Mable
Consulting Engineers

Grid Connection Option 1 Construction Methodology Report

Planning Application 2
Grid Connection Planning Application
Grid Connection to Castlebanny

Project:

Ballyfasy Wind Farm

Applicant:

Manogate Limited

Report Date:

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25516-GCO1 Grid Construction Methodology-P1

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Document Control

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1.0 Introduction

This report has been prepared by Mable Consulting Engineers on behalf of Manogate Limited (the Applicant), in support of a planning application for the proposed Ballyfasy Wind Farm.

The report is one of two reports addressing grid connection options for the project. It specifically outlines the construction methodology for Grid Connection Option 1 (GCO1). See report reference 25516-GCO2 Grid Construction Methodology for the construction methodology for Grid Connection Option 2 (GCO2).

This report has been developed in conjunction with the Environmental Impact Assessment Report (EIAR), which will accompany the planning application for the proposed development.

The report is to be read in conjunction with the following documents:-

- Environmental Impact Assessment Report (EIAR).
- Construction Environmental Management Plan (CEMP).
- Preliminary Traffic Management Plan (PTMP).
- The Grid Design Drawings.
- The Planning Drawings.

1.1 Background

The Grid Connection Route (GCR) does not form part of the Ballyfasy Wind Farm Development Works but is being assessed as part of the preparation of the EIAR. The details provided on the Grid Connection are subject to detail design, in conjunction with ESB Networks (ESBN), EirGrid, Kilkenny Co. Co. and other Stakeholders, at a later date.

1.2 Scope

The purpose of this report is to provide details on the provisional GCR Construction Methodology for Grid Connection Option One (GCO1)

1.3 Report Layout

The report is structured as follows: -

- Section 1 – Introduction.
- Section 2 – 110kV Grid Connection Overview.
- Section 3 – Grid Route On-Site Assessment.
- Section 4 – Consents.
- Section 5 – Construction Management.
- Section 6 – Grid Connection Route Construction.
- Section 7 – Grid Connection Route Crossings.

1.4 Statement of Authority

This Provisional Grid Route Assessment Report has been prepared by Mr. Barry McGinn and Mr. Eoin Roche of Mable Consulting Engineers Limited.

Mr. Barry McGinn is a Chartered Engineer with over 28 years' experience in the design, construction and project management of civil and structural engineering projects including; Wind Farms, Solar Farms, Battery Storage,

Electrical Substations, Flood Alleviation, and multiple other development types. Barry is a member of Engineers Ireland and holds a BSc(Eng) in Structural Engineering, BEng (Ord) in Civil Engineering and Post Graduate Diplomas Planning and Environmental Law, Construction Law & Contract Administration and Project Management.

Mr. Eoin Roche, the co-author of this report, holds a Bachelor of Engineering (Hons) in Structural Engineering and a Postgraduate Diploma (Distinction) in Sustainable Energy and the Environment. With five years of experience, Eoin has been involved in the design and construction of a diverse range of civil and structural engineering projects. His knowledge spans several critical areas of renewable energy infrastructure, including wind farms, solar farms, battery energy storage systems (BESS), synchronous compensators, and electrical substations and grid connection routes. Eoin's multidisciplinary background and experience in both traditional engineering and sustainable energy solutions enable him to effectively and accurately address the environmental and technical considerations of this report.

2.0 110kV Grid Connection Overview

Grid Connection Option One (GCO1) will consist of approximately 12km of underground 110kV electrical cable, connecting the proposed Ballyfasy 110kV Substation to the proposed Castlebanny 110kV Substation in the townland of Castlebanny Co. Kilkenny, An Coimisiún Pleanála Case Reference Number 309306.

The Grid Connection works will consist of the installation of 6 No. ducts in an excavated trench to accommodate 3 No. power cables, 1 No. fibre communications cable to allow communications between the Ballyfasy Wind Farm Substation and Castlebanny 110kV substation, 1 No. spare fibre communications cable and 1 No. earth continuity duct where required.

Due to the narrow width of the public road network in the area, the grid connection will be constructed primarily within the public road roadway. Sections of the grid connection will be constructed in private land at the beginning and the end of the route. GCO1 is outlined in Figure 2-1.

The 110kV High Voltage Underground Cable Connection construction shall be in accordance with EirGrids 110 kV, 220 kV and 400 kV Underground Cable Functional Specification (CDS-GFS-00-001-R2).

Drawings of the GCR along with site specific crossing details and typical GCR construction details are contained in Appendix A.

2.1 Grid Route Location

An overview of the GCO1 location is outlined in Figure 2-1, further details can be found on drawing 25516-1200 contained in Appendix A.

Figure 2-1 – GCO1 Overview

2.2 Grid Route Summary

The key elements of the proposed Grid Connection Route (GCR) are outlined in Table 2-1.

Item	Description
Substations	
Ballyfasy Substation	Ballyfasy Substation is to be constructed as part of Ballyfasy wind farm. The substation is located at the northwest corner of the site.
Castlebanny Sbubstation	Castlebanny Substation is to be constructed as part of Castlebanny wind farm. The substation is located at the end of the grid route
Grid Construction Details	
Grid Constructed in Public Roads	8.45km
Grid Constructed in Private lands	3.55km
Total Length of Grid	12km
Infrastructure Details	
Ducting	6 No. ducts in an excavated trench to accommodate 3 No. power cables, 1 No. fibre communications cable to allow communications between the Ballyfasy Wind Farm Substation and Castlebanny 110kV substation, 1 No. spare fibre communications cable and 1 No. earth continuity duct where required
Joint Bays	16 No. Joint Bays are to be constructed as part of the grid route construction
Communications Chambers	16 No. Communications Chambers are to be constructed as part of the grid route construction
Earthing Link Boxes	16 No. Earthing Link Boxes are to be constructed as part of the grid route construction
Crossings Details	
Watercourse Crossings	6 No. Watercourse Crossings have been identified along the grid route which will be crossed using the horizontal directional drilling method
Culvert Crossings	4 No. Culvert Crossings have been identified along the grid route which will be crossed open dig methodology
Road Crossings	3 No. Road Crossings have been identified along the grid route
HV Cable Crossings	2 No. HV Crossings has been identified along the grid route
Other Works	
Relocation of Services	The relocation of existing services as they are encountered along the grid connection route may be required
Ancillary Works	All associated infrastructure and traffic management required for the construction of the grid connection route

Table 2-1 – Grid Route Summary

3.0 Consents

The key consents, licenses, notifications and permissions required for the GCR construction include the following:-

- Planning Permission and associated Planning Compliance.
- Commission for Regulation of Utilities (CRU) Authorisation and Licence to Generate.
- CRU Section 48 Application; The power to lay electric lines across or under a street, road, railway or tramway, and the right to break up any street, road, railway or tramway for that purpose.
- Cru Section 49 application; The power to lay electric lines across or under any land not being a street, road, railway, or tramway.
- ESBN Functional Specification.
- Office of Public Works (OPW) Section 50 Consent for watercourse crossings.
- Public Road Opening Licenses.
- Public Road Closure and / or Partial Lane Closure Permits.
- 3rd Part Land Agreements.

The consents, licenses, notifications and permissions list above is a non-exhaustive list and will be reviewed prior to construction and regularly thereafter to ensure that the programme is achieved, and new consent requirements are identified as early as possible.

To avoid delays to the project programme, all required construction stage consents will be sought by the appointed designers and contractors prior to commencement.

4.0 Construction Management

4.1 Safety and Health

The contractor shall ensure compliance with all safety legislation and guidelines including but not limited to the following:

- Safety, Health and Welfare at Work Act 2005.
- Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291/2013).
- Safety, Health and Welfare at Work (General Application) Regulations 2007 – 2020.
- H.S.A. Code of Practice for Avoiding Danger from Underground Services.
- H.S.A. Code of Practice for Safety in Excavations.
- Code of Practice for Working on Roads.
- EirGrid's Functional Specifications for Underground Cables.
- ESB Code of Practice Documents.
- CIF Construction Safety Partnership Guidelines.

4.1.1 Project Supervisor Design Process (PSDP)

The design and construction the proposed grid connection works are governed by the Safety, Health and Welfare at Work Act 2005 and also by S.I. No. 291 of 2013 the Safety, Health and Welfare at Work (Construction) Regulations 2013 (H&S Construction Regulations).

The scale and scope of this project requires that a Project Supervisor Design Process (PSDP) and Project Supervisor Construction Stage (PSCS) are appointed by the Employer (referred to as the client in the Construction Regulations).

The role of the PSDP is to ensure co-ordination of the work of designers throughout the project. This role has been performed by TOBIN up to the end of the planning stage of the project.

The Employer will appoint a PSDP for the construction stage of the project, the PSDP will report directly to the Employer. The duties of the PSDP will include:-

- Identify hazards arising from the design or from the technical, organisational, planning or time related aspects of the project;
- Work with and coordinate designers to design out safety, health and environmental risks at source where possible so as to eliminate / reduce these risks during the construction stage and during the operation, maintenance and decommissioning;
- Prepare a written Safety and Health Plan for the project taking into account any particular risks;
- Communicate necessary control measures, design assumptions and residual risks to the PSCS so they can be dealt with in the Construction Stage Safety and Health Plan;
- Ensure that the work of designers is coordinated in terms of Health, Safety and the Environment;
    - Coordinate the designers involved in the project, including any temporary works designs during the construction stage;
- Organise co-operation between designers;
- Prepare a safety file for the completed development and give it to the client;
    - The safety file is to include relevant detail on the project's design, operation, maintenance and decommissioning;
- Notify the HSA and the client of non-compliance with any written directions issued.

4.1.2 Project Supervisor Construction Stage (PSCS)

The role of the PSCS is to manage and co-ordinate health and safety matters during the construction stage.

The Employer will appoint a PSCS for the construction stage of the project, the PSCS will report directly to the Employer. The duties of the PSCS will include:-

- Development of the Safety and Health Plan for the construction stage and update as required as work progresses;
- Notify the Health and Safety Authority (HSA) before work commences;
- Provide required safety file information to the PSDP;
- Report accidents / incidents to the HSA and the client;
- Coordinate the implementation of the H&S Construction Regulations, monitor compliance and take corrective action where necessary;
- Organise cooperation between contractors;
- Coordinate the checking of safe work procedures and monitor compliance with the H&S Construction Regulations;
- Review and approval of contractor method statements and risk assessments;
- Coordinate arrangements to ensure workers have Safe Pass and relevant Construction Skills Certification Scheme (CSCS) cards;
- Coordinate measures to restrict entry to site;
- Provide a site induction to all site personnel and carry out Toolbox Talks as necessary;
- Maintenance of the site Safety Files which are to include detail on personnel on site, their training details and induction date;
- Coordinate the appointment of a Safety Representative (when there are 20+ people on site);

Notify the HSA and the client of non-compliance with any written directions issued.

4.1.3 Preliminary Health and Safety Plan

During the detailed design stage of the Project a Preliminary H&S Plan will be prepared by the PSDP and circulated to designers, potential contractors and other stakeholders. This plan will identify potential safety hazards associated with the site and the works and assess the associated risks. Mitigation and control measures will be recommended to minimise the identified risks.

The Preliminary H&S Plan will then be developed further by the PSCS to create the Construction Stage H&S Plan for the works. This plan will address all safety and health aspects of the construction process and provide relevant contact details and emergency response procedures for the Project.

The Construction Stage H&S Plan will detail the site induction and training requirements for site personnel.

4.1.4 Documentation and Communication

All relevant safety documentation will be readily available on site and communicated clearly to all relevant personnel. This will include, but is not limited to, service drawings, results of detection surveys, risk assessments, and associated method statements.

Safety-critical information will also be shared in advance with the Local Authority and with any subcontractors or utility providers working in the same area.

Toolbox Talks and Site Meetings will be carried out regularly to ensure that safety procedures are understood and followed throughout the duration of the works.

4.1.5 Training and Competency

All workers involved in underground cable installation or excavation shall be trained in excavation safety, underground services awareness, and the safe use of detection and hand tools. Only individuals who have received relevant, up-to-date training such as those holding SOLAS-accredited Construction Skills Certification Scheme

(CSCS) cards for relevant categories will be permitted to carry out excavation or service-related tasks. Site supervisors shall verify training records and ensure that only competent personnel undertake high-risk activities. Regular refresher training and on-site supervision will be carried out to maintain a safe work environment.

4.1.6 Risk Mitigation

Prior to the commencement of works, a comprehensive risk assessment shall be carried out in accordance with the Health and Safety Authority's guidance. This will include identifying all known and potential underground services using up-to-date utility records, site surveys, and appropriate detection technologies such as cable locators and ground-penetrating radar.

In areas where services are known or suspected to be present, safe digging practices must be followed, including hand-digging or vacuum excavation techniques, to prevent accidental contact with live or pressurised systems.

Contractors must maintain minimum clearance distances from existing infrastructure as set out in the HSA Code of Practice for Avoiding Danger from Underground Services. Particular attention will be paid to ensure adequate separation between the newly installed cables from existing water, gas, telecommunications, electrical, and other services.

4.2 Preliminary Requirements

Prior to any works commencing on site, the proposed design for the grid connection works including proposed traffic management will be reviewed and agreed with Kilkenny Co. Co.'s Road Engineer.

The proposed works will also be reviewed and agreed with other relevant stakeholders. Below is a non-exhaustive list of stakeholders whom the Applicant will liaise with prior to commencement of the works:

- Kilkenny County Council.
- EirGrid.
- ESBN.
- IFI.
- Uisce Éireann.
- Gas Networks Ireland.
- EIR.
- The Office of Public Works.

The below is a non-exhaustive list of tasks the Developer/ contractor shall carry out prior to commencement of the works:

- Consents from relevant stakeholders as per Section 3.0 will be sought.
- Ground conditions along the route of the cable to be comprehensively assessed through detailed site investigations.
- A Construction Stage Traffic Management Plan will be prepared and agreed with Kilkenny County Council.
- An on-site assessment of the works area will be carried out.
- A targeted method statement will be developed, outlining the construction methodology and incorporating all mitigation and control measures detailed in the planning application, supporting reports, and any relevant planning conditions.
- All existing overground and underground services will be identified and marked on site prior to the commencement of construction activities.

4.3 Temporary Construction Compounds

All plant and equipment will be stored either within the Grid Connection works area or in the Temporary Construction Compound located within the Ballyfasy Wind Farm Construction Site. Oils and fuels will be securely stored in a designated bunded area within the Ballyfasy Wind Farm Temporary Construction Compound, in compliance with environmental and safety regulations.

Given the length of the grid route, an additional temporary compound will be established on Folio KK16710 This will reduce travel distances for construction activities and improve operational efficiency along the grid connection corridor.

4.4 Traffic Management

Please refer the Traffic Management contained within the EIAR for further details.

4.5 Invasive Species Best Practice Measures

Please refer the Biodiversity Chapter of the EIAR for details.

4.6 Waste Management

Please refer the Waste Management contained within the EIAR for details.

4.7 Implementation of Environmental Protection Measures

All environmental protection measures contained with the EIAR and NIS (Natura Impact Statement) which accompanies the planning application will be incorporated into the CEMP and construction method statements prior to the commencement of development and will be implemented in full during the construction phase. The Project Manager and Site Manager will be responsible for the implementation of measures following consultation with the Environmental Manager where necessary.

4.8 Construction Hours

The hours of construction activity will be limited to avoid unsociable hours, where possible. Construction operations shall generally be restricted to between 07:00hrs and 19:00hrs on weekdays and between 07:00hrs and 14:00hrs on Saturdays.

It may be required to carry out works outside of the above hours, any such out of hours working will be agreed in advance with Kilkenny County Council.

4.9 Employment

For the Grid Connection construction, a peak workforce of approximately 10 persons is anticipated. There will be peaks and troughs in the numbers, with a larger workforce during the general cabling works.

4.10 Programme

Estimates for the duration of the construction works are included in the table below. Please note that some of the elements are likely to happen concurrently; therefore, the overall start-to-finish duration is estimated to be 18 months.

Development Element	Estimated Construction Duration
Substation Works	18 Months
Grid Ducting Works	5 Months
Reinstatement Works	2 Months
Cable Installation Works	2 Months
Commissioning	1 Month

Table 4-1 – Estimated Construction Duration

5.0 Grid Connection Route and Substation Construction

The following is a non-exhaustive list of items that will be adhered to during the construction of the GCR and Substation:

- Works will be supervised by the contractors site management team and other relevant stakeholders at all times.
- Trenching works will be undertaken in a manner to ensure that no more than circa. 250m sections of trench is opened at any one time.
- No spoil shall be stored within 50m of any watercourse.
- Cabins, containers, workshops, plant, materials storage and storage tanks shall not be located near any surface water channels and will be located beyond the 50m hydrological buffer at all times
- At watercourse crossings, the contractor will be required to adhere to the environmental control measures outlined within the EIAR, the CEMP and best practice construction methodologies.
- If dewatering is required as part of the proposed works e.g. in trenches for underground cabling or in wet areas, water must be treated prior to discharge.
- Where the grid connection intersects with culverts or other services, the culvert or service will remain in place (where possible) and the ducting will be installed either below or above the culvert to provide minimum separation distances in accordance with EirGrid and the relevant service providers specifications.
- In the event that a culvert require temporary removal or replacement during ducting installation due to its condition, it is proposed that a suitable method of damming the water source and pumping the water around the work area will be deployed as outlined in Section 5.4 and agreed with the relevant stakeholders. Once the ducts are installed the culvert will be reinstated to match existing levels and dimensions. If works of this nature are required, the contractor will liaise with Inland Fisheries Ireland in advance of works.

5.1 Substation Construction

The proposed sequence of works is as follows:

1. The Onsite Substation compound area will be outlined using ranging rods or wooden posts.
2. Perimeter drains will be installed or upgraded to collect surface water run-off from the Onsite Substation compound. This will involve the installation of check dams, silt traps and level spreaders to manage surface run-off effectively.
3. Topsoil will be stripped and carefully stockpiled for future landscaping use.
4. Subsoil will be excavated and retained on site by incorporated it into the perimeter of the compound area.
5. The Onsite Substation compound will be formed by constructing compacted layers of suitable hardcore;
6. The foundations for the substation building will be excavated down to the level indicated by the designer and concrete trench fill will be poured;
7. Steel reinforcement will be laid in place over the concrete trench fill and concrete foundations will be poured;
8. The blockwork walls for the building will be built up from the foundations to DPC level and the floor slab will be constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors;
9. Scaffold will be erected around the outside of the building;
10. The blockwork will then be raised to wall plate level and the gables & internal partition walls formed.
11. The concrete roof slabs will be lifted into position;
12. The construction and components of the substation buildings will be accordance with EirGrid requirements; The timber roof trusses at the building will be lifted into position using a telescopic loader

or mobile crane depending on site conditions. The roof trusses will then be felted, battened, tiled and sealed against the weather.

13. Installation of a domestic foul wastewater holding tank to hold effluent from the toilets within in the substation building;
14. Installation of a rainwater harvesting tank to collect rainwater from the roofs of the substation building for toilet flushing and hand washing;
15. Construction of foundations for CCTV security monitoring poles and palisade fencing will be commenced;
16. Construction of the transformer bund, equipment plinths etc. within the substation compound will be carried out;
17. Construction of underground cable ducts and trenches within the substation compound will be carried out;
18. Installation of electrical equipment within the substation compound and buildings including transformers, busbars, circuit breakers, cable supports, switchgear, panels etc. and all associated cabling.
19. CCTV Security Monitoring will be mounted on steel columns anchor-bolted to reinforced concrete foundations.
20. Perimeter security fencing and gates will be installed around the compound perimeter on completion of the installation of all electrical components within the compound including those described below.
21. On completion of the ground works areas to be returned to green filed will be re-topsoiled and landscaped

5.2 Grid Trenching Methodology

Cable ducts will be placed within a trench with a typical depth of 1315mm and width of 825mm.

Typical trench layouts for a GCR constructed in a green field and a public road are outlined on drawings 25516-1410, 25516-1411, and 25516-1412 contained in Appendix A.

The proposed sequence of works is as follows:

1. The preliminary tasks outlined in Section 4.2 will be carried out.
2. Traffic control measures will be implemented as agreed with Kilkenny County Council.
3. Pollution control measures will be implemented in advance of any excavation works being undertaken as agreed with Kilkenny County Council and IFI.
4. Circa 250m of trench will be excavated to the required dimensions.
5. Ccable Ducting will be carried out as outlined in Section 5.3.
6. Once reinstatement of the previous 250m of trench has been substantially finished, the next 250m of trench will be excavated.

5.2.1 Excavation and Fill Material Volumes

As part of construction of the proposed grid route, a significant volume of materials such as stone aggregate, concrete and road surfacing material will be required. The material estimates for the grid route are outlined in Table 5-1 below.

Item	Quantity (m^3)
Imported Stone Aggregate	5183
Concrete	6347
Road Surfacing	1690
Excavated Material	13220

Table 5-1 – Excavated and Fill Material Volumes

5.2.2 Managing Excess Material from Trench

Excavated materials from grassed areas (topsoil, subsoil) will be stored separately for use during the reinstatement of works areas. 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).

Excavated material from the public road network will be recycled as appropriate. Excavated bitumen macadam will be placed in dumper trucks and transported to temporary stockpile area and then transported off site by an appropriately authorised waste collector for recycling or disposal at an appropriately licenced waste facility.

5.3 Cable Ducting Methodology

The proposed sequence of works is set out below:

1. Grade, smooth and trim trench base when the required depth and width have been obtained.
2. Place bedding layer of Cement Bound Granular Mixture B (CBGM B) material. Depth of CBGM B to be as per the design drawings.
3. Lay the bottom row of ducts in trefoil formation as detailed on the design drawings. Use spacers as appropriate to establish horizontal duct spacing.
4. Fit a secure cap / bung to the end of each duct run to prevent the ingress of debris or water.
5. Carefully surround and cover ducts with CBGM B in accordance with the design drawings and specifications and thoroughly compact.
6. Place red cable protection strips on compacted CBGM B directly over the ducts.
7. Lay the top duct onto the freshly compacted CBGM B including the cable protection strips above the bottom row of ducts.
8. Fit a secure cap / bung to the end of each duct run to prevent the ingress of debris or water.
9. Surround and cover duct with CBGM B material in accordance with the drawings and thoroughly compact.
10. Place red cable protection strip on top of compacted CBGM B over each set of ducts as shown on the design drawings.
11. Depending on the location of the cable trench and duct, 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 design drawings.
12. Reinstate existing surface. For road sections, carry out temporary or permanent reinstatement in accordance with the grid design drawings and the specification of Kilkenny Co. Co. or private landowners if works are in private lands.
13. 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 at a later date. All the works should be witnessed by ESBN's Clerk of Works as required.

Typical trench layouts for a GCR within a roadway and within landscaped areas are shown in Figure 5-1 & Figure 5-2

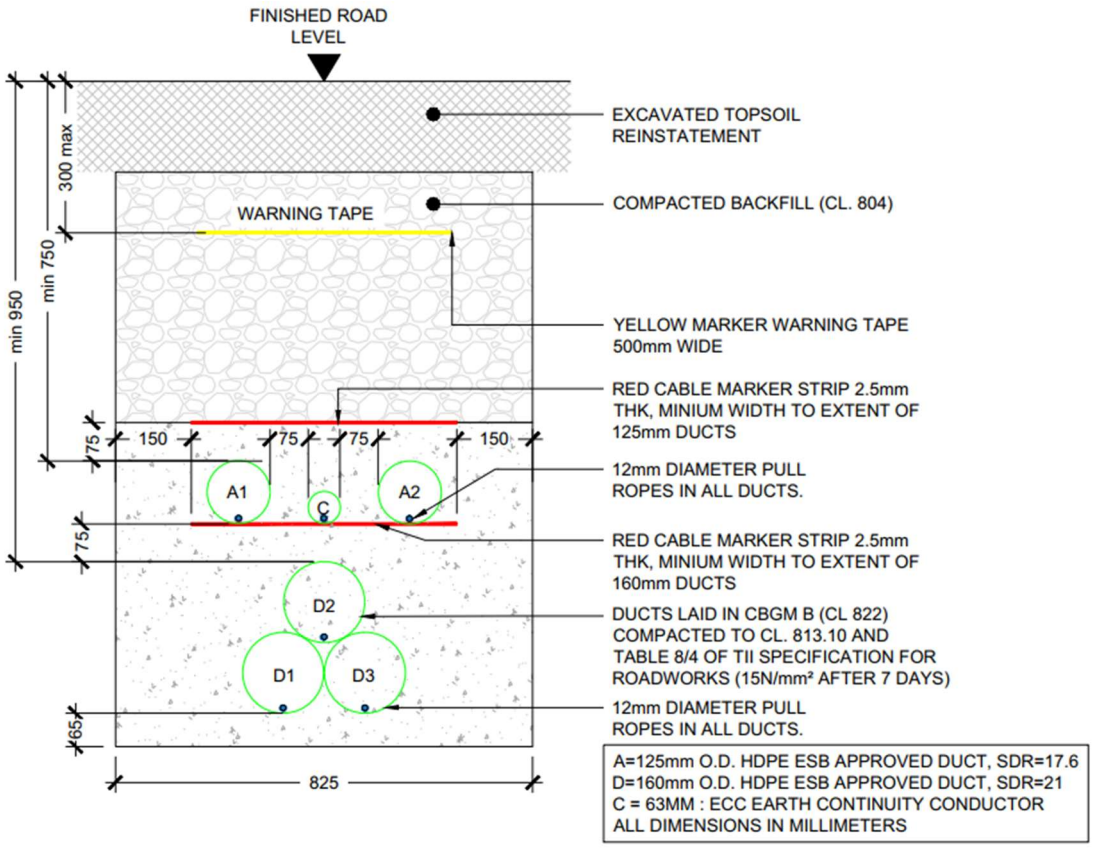

Figure 5-1 - Typical Cable Trench Layout in Soft Landscaped Area

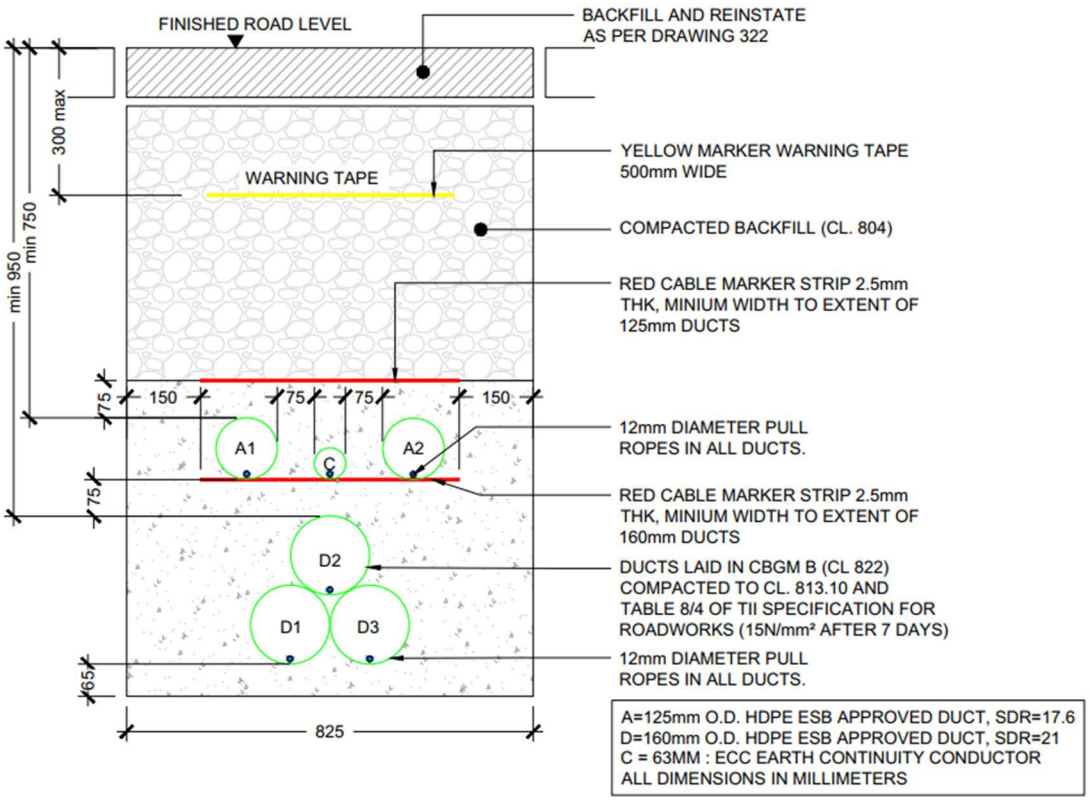

Figure 5-2 - Typical Cable Trench Layout in Roadway

5.4 Culvert Temporary Removal and Replacement

During a survey of the proposed grid connection route, a number of culverts were observed. It will be required to cross these culverts, via and overcrossing methodology or an undercrossing methodology. Where there is insufficient cover over the culvert, it will be necessary to trench under the culvert. In the event that a culvert is in poor condition it may be appropriate to temporarily remove and replace a section of culvert as part of the duct installation works.

All works will be carried out in accordance with the requirements as outlined in the EIAR and in accordance with IFI, the OPW, Kilkenny County Council, and CIRIA guidance.

The methodology for the culvert temporary removal and replacement and associated duct installation is as follows:

1. A detailed method statement will be prepared and agreed with IFI in advance of any works.
2. Establish the designated works area adjacent to the crossing, ensuring minimal disturbance to the surrounding habitat.
3. Install silt control measures around the work area such as sandbags, silt fences, straw bales to prevent sediment from entering the stream.
4. Install upstream and downstream temporary dams such as sandbags or inflatable Aqua-Dams.
5. If required pump flow around the work area using clean over-pumping or flume pipes with adequate flow capacity.
    a. Install flumes for temporary flow diversion and permanent replacement of culverts in line with the requirements of IFI and CIRIA to ensure any fish passage is not impeded.
    b. Install pipe on the upstream side of the dams to allow the water from the watercourse gravity flow around the works area. Where topography does not permit gravity flow, install a pump to carry the water around the works area.
        i. Where pumping is required, scour protection shall be installed at the outlet using rip-rap stone, gabion baskets, rock armour, or other methods as directed by IFI.
        ii. Downstream turbidity shall be continuously monitored during pumping operations.
    c. Fit inlet and outlet filters to pumps to prevent sediment transport.
    d. The discharge will be reviewed to ensure it meets EPA surface water discharge thresholds prior to outflowing.
    e. On completion of installation of the watercourse diversion and sediment control measure, carefully excavate and remove the existing structure.
6. Remove all waste and store it within sealed skips and bunded zones and dispose of at licensed facilities.
7. Install cable route as per the design drawings and EirGrid requirements.
8. Install culvert and align culvert with natural flow and gradient.
    a. Piped culverts shall match the existing culverts as to not change the existing hydrology in the area.
    b. Culverts shall be manufactured from approved materials.
9. Backfill in layers using compacted granular fill.
10. Restore channel bed and banks with locally sourced gravels and vegetation.
11. Reinstate riparian buffer using salvaged or native vegetation.
12. Apply erosion control matting or coir rolls to stabilise banks where required
13. Carefully remove temporary dams to prevent scouring or sudden flow surges.
14. Monitor re-introduction of flow and inspect for leaks or scour until satisfied that flow is not causing issues to existing hydrology.

5.5 Horizontal Direction Drilling (HDD)

Horizontal Direction Drilling is a method of drilling under obstacles such as roadways, bridges, railways, water courses, etc. in order to install cable ducts under the obstacle with no impact. This method is employed where installing the ducts using standard installation methods is not possible or impractical. There are a number of locations on this GCR route which will require HDD, these are outlined in Section 6.0.

Details on HDD crossings are outlined in the design drawings in Appendix A – Grid Design Drawings.

The drilling methodology is as follows:

1. A works area of circa. 50m^2 will be fenced on both sides of the crossing.
2. The drilling rig and fluid handling units will be located on one side of the bridge and will be stored on double bunded 0.5mm PVC bunds which will contain any fluid spills and storm water run-off.
3. Entry and exit pits (1m x 1m x 2m) will be excavated using an excavator, the excavated material will be temporarily stored within the works area and used for reinstatement or disposed of to a licensed facility.
4. A 1m x 1m x 2m steel box will be placed in each pit. This box will contain any drilling fluid returns from the borehole.
5. The drill bit will be set up by a surveyor, and the driller will push the drill string into the ground and will steer the bore path under the watercourse.
6. A surveyor will monitor drilling works to ensure that the modelled stresses and collapse pressures are not exceeded.
7. The drilled cuttings will be flushed back by drilling fluid to the steel box in the entry pit.
8. Once the first pilot hole has been completed a hole-opener or back reamer will be fitted in the exit pit and will pull a drill pipe back through the bore to the entry side.
9. Once all bore holes have been completed, a towing assembly will be set up on the drill and this will pull the ducting into the bore.
10. The steel boxes will be removed, with the drilling fluid disposed of to a licensed facility.
11. The ducts will be cleaned and proven, and their installed location surveyed.
12. The entry and exit pits will be reinstated to the specification of ESBN, EirGrid and Kilkenny County Council.
13. A transition coupler will be installed at either side of the bridge/ following the HDD as per ESBN and EirGrid requirements, this will join the HDD ducts to the standard ducts.

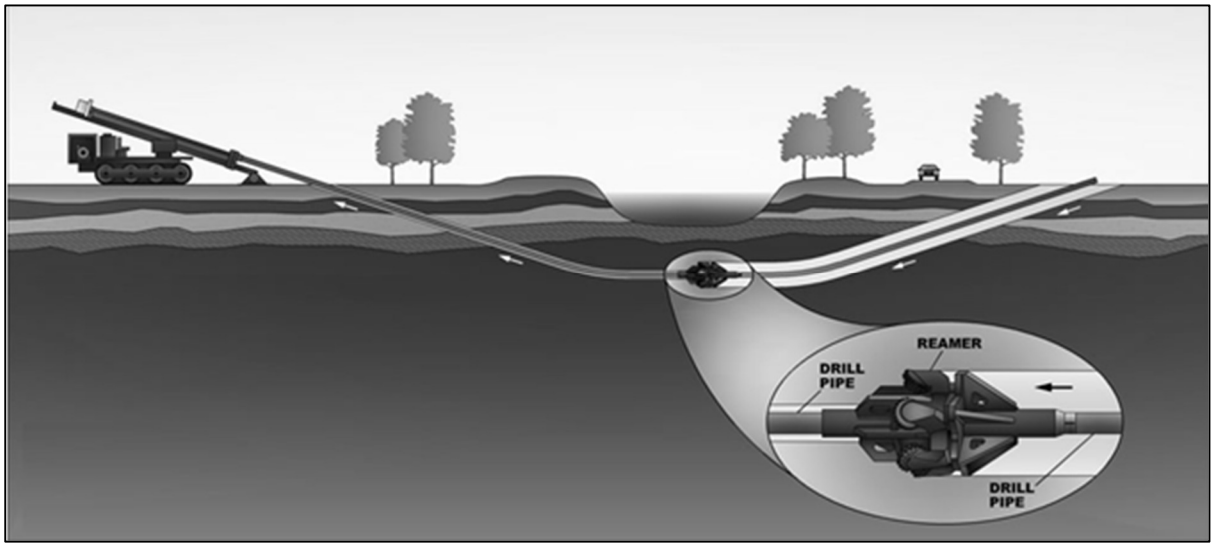

Figure 5-3 – Typical HDD Installation

5.6 Public Road Reinstatement

As the construction of the grid progresses, temporary road reinstatement will be carried out in is sections to facilitates full reinstatement to be completed efficiently in a single phase at a later date. Reinstatement is to be carried out to the requirements of Kilkenny County Council, the 'Guidelines for the Management of Public Utility Street Works (Purple Book)' and in-line with the design drawings contained in Appendix A – Grid Design Drawings.

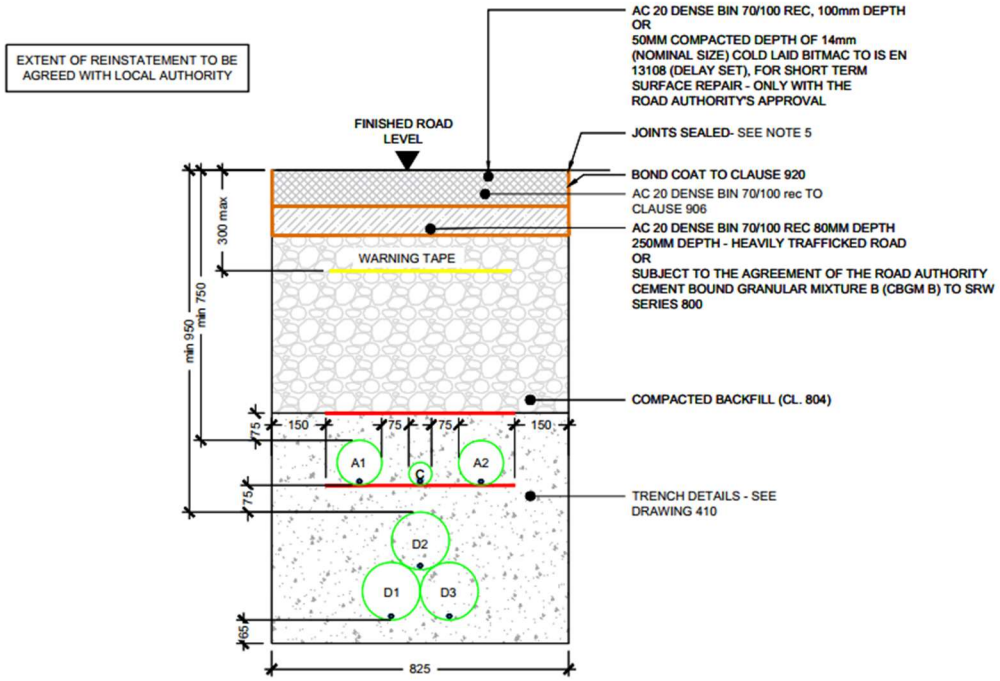

Figure 5-4 – Typical Temporary Reinstatement of Longitudinal Opening in Roadway

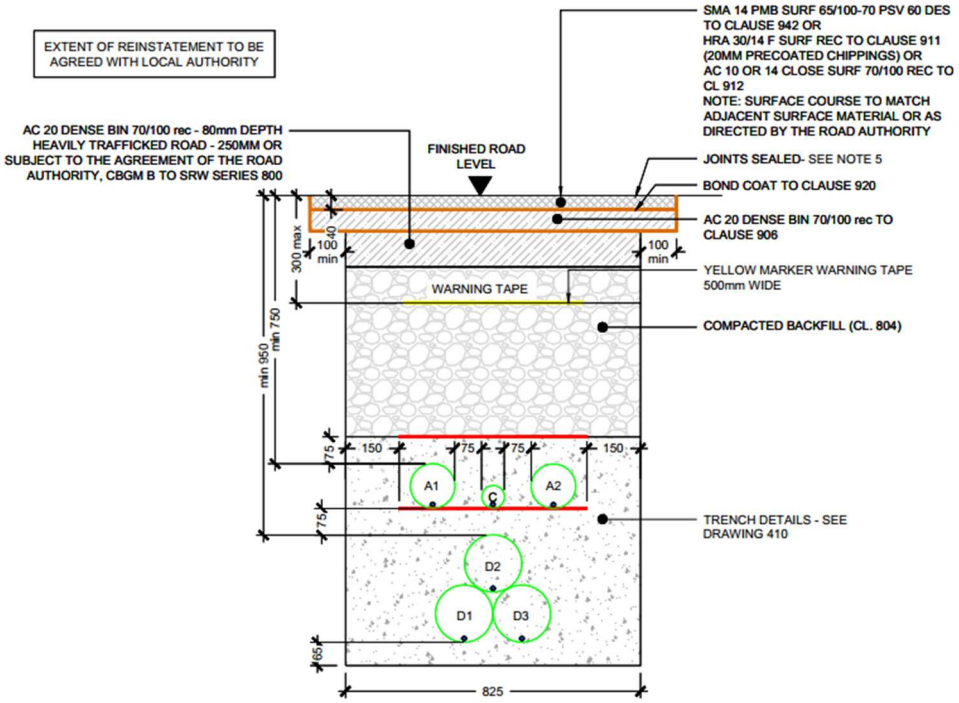

Figure 5-5 – Typical Permanent Reinstatement of Longitudinal Opening in Roadway

5.7 Precast Joint Bays and Associated Chambers

Joint bays will be provided to meet the requirements of standard cable drum lengths and/or as required to limit cable pulling forces. Joints Bays are to be installed as shown on the grid design drawings and approximately every 650m - 850m along the UGC route to facilitate the jointing of 2 No. lengths of Grid Cabling. The Joint Bays will be typically 6m x 2.5m x 2.05m pre-cast concrete structures installed below finished ground level.

In line with the 'Interim Guidance to Road Authorities regarding the proposed placement of Medium or High Voltage electricity assets, including ducts, cables, and associated infrastructure under public roads', joint bays will be installed with a minimum cover of 600mm below finished road level and shall have a precast concrete cover installed prior to backfilling back up to road level.

In association with Joint Bays, Communication Chambers will be installed at each joint bay location to facilitate communication links between the Ballyfasy Wind Farm substation and the proposed 110kV substation at Castlebanny. The Communications chambers will typically be 1.3m x 1.03m x 1.294m pre-cast concrete structures.

Earth Sheath Link Chambers will also be installed at every joint bay along the cable route. Earth Sheath Links are used for earthing and bonding cable sheaths of underground power cables, so that the circulating currents and induced voltages are eliminated or reduced. The Earthing Sheath Link Chambers will typically be 1.75m x 1.25m x 1.2m pre-cast concrete structures.

Earth Sheath Link Chambers and Communication Chambers will be located in close proximity to Joint Bays with a minimum distance of 2.3m and a max distance of 10m from the centre of the joint bay to the centre of the chambers. Earth Sheath Link Chambers and Communication Chambers will typically be pre-cast concrete structures with an access cover at finished surface level.

It is a preference that Joint Bays will be located in the non-wheel bearing strip of roadways, however given the narrow profile of local roads this may not always be possible. In the event of a joint bay and associated chambers being installed within narrow road profiles, there may be a requirement for a temporary construction passing bays to facilitate the works.

The following criteria will apply to the selection of joint bays, earthing link boxes and C2 Communication Chambers:

- Joint bays, link boxes and C2 chambers will be kept away from access points e.g. driveways, entrances etc.
- Adequate room will be provided in front of and behind each joint bay, link boxes and C2 chambers location to accommodate cable drums, vehicle used for maintenance and pulling equipment.
- All proposed joint bay locations will be proven by trial holes and in areas of poor ground conditions the use of bore holes may be necessary.
- The selection of joint bay, link boxes and C2 chambers will take account of the maximum calculated pulling forces and tensions
- Where cross-bonding of the cable sheath is employed, joint bay positions will be constrained and will require that minor sections are of substantially equal length.
- Splicing of fibre optic cable will take place in specific C2 chambers as determined at detailed design stage.

5.8 Joint Bay Construction Methodology

The following steps outline the methodology for joint bay construction and reinstatement:

1. Excavate a trench to suitable bearing strata (100kN/m^3), including for a sump in one corner.
2. Grade and smooth the trench and lay a 75mm deep layer of blinding concrete on 200mm Layer of Clause 804 or similar acceptable material, subject to site ground conditions.
3. Install Pre-cast joint bay sections on the 75mm blinding layer.
4. Where joint bays are located under the road surface the joint bay will be backfilled with compacted layers of Clause 804 and the road surface temporarily reinstated as specified by the local authority.
5. Precast concrete covers may be used as temporary reinstatement of joint bays at off road locations. These covers are placed over the constructed joint bay and are then removed at the cable installation stage of the project.
6. At a later date to facilitate cable installation and jointing, reinstate traffic management signage, secure individual sites, re-excavate three consecutive joint bays and store excavated material for reuse.
7. The cable is supplied in pre-ordered lengths on large cable drums Installing “one section” of cable normally involves pulling three individual conductors into three separate ducts. The cable pulling winch must be set at a predetermined cut off pulling tension as specified by the designer. The cable will be connected to the winch rope using approved suitably sized and rated cable pulling stocking and swivel or the pulling head fitted by the cable manufacturer. A sponge may also be secured to the winch rope to disperse lubricant through the duct. Lubrication is also applied to the cable in the joint bay before it enters the duct.
8. Once the “two sections” of cable (total of 6 conductors) are pulled into the joint bay, a jointing container is positioned over the joint bay and the cable jointing procedure is carried out in this controlled environment.
9. Following the completion of jointing and duct sealing works in the joint bay, place and thoroughly compact cement-bound sand in approximately 200 mm layers to the level of the cable joint base to provide vertical support. Install additional layers of cement-bound sand and compact each layer until the cement-bound sand is level with the top of the joint. Install an additional 100 mm cement-bound sand layer. Install cable protection strip. Backfill with cement-bound sand to a depth of 250 mm below surface
10. Once Backfilled, a precast concrete cover will be installed to comply with the ‘Interim Guidance to Road Authorities regarding the proposed placement of Medium or High Voltage electricity assets, including ducts, cables, and associated infrastructure under public roads’.
11. Permanent reinstatement including placement of warning tape at 400 mm depth below finished surface will then be installed.

A typical detail joint bay and associated chambers are shown in Figure 5-6.

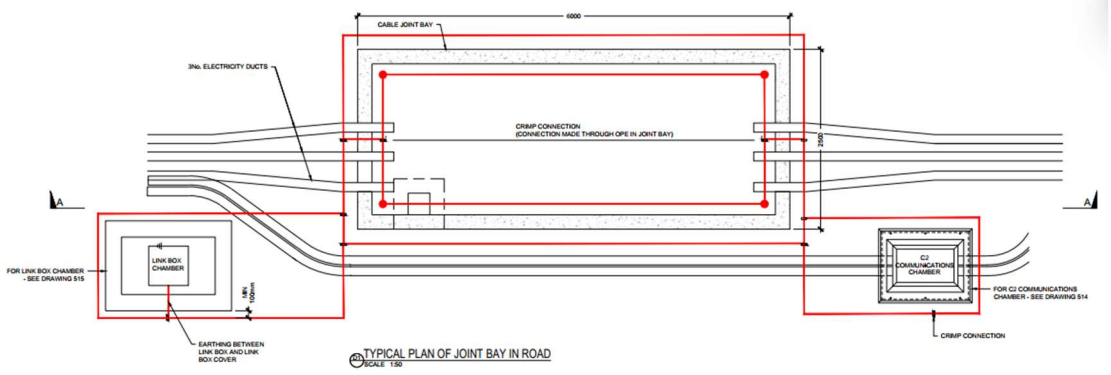

Figure 5-6 – Joint Bay and Associated Chambers Arrangement

5.9 Surface Cable Markers & Marker Posts

Surface Marker posts will be used on non-roadway routes to delineate the cable route and joint bay positions. Marker posts will also be placed in the event that burial depth is not to standard. Marker posts will be in accordance with Figure 5-7. The design of the marker posts shall be agreed with EirGrid and ESBN as part of the detailed design process.

Figure 5-7 below shows a Typical Cable Marker Post.

Figure 5-7 Typical Cable Marker Post

6.0 Grid Connection Route Crossings

6.1.1 Existing Underground Services

In order to facilitate the installation of the underground cable, it will be necessary to cross or relocate/ divert existing underground services such as drainage lines, water mains, telecom networks or electrical cables. Crossing existing services will be carried out using open trenching with either crossing under (undercrossing) or crossing over (overcrossing), depending on the depth of the service. Where this method is not suitable, the "no dig" HDD method will be used.

At detailed design stage a detailed survey and scan of existing services in the public road will be carried out. Records of existing service at the time of construction of will also be obtained from utility companies. These will be used to select the most appropriate routing of the grid connection route to avoid clashing with existing services as far as is practicable.

This process will be carried out in coordination with all relevant stakeholders outlined below:

- Kilkenny County Council.
- ESBN.
- Gas Networks Ireland.
- Uisce Éireann.
- EIR.
- All other relevant stakeholders which may be encountered/ affected during the works.

Crossing of the existing services are outlined in Appendix A – Grid Design Drawings.

6.1.1.1 Existing Service Requests

Uisce Éireann

Uisce Éireann records for services in the vicinity of the Grid Connection were requested. A response from Uisce Éireann outlined that no Uisce Éireann services were present along the grid connection route. It is not envisaged that the grid connection route interacts with the existing Uisce Éireann services.

Group Water Scheme

Group Water Schemes and their protection zones in the vicinity of the development were reviewed. It is noted that the nearest GWS and protection zone is at a distance of 2km from the development. It is not envisaged that the grid connection route interacts with any GWS.

Gas Networks Ireland

Gas Networks Ireland (GNI) service records were obtained. a review of the service records showed that there are no gas connections in the vicinity of the grid connection route. It is not envisaged that the grid connection route interacts with the existing GNI services.

ESBN

ESBN records for overground and underground services in the vicinity of the GCR were obtained. There are no underground ESBN services present along the grid connection route. A number of overhead lines were observed on along the route. It is not envisaged that the grid connection route interacts with the existing ESBN services.

Eir

Eir records for overground and underground services in the vicinity of the GCR were obtained and reviewed. There are overground Eir services along the route. It is not envisaged that the grid connection route interacts with the existing Eir services.

Surface Water

Kilkenny County Council were contacted for surface water services in the area.

Surface water services were reviewed on the ground during GCR walkover inspection. There are localised drainage features such as verge ditches, swales and drainage channels along the route. There is no surface water sewer network present along the grid route.

It is envisaged that the grid connection route will interact with roadside drainage and field drains in a number of locations.

6.1.2 Culvert Crossings

4 No. culvert crossing locations were observed along the proposed grid connection route which have pipe drains & culvert crossings. The location of these culverts has been outlined on the grid design drawings 25516-1200 to 25516-1207.

Crossing existing culverts will be carried out using open trenching with either an undercrossing or an overcrossing depending on the depth of the culvert. The culvert crossing methods are detailed in Figure 6-1 & Figure 6-2. Further detail is contained in Appendix A – Grid Design Drawings.

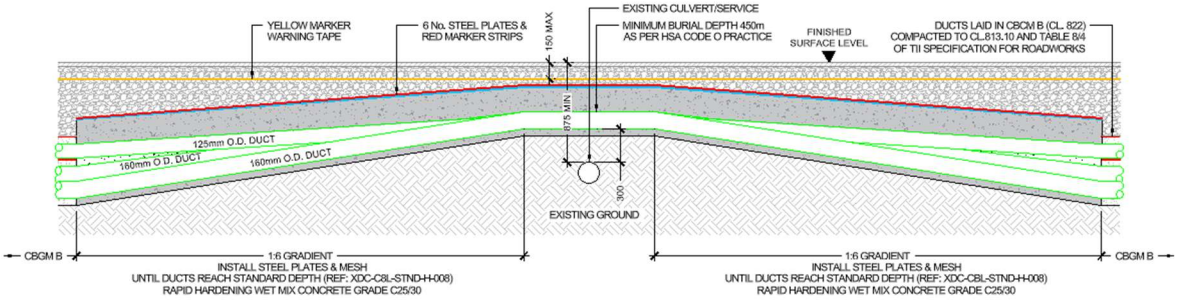

Figure 6-1 – Culvert/ Service Overcrossing

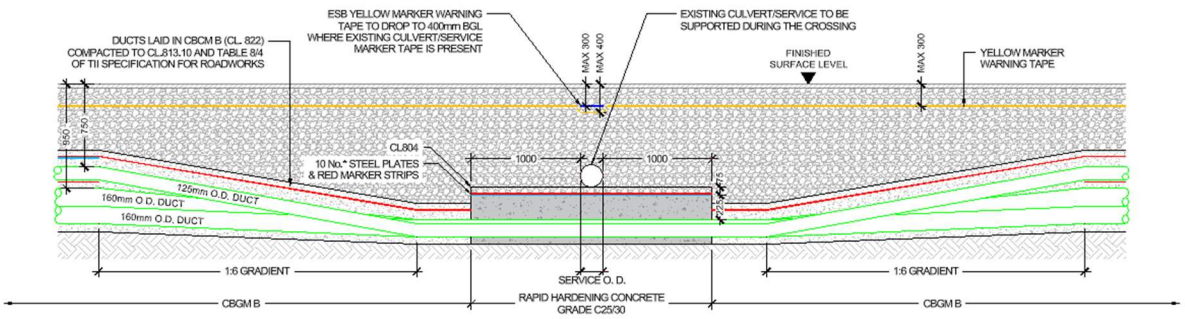

Figure 6-2 – Culvert/ Service Undercrossing

6.1.3 HV Underground Cable Crossings

There are 2 No. locations where the proposed cable will cross the proposed the Castlebanny Wind Farm 110kV Loop-In-Loop-Out Grid Connection Circuit, An Coimisiún Pleanála Case Reference Number 309306.

With the construction of grid cables in close proximity there is a risk of mutual thermal de-rating of the circuits. To mitigate this, the required minimum separation distances have been provided in accordance with EirGrid's requirements.

6.1.4 Watercourse Crossings

The proposed grid connection route consists of 6 No. Watercourse crossings which Horizontal Directional drilling will be deployed. Detail on each crossing is provided within the subsections below. The location of each crossing is outlined in Figure 6-3.

Where the cable route intersects with existing watercourses, a detailed construction method statement will be prepared by the Contractor prior to the commencement of construction and agreed with Kilkenny County Council, IFI, the OPW, and other relevant environmental agencies.

It is proposed to horizontal directional drill (HDD) approximately 1.5m beneath the watercourses and bridge foundations. The depth may increase subject to geotechnical investigations and IFI Requirements. Drilling will take place from the road roadway.

IFI have published guidelines relating to construction works along water bodies titled 'Guidelines on Protection Of Fisheries During Construction Works In and Adjacent To Waters (IFI, 2016)". These guidelines will be adhered to during the construction of the grid connection route.

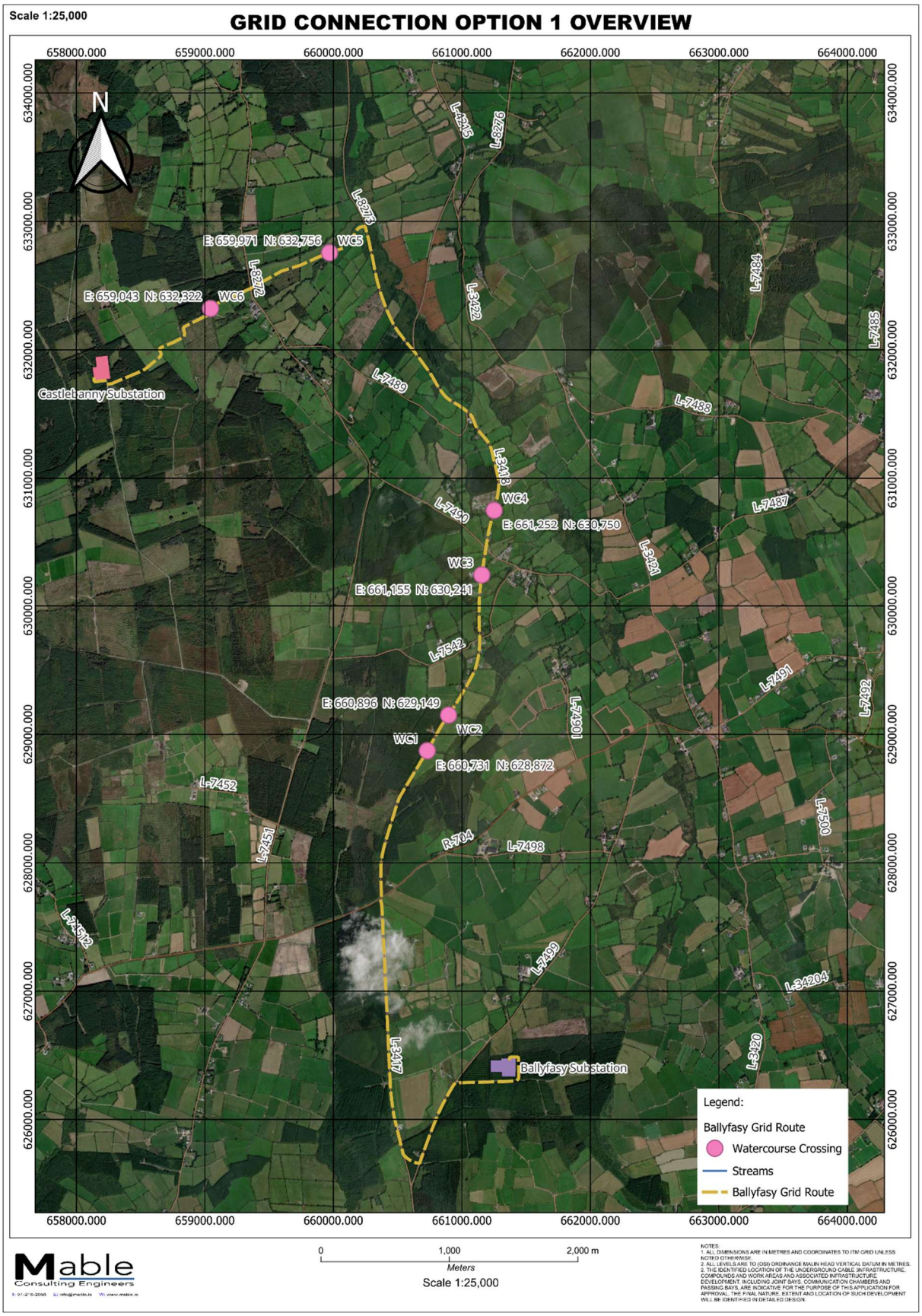

Figure 6-3 – Watercourse Crossings – Coordinates to ITM

6.1.4.1 Watercourse Crossing 1

Watercourse Crossing 1 is located at ITM Coordinates 660731E 628872N. The structure is a 300mmm Diameter Concrete Culvert. The no dig HDD method will be implemented. It is proposed to horizontal directional drill (HDD) approximately 1.5m beneath the watercourse and bridge foundations subject to site investigations and agreement with IFI.

Table 6-1 & Table 6-2 outlines a summary of the proposed crossing and Figure 6-5 shows a photograph of the existing watercourse to be crossed and the existing stone arch bridge.

Watercourse Name	Crossing Structure	Dimensions	Crossing Method	ITM Coordinates
Unnamed	Concrete Culvert	300mm Dia.	Horizontal Directional Drilling	660731E 628872N

Table 6-1 – Watercourse Crossing 1 Summary

Figure 6-4 - Watercourse Crossing 1 Photographs

6.1.4.2 Watercourse Crossing 2

Watercourse Crossing 2 is located at ITM Coordinates 660896E 629149N. The structure is a 5.8m Long x 8.6m Wide Masonry Arch Bridge. The top of the bridge arch is located 1.15m below finished road level. There is insufficient room within the bridge deck to accommodate cover to the top of the ducts without potentially impacting the structural integrity of the bridge arch, thus the no dig HDD method will be implemented. It is proposed to HDD approximately 1.5m beneath the watercourse and bridge foundations subject to site investigations and agreement with IFI.

Table 6-2 outlines a summary of the proposed crossing and Figure 6-5 shows a photograph of the existing watercourse to be crossed and the existing stone arch bridge

Watercourse Name	Crossing Structure	Dimensions	Crossing Method	ITM Coordinates
Unnamed	Stone Arch Bridge	5.8m Long x 8.6m Wide	Horizontal Directional Drilling	660896E 629149N

Table 6-2 – Watercourse Crossing 2 Summary

Figure 6-5 - Watercourse Crossing 2 Photographs

6.1.4.3 Watercourse Crossing 3

Watercourse Crossing 3 is located at ITM Coordinates 661155E 630241N. The structure is a Concrete Culvert. The no dig HDD method will be implemented. It is proposed to horizontal directional drill (HDD) approximately 1.5m beneath the watercourse and bridge foundations subject to site investigations and agreement with IFI.

Table 6-1Table 6-2 outlines a summary of the proposed crossing and Figure 6-5 shows a photograph of the existing watercourse to be crossed and the existing stone arch bridge.

Watercourse Name	Crossing Structure	Dimensions	Crossing Method	ITM Coordinates
Unnamed	Culvert	N/A	Horizontal Directional Drilling	661155E 630241N

Table 6-3 – Watercourse Crossing 3 Summary

6.1.4.4 Watercourse Crossing 4

Watercourse Crossing 4 is located at ITM Coordinates 661252E 630750N. The structure is a 5.1m Long x 8.5m Wide Masonry Arch Bridge. The top of the bridge arch is located 0.66m below finished road level. There is insufficient room within the bridge deck to accommodate cover to the top of the ducts without potentially impacting the structural integrity of the bridge arch, thus the no dig HDD method will be implemented. It is proposed to HDD approximately 1.5m beneath the watercourse and bridge foundations subject to site investigations and agreement with IFI AND Kilkenny County Council.

Table 6-4 outlines a summary of the proposed crossing and Figure 6-6 shows a photograph of the existing watercourse to be crossed and the existing stone arch bridge

Watercourse Name	Crossing Structure	Dimensions	Crossing Method	ITM Coordinates
Arrigle Trib 2	Stone Arch Bridge	5.1m Long x 8.5m Wide	Horizontal Directional Drilling	661252E 630750N

Table 6-4 – Watercourse Crossing 4 Summary

Figure 6-6 - Watercourse Crossing 4 Photographs

6.1.4.5 Watercourse Crossing 5

Watercourse Crossing 5 is located at ITM Coordinates 659971E 632756N. The watercourse is 10m wide from bank to bank. There is no crossing structure located where the grid connection route intersects the watercourse. It is proposed to HDD approximately 1.5m beneath the watercourse subject to site investigations and agreement with IFI.

Table 6-5 outlines a summary of the proposed crossing and Figure 6-7 shows a photograph of the proposed watercourse to be crossed.

Watercourse Name	Crossing Structure	Dimensions	Crossing Method	ITM Coordinates
Mullenhakill Stream	N/A	6m Wide – Bank to Bank	Horizontal Directional Drilling	659971E 632756N

Table 6-5 – Watercourse Crossing 5 Summary

Figure 6-7 – Watercourse Crossing 5 Photographs

6.1.4.6 Watercourse Crossing 6

Watercourse Crossing 6 is located at ITM Coordinates 659043E 632322N. The stream is 10m wide from bank to bank. There is no crossing structure located where the grid connection route intersects the stream. It is proposed to horizontal directional drill (HDD) approximately 1.5m beneath the watercourse subject to site investigations and agreement with IFI.

Table 6-6 outlines a summary of the proposed crossing and Figure 6-8 shows a photograph of the proposed stream to be crossed.

Watercourse Name	Crossing Structure	Dimensions	Crossing Method	ITM Coordinates
Unnamed Stream	N/A	10m Wide – Bank to Bank	Horizontal Directional Drilling	659043E 632322N

Table 6-6 – Watercourse Crossing 6 Summary

Figure 6-8 – Watercourse Crossing 6 Photographs

6.1.5 Other Crossings

Typically for works of this nature there will be a number of smaller sundry utility ducts, water supply pipes, drainage pipes and stone built drainage crossings along the route.

The method of crossing selected for each crossing will depend on the depth of the service and its condition, the details used will be as per the Typical details contained in Appendix A – Grid Design Drawings.

Appendix A – Grid Design Drawings

Drawing List:

Drawing List	Mable Consulting Engineers T: 01-216 2956 E: info@mable.ie W: www.mable.ie			Created By:	VC
				Checked By:	ER
				Date Created:	21/11/2025
				Status	PLANNING
Drawing Title	Drawing Number	Scale	Page Size	Description	
Site Location Map					
Site Location Map - Key Plan	1100	1:15000	A1	Planning Issue	
Site Location Map - 1 Of 8	1101	1:2500	A1	Planning Issue	
Site Location Map - 2 Of 8	1102	1:2500	A1	Planning Issue	
Site Location Map - 3 Of 8	1103	1:2500	A1	Planning Issue	
Site Location Map - 4 Of 8	1104	1:2500	A1	Planning Issue	
Site Location Map - 5 Of 8	1105	1:2500	A1	Planning Issue	
Site Location Map - 6 Of 8	1106	1:2500	A1	Planning Issue	
Site Location Map - 7 Of 8	1107	1:2500	A1	Planning Issue	
Site Location Map - 8 Of 8	1108	1:2500	A1	Planning Issue	
Grid Connection Option One					
Grid Connection Option One Site Layout Map Key Plan	1200	1:10000	A1	Planning Issue	
Grid Connection Option One - Site Layout Map 1 of 7	1201	1:2500	A1	Planning Issue	
Grid Connection Option One - Site Layout Map 2 of 7	1202	1:2500	A1	Planning Issue	
Grid Connection Option One - Site Layout Map 3 of 7	1203	1:2500	A1	Planning Issue	
Grid Connection Option One - Site Layout Map 4 of 7	1204	1:2500	A1	Planning Issue	
Grid Connection Option One - Site Layout Map 5 of 7	1205	1:2500	A1	Planning Issue	
Grid Connection Option One - Site Layout Map 6 of 7	1206	1:2500	A1	Planning Issue	
Grid Connection Option One - Site Layout Map 7 of 7	1207	1:2500	A1	Planning Issue	
110kV Substation Compound Option 1 - Tail Fed Station – Key Plan	1250	1:500	A1	Planning Issue	
110kV Substation Compound Option 1 - Tail Fed Station	1251	1:200	A0	Planning Issue	
Substation Compound Option 1 - Elevations 1 of 2	1252	1:200	A1	Planning Issue	
Substation Compound Option 1 - Elevations 2 of 2	1253	1:200	A1	Planning Issue	
Temporary Site Construction Compound Layout And Building Details	1254	As Shown	A1	Planning Issue	
Typical Horizontal Directional Drilling Under Watercourse	1260	As Shown	A2	Planning Issue	
Typical Horizontal Directional Drilling Under Watercourse Culvert	1261	As Shown	A2	Planning Issue	
Glenpipe Road Bridge 1.0 Crossing	1262	As Shown	A2	Planning Issue	
Glenpipe Road Bridge 2.0 Crossing	1263	As Shown	A2	Planning Issue	
Grid Connection Option Two					
Grid Connection Option Two Site Layout Map Key Plan	1300	1:10000	A1	Planning Issue	
Grid Connection Option Two - Site Layout Map 1 of 2	1301	1:2500	A1	Planning Issue	
Grid Connection Option Two - Site Layout Map 2 of 2	1302	1:2500	A1	Planning Issue	
110kV Substation Compound Option 2 - Loop Station – Key Plan	1350	1:500	A1	Planning Issue	
110kV Substation Compound Option 2 - Loop Station Station	1351	1:200	A0	Planning Issue	
Substation Compound Option 2 - Elevations 1 of 2	1352	1:200	A1	Planning Issue	
Substation Compound Option 2 - Elevations 2 of 2	1353	1:200	A1	Planning Issue	
Interface Mast Detail	1354	As Shown	A3	Planning Issue	
Typical Horizontal Directional Drilling Under Watercourse	1360	As Shown	A2	Planning Issue	
Detailed Drawings					
EirGrid Substation Building Plan & Elevations	1400	1:100	A1	Planning Issue	
IPP Substation Building Plan & Elevations	1401	1:100	A1	Planning Issue	
Site Compound Details & Access Road Details	1402	As Shown	A3	Planning Issue	
Rainwater Harvesting and Foul Tank Details	1403	1:50	A3	Planning Issue	
18m High Lightning Rod	1404	As Shown	A3	Planning Issue	
Substation Gate & Fence	1405	1:50	A3	Planning Issue	
Typical Property Boundary Fence and Gate Detail	1406	1:50	A3	Planning Issue	
Relay Tower Details	1407	1:200	A3	Planning Issue	
Typical 110kv Cable Trench Details	1410	1:20	A3	Planning Issue	
Typical Grid Connection Spacing Details	1411	1:50	A3	Planning Issue	
Typical 110kV Cable Trench Details Through Public Road 1 Of 2	1412	1:20	A3	Planning Issue	
Typical 110kV Cable Trench Details Through Public Road 2 Of 2	1413	1:20	A3	Planning Issue	
Standard Existing Service Under-Crossing; Ducts In Full Flat Formation	1414	As Shown	A3	Planning Issue	
Standard Existing Service Over-Crossing; Ducts In Full Flat Formation	1415	As Shown	A3	Planning Issue	
Typical 110kV Cable Trench Open Drain Crossing	1416	As Shown	A3	Planning Issue	
Joint Bay Typical Earthing Arrangement	1420	1:50	A3	Planning Issue	
Joint Bay Typical Arrangement	1421	1:50	A3	Planning Issue	
Joint Bay Reinstatement	1422	1:50	A3	Planning Issue	
Standard C2 Chamber General Arrangement	1423	1:20	A3	Planning Issue	
Link Box Chamber General Arrangement	1424	1:20	A3	Planning Issue	

Enclosed Separately