locations, depth and number of boreholes are determined by the blast engineer. This is a specialist role fulfilled by the blasting contractor.

The blast engineer will arrange for the necessary quantity of explosive to be brought to site to undertake a single blast. The management of explosives on-site and the actual blasting operation will be agreed in advance with and supervised by An Gardaí Siochána. The blast engineer sets the explosives in place in the boreholes, sets the charges, and fires the blast.

A properly designed blast should generate rock of a size that can be loaded directly into a mobile crusher, using the same wheeled loader outlined above. The same method is used for processing the rock generated from a blast, as would be used to process rock generated by rock breaking. Generally, the drilling rig will recommence drilling blast holes for the next blast as soon one blast finished. The potential impacts and control measures associated with noise and vibration from this extraction method are assessed in Chapter 12: Noise and Vibration. Any blasting will be carried out in accordance with the *Guidance on the Safe Use of Explosives in Quarries* (Safety and Health Commission for the Mining and Other Extractive Industries, 2002)[9] and the British Standard BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Noise*[10].

4.9.2 Proposed Grid Connection

4.9.2.1 Onsite Electricity Substation and Control Buildings

The proposed onsite 110kV substation will be constructed to loop-in to the existing Cloon- Castlebar 110kV OHL. The proposed 110kV substation will be made up of a control building, transformer compound and busbar compound, and will be constructed using the following methodology:

i. *This new substation will be in a compound of circa 125m x 100m plan area secured by a 2.6m high palisade fence.*
ii. *The substation compound and drainage will be marked out by a qualified engineer.*
iii. *A drainage system will be excavated and installed around the compound area.*
iv. *Topsoil and subsoil will be removed from the footprint of the compound using an excavator. The excavated material will be temporarily stored in adjacent berms for later use during reinstatement works.*
v. *A layer of geotextile material will be laid over the footprint of the compound.*
vi. *Using an excavator, a base layer of Clause 804 material will be laid followed by a 6F2 capping layer which will provide the finished surface.*
vii. *Each layer will be compacted using a vibrating roller.*
viii. *Earthing cable will be laid underground around the substation for connection to the various electrical components during the electrical fit out phase.*
ix. *The construction of an 12,206.8m² substation compound comprising of approx. 437.5m² single storey 110kV substation control building, a 216.4m² IPP building and associated outdoor electrical equipment, including 1 no. 110kV transformer, associated internal access track, 2.6m high station perimeter fencing and concrete post and rail property boundary fence will be built.*
x. *Adequate lighting will be installed around the compound on the lighting masts.*
xi. *Lightning protection masts of approximate height 18m will be installed to protect the station from direct lightning strikes.*
xii. *The electrical installation is expected to take 20 weeks and includes the following:*
    a. *Delivery and installation of 33/110kV transformer. These are unusually large and the deliveries will be managed in accordance with regulations governing the movement of large loads.*
    b. *Delivery and installation of all other HV equipment.*
    c. *Wiring and cabling of HV/LV equipment, protection and control cabinets.*
    d. *Commissioning of all newly installed equipment.*

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[9] https://www.hsa.ie/eng/Publications_and_Forms/Publications/Mines_and_Quarries/Guidance%20on%20the%20Safe%20Use%20of%20Explosives%20in%20Quarries.pdf
[10] https://www.thenbs.com/PublicationIndex/documents/details?Pub=BSI&DocID=305965

Plate 4-13 Typical 110kV electrical infrastructure

Plate 4-14 Typical 110kV transformer connection

4.9.2.2 Underground Electrical (110kV) Cabling

The underground cabling works will consist of the installation of ducts in an excavated trench to accommodate electrical and fibre communications cables to facilitate a loop connection between the proposed 110kV on-site substation and the existing 110kV Cloon - Castlebar OHL.

The proposed UGC will consist of 2 No. trenches with a minimum of 2m separation distance between each circuit. Each trench will contain 3 No. 160mm diameter HDPE power cable ducts and 3 No. 125mm diameter HDPE communications duct to be installed in an excavated trench, typically 825mm wide by 1,315mm deep, with variations on this design to adapt to bridge crossings, service crossings and watercourse crossings, etc. The power cable ducts will accommodate 3 No. power cables. The communications duct will accommodate a fibre cable to allow communications between the Cunlaghfadda substation and the adjoining Cloon and Castlebar 110kV substations. The ducts will be installed, the trench reinstated in accordance with landowner/ Mayo County Council specification, and then the electrical cabling/fibre cable is pulled through the installed ducts. Construction methodologies to be implemented and materials to be used will ensure that the UGC is installed in accordance with the requirements and specifications of EirGrid and ESB.

The following outlines the methodology to be followed during trenching works:

i. The Contractor, and their appointed Site Manager, will prepare a targeted Method Statement concisely outlining the construction methodology and incorporating all mitigation and control measures included within the planning application and accompanying reports and as required by planning conditions where relevant;
ii. All existing underground services shall be identified on site prior to the commencement of construction works;
iii. Where the cable route intersects with culverts, the culvert will remain in place (where possible) and the ducting will be installed either above or below the culvert to provide minimum separation distances in accordance with ESB and Irish Water specifications;
iv. Excavated material will be temporarily stockpiled onsite for re-use during reinstatement. Stockpiles will be restricted to less than 2m in height. Stockpiles will be located a minimum of 50m from surface water features and all stockpiling locations will be subject to approval by the Site Manager and Project Ecological Clerk of Works (ECoW);
v. Excavated material shall be employed to backfill the trench where appropriate and surplus material will be transferred to the spoil deposition area;
vi. Any earthen (sod) banks to be excavated will be carefully opened with the surface sods being stored separately and maintained for use during reinstatement;
vii. The excavated trench will be dewatered if required, from a sump installed within the low section of the opened trench. Where dewatering is required, dirty water will be fully and appropriately attenuated, through silt bags, before being appropriately discharged to vegetation or surface water drainage feature;
viii. Where required, grass will be reinstated by either seeding or by replacing with grass turves;
ix. No more than a 100m section of trench will be opened at any one time. The second 100m will only be excavated once the majority of reinstatement has been completed on the first;
x. The excavation, installation and reinstatement process will take an average of 1 no. day to complete a 100m section;

Plate 4-15 Typical 110kV underground duct installation on private land

For the trenching and ducting works the following step by step methodology will apply:

i. Grade, smooth and trim trench floor when the required 1315mm depth and 825mm widthhave been obtained.
ii. Place bedding layer of Cement Bound Granular Mixture B (CBGM B) material in accordancewith the specification and compact it so that the compacted thickness is as per the drawings.
iii. Lay the bottom row of ducts in trefoil formation as detailed on the design drawings. Usespacers as appropriate to establish horizontal duct spacing. Fit a secure cap / bung to the endof each duct run to prevent the ingress of dirt or water.
iv. Carefully surround and cover ducts with CBGM B in accordance with the design drawings and specifications and thoroughly compact without damaging ducts.
v. Place cable protection strips on compacted CBGM B directly over the ducts.
vi. Lay the top row of ducts onto the freshly compacted CBGM B including the cable protection strips above the bottom row of ducts. Place a secure cap at the end of each duct to prevent the ingress of dirt or water.
vii. Carefully surround and cover ducts with CBGM B material in accordance with the drawing sand thoroughly compact without damaging ducts.
viii. Place red cable protection strip on top of compacted CBGM B over each set of ducts as shown on the drawings.
ix. Place and thoroughly compact CBGM B material or Clause 804 backfill or soil backfill as specified and place warning tape at the depth shown on the drawings.
x. For unsurfaced/grass sections, backfill with suitable excavated material to ground level leaving at least 100 mm 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.
xi. Clean and test the ducts in accordance with the specification by pulling through a brush and mandrel. Install 12 mm polypropylene draw rope in each duct and seal all ducts using robust

duct end seals fitted with rope attachment eyes in preparation for cable installation later. All the works should be witnessed by ESBN Clerk of Works (CoW) as required.

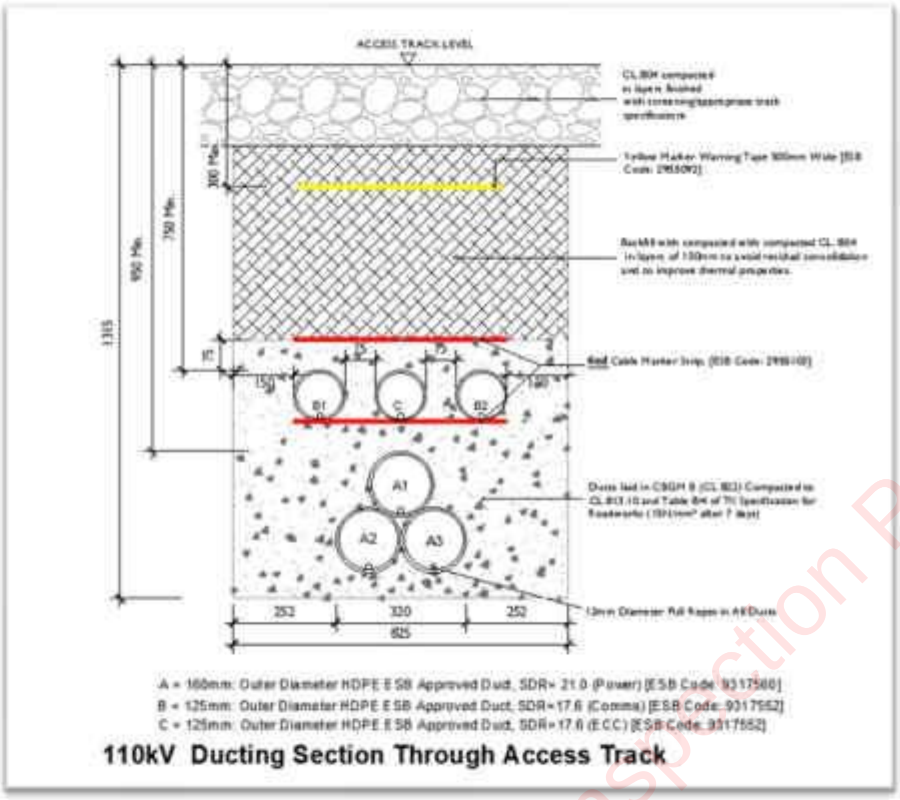

Plate 4-16 Typical single trench in access track

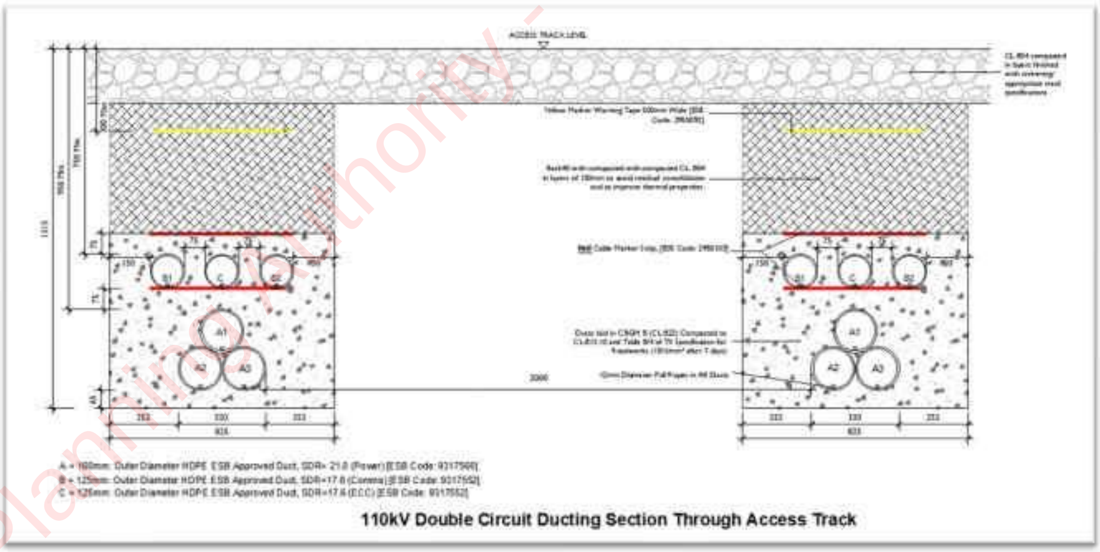

Plate 4-17 Typical double trench in access track

4.9.2.3 Connection Point to National Grid

It is proposed to connect the proposed on-site 110kV substation to the existing Cloon- Castlebar 110kV OHL. Two proposed end masts (lattice type towers) will be located immediately beneath the existing OHL. The existing OHL conductor will be terminated at these end masts to facilitate a new loop connection following the proposed c.982m underground grid connection route leading to the on-site 110kV substation. See Appendix 4-2 and Figure 4-24 for details.

The following section outlines the construction methodology for the new end mast structures which will be constructed underneath the existing Cloon- Castlebar 110kV OHL:

i. End Mast sites are scanned for underground services such as cables, water pipes etc. Consultation with the landowners and utility service providers will help to identify hazards and ensure there are no unidentified services in the area.
ii. For each leg of the 2 No. end masts (8 legs in total) a foundation circa. 4m x 4m x 3m deep is required. To allow for safe construction the excavation will be stepped back which requires additional area to be excavated or shutter piles used if ground material is not suitable for benching. The formation levels (depths) will be checked by the onsite engineer. The excavated material will be temporarily stored close to the excavation and excess material will be used as berms along the site access tracks.
iii. To aid construction, a concrete pipe is placed into each excavation to allow operatives level the mast at the bottom of the excavation. The frame of the reinforcing bars will be prepared and strapped to a concrete pipe with spacers as required. The reinforcing bars will be lifted into each excavated foundation using the excavator and chains/slings. The base and body section of each mast will then be assembled next to the excavation.
iv. Concrete trucks will pour concrete directly into each excavation in distinct stages.
v. A final pour for the mast is the encasing of the mast leg which will be finished 300mm over finished ground level. The leg of the mast is required to be shuttered with metal panels to form the required shape.
vi. Once the concrete is set after five days the shuttering is removed and if used sheet piles removed.

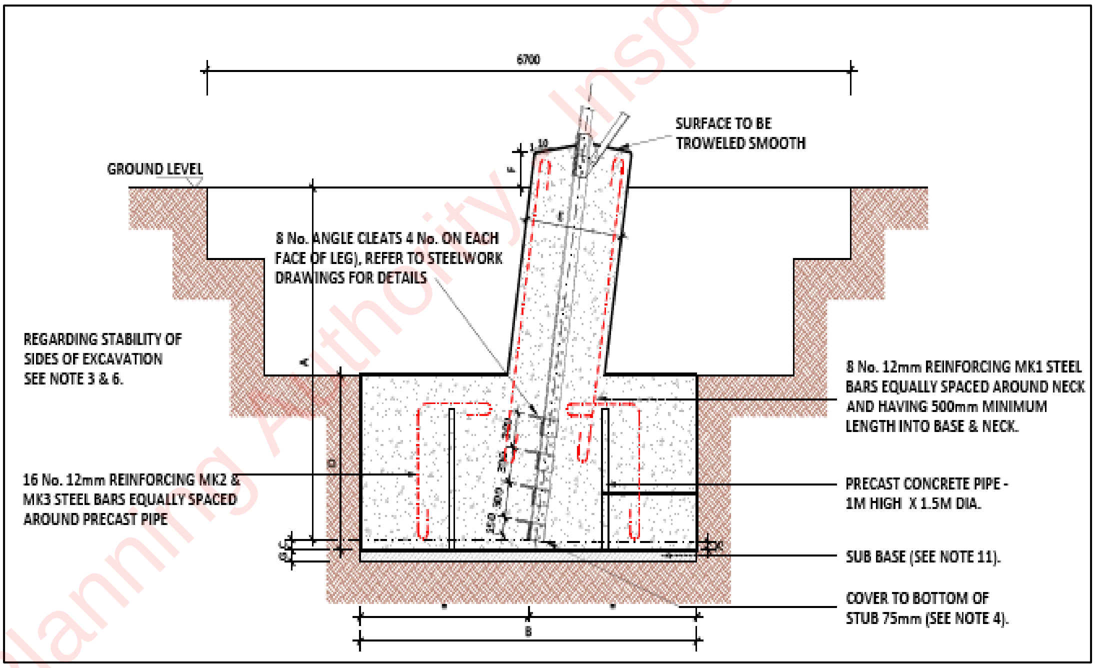

Plate 4-18 New End Mast Foundation

Plate 4-19 Typical 110kV end mast foundation excavation (example image)

vii. The end mast foundations will be backfilled one leg at a time with the material already excavated at the location. The backfill will be placed and compacted in layers. All dimensions will be checked following the backfilling process. All surplus excavated material will be removed from the mast locations and stored in berms for reuse across the construction site.

Plate 4-20 Base of end mast structure backfilled

viii. For the masts located under the existing line, the line will be de-energised by ESB so work can commence on the construction of the masts. Where it is offline the masts will be built without an outage.

ix. An earth mat consisting of copper or aluminium wire will be laid circa 400mm below ground around the mast. This earth mat is a requirement for the electrical connection of the equipment on the mast structure.

x. Once the base section of each mast is completed and the concrete sufficiently cured, it is ready to receive the mast body.
xi. A hardstand area for the crane will be created by laying geogrid material on the ground surface and overlaying this geogrid with a suitable grade of aggregate.
xii. A physical barrier (Heras Fence Site Boundary) will be put in place to restrict plant from coming too close to the OHL.
xiii. The mast will be constructed lying flat on the ground beside the recently installed mast base.
xiv. The conductor will be moved off centre using a stay wire and weights to anchor the stay wire to ground.
xv. The mast section will be lifted into place using the crane and guide ropes.
xvi. The body sections will be bolted into position.
xvii. The conductor will be centred over the masts and held in place. Once the conductor is secured at both ends it is then cut and attached onto each mast. The section of conductor in between the two masts will be removed and utilised as connector wire for the new masts.
xviii. Down dropper conductors (For Electrical Connections, Insulators, Surge arrestors), shackles and all associated accessories required for transition from line to cable will be installed on the interface masts.
xix. The circuit will be tested in both directions before the line is re-energised.

Plate 4-21 End Mast under construction

Plate 4-22 Cable end mast

4.9.2.4 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. In order to facilitate the installation of an underground grid connection, 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 services. If found to be present, the relevant service provider will be consulted with in order to determine the requirement for specific excavation or relocation methods and to schedule a suitable time to carry out works.

If existing low voltage underground cables are found to be present, a trench will be excavated, and new ducting and cabling will be installed along the new alignment and connected to the network on either end. The trench will be backfilled with suitable material to the required specification. Warning strip and marking tape will be laid at various depths over the cables as required. Marker posts and plates will be installed at surface level to identify the new alignment of the underground cable, the underground cables will then be re-energised.

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.

4.9.2.5 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 by the site engineer, the appropriate crossing methodology identified in Section 4.9.3.1 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 4.8.4.9.3.1.4 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.

4.9.3 Proposed Project

The following sections outline the construction methodology for elements included as part of both the Proposed Wind Farm and the Proposed Grid Connection, with the construction methodologies being the same for both applications.

4.9.3.1 Culvert Crossings

All new proposed culverts and proposed culvert upgrades at field drain crossings required for the Proposed Project 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 access track 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 900m 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 track 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 4-27 for details.

4.9.3.2 Site Tracks and Hardstand Areas

Construction methodologies for site access tracks and hardstand relating to the Proposed Project detailed in Section 4.4.1.1.5 and Section 4.4.3.1 are detailed below.

4.9.3.2.1 *Upgrading of Existing Access Tracks and Public Road (L15053)– Types A and B*

Approximately 1km of the existing access tracks and 772m of public road (L-15053) will require upgrading for the Proposed Project which will comprise widening of the track/roadway to a total running width of approximately five metres, with wider sections at corners and the passing bay and the laying of a new surface dressing on the existing section of track/roadway where necessary. The track/road upgrade methodology will be undertaken as follows:

i. *Access track construction will be to the line and level requirements as per design/planning conditions.*

ii. *For upgrading of all existing excavated access tracks the following guidelines apply:*

   a. *Excavation of the access track will take place to a competent stratum beneath the peat, removing all peat and soft clay and backfilled with suitable granular fill.*

   b. *Benching of the excavation will be required between the existing section of access track and the widened section of access track where the depth of excavation exceeds 500mm.*

   c. *For a founded access track, the surface of the existing access track will be overlaid with up to 300mm of selected granular fill.*

   d. *Access tracks 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 track where the existing tracks shows signs of rutting, etc.*

   f. *For excavations in peat, side slopes will be not greater than 1 (v): 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 to ensure stability.*

iii. *For upgrading of existing access tracks constructed using a floated construction technique the following guidelines apply:*

   a. *The surface of the existing access track should be graded/tidied up prior to the placement any geogrid/geotextile, where necessary (to prevent damaging the geogrid/geotextile).*

   b. *Where granular fill has been used in the existing access track make-up, a layer of geogrid should be placed on top of the existing access track.*

   c. *The geogrid may be overlaid with up to 500mm of selected granular fill.*

   d. *Additional geogrid and granular fill may be required in certain sections of the works, such as where excessive rutting is noted in the existing track (to be confirmed by the designer).*

iv. *The finished track width will have a running width of approximately 5m, with wider sections on bends, corners and the passing bay.*

v. *On side long sloping ground any track widening works required will be done on the upslope side of the existing access track, where possible.*

vi. *At transitions between new floating and existing excavated tracks, a length of about 10m shall have all peat excavated and replaced with suitable fill. The surface of this fill shall be graded to accommodate wind turbine construction and delivery traffic.*

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

4.9.3.2.2 New Site Tracks- Types C and D

Approximately 3.7km of new access tracks will be constructed which will comprise an access track with a final running width of approximately five metres, with wider sections at corners and the laying of appropriate surface dressing on the new access track where necessary. It is also proposed to construct 615m of temporary construction tracks and 0.37ha of temporary widening areas at the Site to facilitate the delivery of turbines and abnormal loads. All temporary construction tracks will be constructed as excavated track. Approximately 2.5km of proposed new tracks will be excavated track and approximately 0.7km of proposed new track will be floating track. Approximately 615m of temporary construction tracks will be constructed as new excavated tracks.

Construction of New Excavated Tracks through Peat – Type C

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

i. *Prior to commencing the construction of the excavated tracks, movement monitoring posts will be installed in areas where the peat depth is greater than 2.0m, and in areas identified within the peat stability risk assessment (see Appendix 8-1 Geotechnical & Peat Stability Assessment, FT, 2025) as requiring monitoring.*
ii. *Interceptor drains will be installed upslope of the access track alignment to divert any surface water away from the construction area.*
iii. *Excavation of tracks will be to the line and level given in the design requirements. Excavation will take place to a competent stratum beneath the peat.*
iv. *Track construction will be carried out in sections of approximately 20m lengths i.e. no more than 20m of track will be excavated without replacement with stone fill. This length will be reduced to 5m in areas identified within the peat stability risk assessments.*
v. *Excavation of materials with respect to control of peat stability:*

   a. *Acrotelm (to about 0.3 to 0.4m of peat) will be required for landscaping and 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 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 tracks and hardstands before being placed into the permanent peat and spoil management areas or within the borrow pit. All peat and spoil management areas will be upslope of founded tracks/hardstands and will be inspected by the Project Geotechnical Engineer before material is stored in the area. No material is to be sidecast or stored on the in-situ peat on the downslope side of the access tracks.*

vii. *Excavation side slopes in peat will be not greater than 1 (v): 3 (h). This slope inclination will be reviewed during construction, as appropriate. Should areas of weaker peat be encountered then slacker slopes will be required. Battering of the side slopes of the excavations will be carried out as the excavation progresses.*

viii. *End-tipping of stone onto the track during the construction/upgrading of the access track will be carefully monitored to ensure that excessive impact loading, which may adversely affect the adjacent peat, is limited.*

ix. *The excavated access track will be constructed with a minimum of 500mm of selected granular fill. Granular fill will be placed and compacted in layers in accordance with the TII Specification for Road Works.*

x. *Access tracks will be finished with a layer of capping across the full width of the track.*

xi. *A layer of geogrid/geotextile may be required at the surface of the competent stratum.*

xii. *Where slopes of greater than 5 degrees are encountered along with relatively deep peat (i.e. greater than 2m) and where it is proposed to construct the access track 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.*

xiii. *Where the above is not possible, a specific Risk Assessment Method Statement (RAMS) from the contractor will be produced, detailing how the downslope works will be undertaken, including that all plant would operate from the already constructed section of track, with no loading of the peat on the downslope slope and limiting the length of ground to be stripped/excavated at any one time. Movement monitoring posts (as described in Appendix 4-3 Peat & Spoil Management Plan, Section 9.1) will also be installed downslope of the works area to allow for ongoing monitoring during the construction works.*

xiv. *A final surface layer will be placed over the excavated track and graded to accommodate wind turbine construction and delivery traffic.*

xv. *The construction and upgrading of access tracks 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 and following intense rainfall events.*

Construction of New Floating Access Tracks over Peat – Type D

The construction methodology for the sections of new floating access tracks is outlined below. This methodology includes procedures that will be included in the construction to minimise any adverse effecton peat stability.

It should be noted that details of geogrid arrangement will be provided by the specialist geogrid provider/designer.

i. *Prior to commencing floating track construction movement monitoring posts will be installed in areas where the peat depth is greater than 2m.*

ii. *Base geogrid will be laid directly onto the existing peat surface along the line of the track in accordance with geogrid provider's requirements.*

iii. *Construction of the track will be in accordance with the appropriate design from the designer.*

iv. *The make-up of the new floated access track 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 the TII Specification for Road Works.*

vi. *Following the detailed design of the floated access tracks it may be deemed necessary to include pressure berms either side of the access track 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 track will reduce the likelihood of potential bearing failures beneath the access track.*

vii. *The finished track width will be 5m, with wider sections on bends and corners.*

viii. *Stone delivered to the floating track construction will be end-tipped onto the constructed floating track. Direct tipping of stone onto the peat will not be carried out.*
ix. *To avoid excessive impact loading on the peat due to concentrated end-tipping all stone delivered to the floating track will be tipped over at least a 10m length of constructed floating track.*
x. *Where it is not possible to end-tip over a 10m length of constructed floating track then dumpers delivering stone to the floating track 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 track.*
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 track.*
xii. *A final surface layer will be placed over the full width of the floating track, as per design requirements, to provide a track profile and graded to accommodate wind turbine construction and delivery traffic.*

4.9.3.3 Temporary Construction Compound

As discussed in section 4.4.1.4, there are two proposed construction compounds; one in the southwest of the Site and forms part of the Section 34 application (Proposed Wind Farm) and one adjacent to the proposed 110kV substation which will be subject to a Section 182A application (Proposed Grid Connection). Both compounds will be constructed in the same manner as follows:

i. The area to be used as the compound will be marked out at the corners using ranging rods or timber posts. Drainage runs and associated settlement ponds will be installed around the perimeter;
ii. The compound platform will be established using a similar technique as the construction of the substation platform as discussed below in section 4.9.2.1;
iii. 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;
iv. A limited amount of fuel will have to be stored in appropriately bunded containers and a designated area for oil storage will be constructed within the compound.
v. Areas within the compound will be constructed as access tracks and used as vehicle hardstandings during deliveries and for parking;
vi. A bunded containment area will be provided within the compound for the storage of lubricants, oils and site generators etc;
vii. A waste storage area will be provided within the compound;
viii. The compound will be fenced and secured with locked gates if necessary; and,
ix. Upon completion of the Proposed Project, the temporary construction compounds will be decommissioned and allowed to vegetate naturally.

4.9.3.4 Peat and Spoil Management Areas

The following recommendations and best practice guidelines for the placement of peat and spoil in the identified peat and spoil management areas, alongside the site access tracks, and as landscaping around turbines will be adhered to during the construction of the Proposed Project:

i. Excavated peat/spoil will be placed/spread on the upslope side of sections of access tracks. These locations are shown in Figure 4-28. Excavated spoil will only be placed in areas where there is no/limited peat (<0.3m), such as around the substation and close to T04, T06 and T07.
ii. The peat placed within the areas shown in Figure 4-29 will be restricted to a maximum height of 1.25m.
iii. The spoil placed in the areas shown in Figure 4-30 will be restricted to a maximum height of 1.5m.

iv. 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.
v. 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.
vi. It will be ensured that the surface of the placed peat is 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 progresses. This will reduce the likelihood of debris run-off and reduce the risk of instability in the placed peat.
vii. 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.
viii. 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 within the peat and spoil management areas.
ix. 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.
x. Supervision by the Project Geotechnical Engineer is required for the works.
xi. 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.
xii. All the above-mentioned commitments will be undertaken by the Contractor during construction.

4.10 Community Gain Proposal

4.10.1 Background

The Proposed Project 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 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, Cunlaghfadda Green Energy Ltd. is endeavouring to develop new ways to direct increased gain towards the local community with particular focus on those living closest to the Proposed Project.

The Applicant has given careful consideration to the issue of community gain arising from the Proposed Project, 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 Project 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 Project 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. Likewise, based on the Renewable Energy Support Scheme (discussed below) direct payments could be made to households within a certain catchment e.g. €1,000 annual payment to households within 1km of the proposed turbines.

4.10.2 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. These 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;*
   In respect of Onshore Wind RESS3 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 An Post's geodirectory;
   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;
   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
   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.

4.10.3 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 Project. 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 Community Benefit Fund 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 RESS, it would attract a community contribution in the region of approx. €145,000/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 current T&C's of RESS, the following would be required for the Proposed Project:

- **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 Wind Farm;
- **Education, Energy Efficiency, Sustainable Energy and Climate Action** – A minimum of 40% per year 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.
- **Administration costs** - a maximum of 10% of this fund to 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 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.

4.11 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 110kV 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.

4.11.1 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 site access tracks will involve filling potholes and maintaining access track edge markers. Drainage maintenance will typically involve cleaning of drainage ditches when required to prevent water backing up.

The proposed 110kV substation and site access tracks will also require periodic maintenance. The proposed 110kV 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.

Although daily visits are unlikely required, the site will be accessible on a day-to-day basis 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 both the Proposed Wind Farm and Proposed Grid Connection infrastructure is minimal, the effects associated with traffic volumes for this period are assessed in Chapter 15 Material Assets: Traffic and Transport.

4.11.2 Monitoring

Section 9 of the CEMP sets out a programme of monitoring required for the operational phase of the Proposed 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 will be carried out in accordance with guidelines issued by the Scottish Natural Heritage (SNH, 2009). Please see the Bird Monitoring Plan provided in Appendix 7-7.
- Post-construction bat monitoring will be undertaken for at least three years' post construction of the Proposed Project. Please see Section 6.4 of the Bat Report recommendations in Appendix 6-2.
- Post-construction linear habitat restoration monitoring following the main growing season (i.e., in September) in a given year for the first five years of growth.
- Post turbine commissioning noise monitoring within 6 months of commissioning the wind farm.

4.12 Decommissioning

The proposed wind turbines 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 would 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 disturbances such as noise, dust and/or vibration. Site access tracks will be used during the operational phase by farm machinery and therefore will be retained post decommissioning to facilitate these activities.

The underground electrical cabling connecting the turbines to the proposed 110kV 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 underground electrical cabling and proposed 110kV substation will remain in place as it will be part of the Electricity Grid under the ownership and control of ESB Networks and Eirgrid.

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 be agreed 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".*