

Appendix 4L

Corroconsult Report



ELECTRICAL INTERFERENCE ASSESSMENT

BALLINLEE

WIND FARM

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1. Introduction

Cathodically protected pipelines can be adversely affected by electrical interference. The difference in potential between a well-protected pipeline and a pipeline that is freely corroding is approximately 0.5 Volts DC.

Any new development that includes AC and DC power distribution can be a source of electrical interference and affect the integrity of buried structures.

Electrical interference could originate from the operation of the proposed onshore windfarm energy system at Ballinlee.

Under normal operating conditions the most significant risk is from AC induced voltages, where the induced voltage can lead to accelerated pipeline corrosion EN ISO 21857, EN ISO 15589-1 and EN ISO 18086).

As well as the corrosion risks during normal operation there are also safety risks to livestock or humans, and pipeline coating damage risks during fault conditions.

This document assesses the risk of unacceptable electrical interference to adjacent buried pipelines under normal operation and pole fault conditions.

This risk assessment is based on the information provided for the preliminary design (see [Table 10](#)).

To ensure that there are no significant design changes that can affect the risk of unacceptable interference a further review is required when the final design is complete.

2. Executive Summary

Under normal operating conditions there will be no unacceptable electrical interference to the adjacent buried pipelines.

Under fault conditions the rise of earth potential is not harmful to the applied pipeline coating.

Under both normal and fault conditions the touch potential on the pipeline above-ground appurtenances (e.g. cathodic protection test posts, valves etc.) does not exceed a limit of 15 V rms and thus there are no safety risks to both livestock and the general public.

3. Applicable Standards and Guidelines

Table 1 Applicable Standards and Guidelines

Reference	Title
EN ISO 8044:2015	Corrosion of metals and alloys – Basic terms and definitions.
EN 12954	General Principles of cathodic protection of buried or immersed onshore metallic structures
EN 13509	Cathodic protection measurement techniques
EN 14505	Cathodic protection of complex structures

Reference	Title
EN ISO 15589-1:2015	Petroleum, petrochemical, and natural gas industries – cathodic protection of pipeline transportation systems – Part 1: On-land pipelines.
EN ISO 18086:2020	Corrosion of metals and alloys. Determination of AC corrosion. Protection criteria.
EN ISO 21857:2021	Petroleum, petrochemical, and natural gas industries – Prevention of corrosion on pipeline systems influenced by stray currents.
EN 13509	Cathodic Protection Measurement Techniques
EN 14505	Cathodic Protection of Complex Structures
EN 50122-1	Electrical Safety, earthing and the return circuit. Protective provisions against electric shock.
EN 50443:2011	Effects of electromagnetic interference on pipelines caused by high voltage AC electric traction systems and/or high voltage AC power supply systems
EN 61140	Protection against electric shock. Common aspects for installation and equipment.
CIGRE 95	Guide on the influence of high voltage AC power systems on metallic pipelines
ENA EREC S34 Issue 2	A guide for assessing the rise of earth potential at electrical installations
IEC 60364-4-41	Low-voltage electrical installations. Part 4-41: Protection for safety – Protection against electric shock
IEC 60364-5-52	Low-voltage electrical installations. Part 5-52: Selection and erection of electrical equipment – Wiring systems
IEC TR 60479-5	Effects of current on human beings and livestock – Part 5 Touch voltage threshold values for physiological effects.
IEC TS 60479-1:2005	Effects Of Current On Human Beings And Livestock Part 1; General Aspects
IEC TS 61201	Use of conventional touch voltage limits – Application guide
IEC 61557-8:2014	Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. - Equipment for testing, measuring or monitoring of protective measures - Part 8: Insulation monitoring devices for IT systems,
IEC 62109-2	Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters,
IEC 62128-2	Railway applications – Fixed installations – Electrical safety, earthing and the return circuit – Part 2 Provisions against the effects of stray currents
IEEE Std 80:2013	Guide for Safety in AC Substation Grounding
INGAA:2015	Criteria for pipeline co-existing with electric power lines
ITU-T K.68:2008	Protection against interference. Operator responsibilities in the management of electromagnetic interference by power systems on telecommunication systems
NACE SP0177:2019	Mitigation Of Alternating Current And Lightning Effects On Metallic Structures And Corrosion Control Systems
UKOPA GPG-013-006	Requirements for the siting and installation of wind turbines installation in the vicinity of buried pipelines
UKOPA GPG-014	Solar Voltaic PV installations in the vicinity of buried pipelines Ed 2-1
UKOPA GPG-027	AC Corrosion guidelines

Reference	Title
UKOPA GPG-031	DC Interference guidelines
UKOPA GPG- 036	Managing developments and works in the proximity of high pressure pipelines
UL 1741:2010	Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources

4. Abbreviations

The following abbreviations are used in this document:

Table 2 Abbreviations

Abbreviation	Meaning
a ⁻¹	Per year
AC	Alternating current or voltage
BESS	Battery Energy Storage Systems
CP	Cathodic Protection
EIA	Electrical Interference Assessment
EMI	Electromagnetic Interference
EPR	Earth Potential Rise
HVAC	High Voltage AC. (For corrosion risks, generally considered to be > 10 kV)
HVDC	High Voltage DC
Hz	Hertz. (1 Hertz = 1 cycle per second)
ICCP	Impressed Current Cathodic Protection
INGAA	Interstate Natural Gas Association of America
MW	Megawatt
rms	Root Mean Square

5. Background

The proposed Ballinlee Wind Farm Development is located in county Limerick. The wind farm layout, HVAC cable route and the adjacent buried pipelines (GNI07, GNI24 and GNI77) are shown in [Figure 1](#)

. The cable is buried for the entire route and laid in HDPE conduit.

Figure 1 General layout of Windfarm and adjacent pipelines



5.1. Introduction

5.1.1. AC Interference

Under normal operation the sources of interference from AC powerlines is mostly by Electromagnetic Induction (EMI). The varying magnetic field (e.g. 50 times per second) will induce a voltage in a conductor (e.g. a pipeline) and the amount of interference is directly related to the frequency, the strength of the magnetic field, the separation distance and the length of the pipeline. The frequency is fixed by the grid, and in the Republic of Ireland it is 50 Hz. The strength of the magnetic field is determined by the magnitude of the current but the magnetic field decreases with distance, so the separation distance between the overhead power line and the pipeline is an important factor.

Buried AC powerlines do not have the same effect on buried pipelines as overhead powerlines. This is because the power line conductors are laid either in a trefoil formation or they are laid close together. In these configurations, assuming a balanced load, the electromagnetic fields largely cancel out and the radiated magnetic field is significantly reduced.

5.2. Separation Distances

Recommended separation distances are provided in some standards and guidelines, but there is presently no consistency in the recommendations. This assessment uses the guidelines in EN 50443 as the primary reference for separation distances (see [Table 3](#)). Where required, an acceptable separation distance has been calculated.

For HVAC powerlines the induced voltage can be calculated using a modified Carson-Clem series of equations (EN ISO 21857).

Table 3 Coupling types and Distance to be Considered (extract from EN 50443)

Steel Pipeline System					
Above Ground				Underground	
Not electrically connected to earth		Electrically connected to earth			
Normal Operation	Fault Condition	Normal Operation	Fault Condition	Normal Operation	Fault Condition
Inductive Table 8	Inductive Table 8	Inductive Table 8	Inductive Table 8	Inductive Table 8	Inductive Table 8
Capacitive < 100 m					
		Conductive < 150 m	Conductive Note 1	Conductive < 150 m	Conductive Note 1

Notes: 1. 5 m from closest tower < 50 kV
 20 m from closest tower > 50 kV (with earth wire)
 100 m from closest tower > 50 kV (no earth wire)
 20 m from earthing systems > 50 kV
 150 m from earthing grid of a power substation
 Minimum distance from tower 2 m

6. Windfarms

Large-scale installations of wind turbines generate electricity by harnessing wind energy,

Turbine towers support the rotor and nacelle and are typically 80 m to 120 m in height.

The induction generator within the nacelle converts the rotational energy of the blades into electrical energy. The voltage generated in the nacelle is alternating current (AC).

The power is transferred by cables to a transformer, where it is converted to a suitable voltage level. This energy is then synchronized and fed into the national distribution grid.

Turbines are separated so that there is no mutual interference, and the turbines operate at their maximum efficiency.

6.1.Sources of Interference (Normal Operation)

The main sources of electrical interference at windfarms depends upon their configuration (See Table 4).

Table 4 Sources of Interference (Normal Operation)

Item	Function	AC	DC
Overhead Lines	Transfer	Induction	None

Item	Function	AC	DC
Buried Lines	Transfer	None	None
Converter	Converts AC to DC	Ripple and Harmonics	Leakage and Induction

6.2.Sources of Interference (Fault Conditions)

Under fault conditions the rise of earth potential (EPR) can cause both a safety risk to livestock and humans and a risk of damage to the pipeline coating.

7. Cathodic Protection

CP effectiveness for onshore pipelines is assessed by reference to EN ISO 15589-1. When there is interference from electrical sources there are other criteria that are applied. EN ISO 21857 deals with interference to pipelines in general and EN ISO 18086 provides acceptance criteria guidelines for AC interference criteria.

CP can be applied either by galvanic anodes (e.g. zinc, magnesium) or by an impressed current system (ICCP). Galvanic anode systems are often referred to as sacrificial anode systems.

ICCP systems use an inert anode and a power supply to impress the current onto the pipeline.

The mitigation of the effects of electrical interference are generally better managed with impressed current systems.

The competence of CP practitioners is regulated by EN ISO 15257, which defines the various competence levels.

When assessing the impact of interference from wind farm systems it is recognized that in many cases the pipeline may already be suffering from electrical interference from existing sources such as overhead powerlines, battery energy storage systems (BESS), solar farms, HVDC interconnectors, existing CP systems and traction systems.

8. Cathodic Protection Criteria (Steady State Conditions)

Generally speaking, a pipe-to-soil potential between -0.85 V and -1.20 V is required for CP to be effective. These potentials are measured with respect to a calibrated copper/copper sulphate reference electrode and without measurement errors caused by current flowing in the measurement circuit.

8.1.Cathodic Protection Criteria (Dynamic Interference)

Dynamic interference conditions are more complex. Due to the dynamics of the corrosion process the magnitude, polarity and duration of the interference has to be taken into account.

The methodologies for assessing the corrosion risk in the presence of dynamic interference are detailed in EN ISO 21857.

Table 5 CP Criteria - Dynamic Conditions (extract from EN ISO 21857)

	Non-cathodically protected	Cathodically protected
Steel and cast iron structures		
Anodic interference Time constant	Anodic potential shift ΔE_a (IR-drop included): $\Delta E_a \leq 300 \text{ mV}$ ($\rho > 200 \Omega \cdot \text{m}$) or $\Delta E_a \leq 1.5 \text{ mV}(\Omega \cdot \text{m})^{-1} \cdot \rho$ ($15 \Omega \cdot \text{m} \leq \rho \leq 200 \Omega \cdot \text{m}$) or $\Delta E_a \leq 20 \text{ mV}$ ($\rho < 15 \Omega \cdot \text{m}$) or anodic potential shift $\Delta E_{a, \text{IR-free}}$ (IR-drop excluded): $\Delta E_{a, \text{IR-free}} \leq 20 \text{ mV}$	IR-free potential $E_{\text{IR-free}}$: $E_{\text{IR-free}} \leq E_p$ (E_p =protection potential according to EN ISO 15589-1)
Anodic/cathodic interference	Average anodic potential shift $\Delta E_{a, \text{avg}}$: $\Delta E_{a, \text{avg}} \leq \Delta E_a$	IR-free potential $E_{\text{IR-free}}$: $E_{\text{IR-free}} \leq E_p$ (E_p =protection potential) Shift of $E_{\text{on, avg}}$: $E_{\text{on, avg}} \leq E_{\text{ref}} - \Delta E_{a, \text{avg}}$
Time variant	Average cathodic potential shift $\Delta E_{c, \text{avg}}$: $\Delta E_{c, \text{avg}} \leq 500 \text{ mV}$ (IR-drop included)	
All conditions	Corrosion rate design value	$v_{\text{corr}} \leq 0,01 \text{ mm} \cdot \text{a}^{-1}$

8.2. AC Interference Criteria

There are a number of variables to take into account when assessing the risks of AC corrosion on a cathodically protected pipeline.

Table 6 AC Criteria (extract from EN ISO 18086)

Step	Criterion	Comments
1	15 V RMS or less	Average value over a representative period of time (e.g. 24 hours)
2	Cathodic Protection	Meet the criteria defined in EN ISO 15589-1 Table 1
2(a)	$< 30 \text{ A} \cdot \text{m}^{-2}$	AC current density on a 1 cm^2 coupon over a representative period of time (e.g. 24 hours)
2(b)	$< 1 \text{ A} \cdot \text{m}^{-2}$	DC current density on a 1 cm^2 coupon over a representative period of time (e.g. 24 hours) if the AC current density $> 30 \text{ A} \cdot \text{m}^{-2}$
2(c)	< 5	Ratio between AC and DC current density over a representative period of time (e.g. 24 hours)

8.3. Safety

Under AC fault conditions large currents can flow for short periods until the system automatically restores itself or shuts down.

Because the duration of the fault conditions are short, they do not constitute an immediate corrosion risk.

There is a risk, however, that the rise of earth potential (often referred to as Earth Potential Rise or Ground Potential Rise) can degrade the pipeline coating if the voltage exceeds the dielectric strength of the coating. This degradation can lead to a change in the performance of the coating (e.g. porosity changes) over time.

For pipeline coatings of fusion bonded epoxy or three-layer polyethylene a conservative value that is widely used is between 2 kV and 5 kV.

The rise of earth potential at the pipeline is governed by the magnitude of the fault current, the impedance of the substation earthing system and the substation separation distance from the pipe.

There is also the risk of electric shock to animals and humans. Acceptable levels for electrically instructed persons are shown in [Table 7](#).

Table 7 Interference Limits (extract from EN ISO 50443)

Fault duration (s)	Interference voltage (V_{RMS})
≤ 0.1	2 000
0.1 – 0.2	1 500
0.2 – 0.35	1 000
0.35 – 0.5	650
0.5 – 1.0	430
1.0 – 3.0	150
> 3	60

These limits are for persons who are trained and wearing protective clothing. For locations where the general public could be in contact with the pipeline (e.g. at a CP test post) is preferable to adopt lower limits. A 15 V rms value is often used.

9. Separation Distances (AC)

Within the present standards there is no consistency in the recommended separation distances. Until there is consistency in the recommendations this EIA will follow the recommendations of EN ISO 50443 ([Table 8](#)) and INGAA Report Number 2015-04 Rev. 0 Document number 1E02G9N-4.

INGAA have developed severity ranking tables for key variables and their impact on the severity of AC interference ([Table 9](#)).

Table 8 Recommended Separation Distance- Normal Operations (extract from EN ISO 50443)

Type of AC Power System	Areas	Resistivity ($\Omega \cdot m$)	Interference Distance (m)	
			Normal Operation	Fault Condition
Overhead	Rural	> 3000	Resistivity/3	Resistivity
		≤ 3000	1000	3000
Overhead	Urban	> 3000	≥ 300	Resistivity/10
		≤ 3000		≥ 300
Buried	All	All	50	50

Table 9 INGAA Severity rating of separation distance

Extract from INGAA Report Number 2015-04 Rev. 0 (Distance converted from feet to metres)

Separation distance (m)	Severity Ranking of AC interference
$D < 30$	High
$30 < D < 150$	Medium
$150 < D \leq 300$	Low
$300 < D \leq 760$	Very Low

10. Mitigation by Design

During the design and construction phase the risks of electrical interference will be minimised by prudent design and construction techniques and compliance with the relevant standards.

10.1. Parallelism

Parallelism of above-ground and buried HVAC cables will be minimized to reduce the magnitude of EMI. Buried cables should be used, since this produces less EMI.

10.2. Buried Cable Crossings

Optimum crossing angles between 60° and 90° should be used to minimize EMI.

10.3. Separation

A maximum separation distance between buried metallic structures (e.g. pipelines) will be applied for all cables (See Table 8).

10.4. Rise of Earth Potential

The earthing design will minimize the risk of unacceptable rise of earth potentials at the pipeline.

10.5. Harmonics

For energy systems with converters or inverters there is a risk that harmonics will be generated which can augment the induced AC voltage. The production of harmonics is a function of the type of inverter/convertor and the filtering systems installed. Harmonic filter design and control will limit the production sub-harmonics and harmonics by a combination of inductance and capacitance combined with software driven process control. There are no converters or inverters proposed for Ballinlee.

11. Mitigation by Intervention

In the event that the design and construction of the systems does not satisfy the acceptance criteria for the structure, then additional mitigation measures will be designed.

11.1. Corrosion

If the induced AC under normal operating conditions exceeds the criteria given in EN ISO 18086 a mitigation system to control the risks and reduce the pipe-to-soil potential to acceptable limits will be designed.

The primary means to achieve this will be by installing one or more auxiliary earthing system(s) at selected locations that will offer a low impedance path to earth for the AC voltage. The auxiliary earthing will most likely be in the form of zinc ribbon electrodes connected to the pipeline at existing test posts via a decoupling device. The decoupling device will present a high impedance to the CP current, which is DC, and a low impedance to the induced voltage, which is AC. This means that the cathodic protection potential requirements will not be affected.

11.2. Cathodic Protection

Under some circumstances it can be advantageous to change the CP system to a potentiostatic impressed current system. This can require replacement power sources and the addition of permanent reference electrodes.

Permanent monitoring of the pipe-to-soil potentials (AC and DC) and Electrical Resistance probe measurements can also be necessary.

11.3. Safety

Electrical safety potentials are different from the AC corrosion potentials. This assessment uses the values recommended in EN ISO 50443 (see [Table 8](#)) for voltages lasting longer than 3 s, i.e. 60 V rms as the acceptance criterion for trained personnel and 15 V rms for the general public.

If the voltage limits are exceeded, then remedial measures will be applied to any of the affected pipeline aboveground appurtenances. Appurtenances include equipment such as:

- CP test posts
- Valve spindles/handles
- Above ground sections of the pipeline.
- Metallic fences

M28 plastic cathodic protection test posts can be modified to prevent any risk of accidental contact to the pipeline connection. This is achieved by creating a dead-face configuration where all of the connections are either internal to the test post or only available through insulated sockets.

If the test posts are a concrete type M28 then they can be replaced with dead-face M28 plastic test posts.

For locations where there are exposed parts of the pipeline that could be touched, suitable remedies will be designed. Such remedies could include:

- equipotential ground mat
- fencing
- warning signs

12. Permanent Liaison

The long-term management of the stray current and safety risks should include a permanent liaison between the operator of the pipeline and the operator of the energy system, as recommended in EN ISO 21857.

This permanent liaison should be formally established and managed by both parties to ensure prompt awareness of any issues.

13. Long-term Monitoring and Maintenance

The pipeline operator is recommended to consider the installation of a permanent remote monitoring system to provide an early warning of any AC and DC pipe-to-soil potential anomalies or unacceptable increases in corrosion rates. This may require the installation of a suitably sized coupon.

Electrical Resistance (ER) probes should be considered if there is stray current interference from other sources. These devices can also provide remote monitoring.

14. Electrical Interference Assessment

This assessment is based on the documentation listed in [Table 10](#), which constitute a preliminary design, and the additional information provided in [Table 11](#).

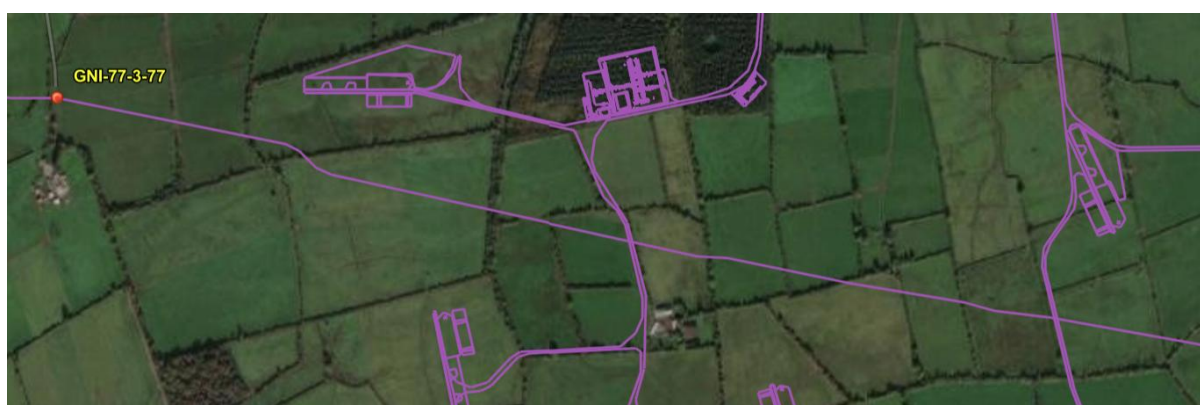
[Figure 1](#) shows the general layout of the windfarm.

There are three locations where the HVAC cables will cross the pipelines. These are shown in [Figure 2](#) and [Figure 3](#).

Figure 2 Crossing Location #1(Pipeline 07)



Figure 3 Crossing Locations 2 and 3 (Pipeline 77)



No soil resistivity measurements have been provided and a value of $30 \Omega \cdot m$ has been assumed, since it is a typical value found in rural Ireland.

Table 10 Documents Provided for the EIA

Document	Description
22635-MWP-00-00-DR-C-0001 Rev. P12	Proposed site layout
	Turbine locations shape file
22635-MWP-00-00-SK-C-0001 Rev. P01	Proposed site layout and existing gas pipeline

Table 11 Information provided by email 22 September 2024

Query	Response
Is the installation primarily on arable land?	Yes
Will the cables all be buried?	Yes
What formation will be used for the buried cables?	1. If cover depth of the pipeline > 1210 mm crossover formation will be flat. 2. If cover depth > 1550 mm crossover formation will be trefoil 3. If cover depth is less than 1210 mm cables will cross under the pipe

Query	Response
	formation will be either trefoil or flat (both acceptable to Eirgrid)
	Power duct diameter 160 mm with 600 mm separation
	One power cable per duct
Will the crossing points have the cables sealed in a non-metallic sealed duct?	Ducts will be HDPE and joined using push-fit couplers with rubber ring seals and cables where they emerge from ducts at joint bays are sealed using duct sealing bags to stop water ingress.
Are there any DC systems associated with the site?	No
Any new substations planned? If so, do you have a footprint, earth impedance, fault current and fault duration?	Only the 110 kV substation identified in the layout already sent is proposed. Any specific electrical design details for this would be done at a later stage.
Any associated energy storage systems?	No
Maximum export power?	77 MW
Pipeline crossing details	There are three crossings of the gas pipeline. At the site entrance, south of the substation and between T13 and T16.

14.1. Interference Under Normal Operational Conditions

Under normal operational conditions the principle source of interference to buried pipelines is induced voltage caused by a changing magnetic field.

The HVAC buried cables for this project are laid in a trefoil or flat formation, and this has the effect of largely cancelling out the magnetic field and hence significantly reduces the interference levels.

The calculated induced voltage (EN ISO 21857) is less than 1 V rms at each of the three crossings.

Table 12 shows the measured separation distances, length of parallelism, and induced voltage under normal operating conditions.

Table 12 Separation distances and interference under normal operating conditions

Location	Separation Distance (m)	Induced voltage (V rms)
Substation to pipeline 77	134	< 1
Turbine 6 to pipeline 77	189	< 1
Turbine 6 to TP 77-3-77	422	< 1
Parallelism separation with pipeline 7	280	
Parallelism length with pipeline 7	956	< 1

14.2. Interference Under Pole Fault Conditions

Under fault conditions there are no immediate corrosion risks because the faults are of short duration (typically between 0.1 s and 3 s) but there can be risks of unacceptable earth potential rise

conditions. The EPR can result in an unacceptable touch potential on above-ground metal appurtenances and, depending on the dielectric strength of the pipeline coating, this can change the coating characteristics or cause damage to the coating.

The area of greatest risk is at the pipeline crossings, but the HDPE ducting will prevent any conductive current.

To cover all contingencies a fault current of 100 kA, and a coating threshold voltage of 5 kV were assumed.

Under these circumstances the minimum separation distance between the source (100 kA) and the pipeline is 99.3 m. From Table 12 we can see that there is no distance less than 99.3 m so there is no risk of coating degradation or damage during a pole fault condition.

During the fault condition there is the possibility for the potential of the pipe to beyond an acceptable threshold (See Table 7). These values relate to trained personnel with the correct protection equipment. For members of the public, and livestock we have assumed a more onerous criterion of 15 V rms. The pipeline potential decreases exponentially with distance. For Ballinlee the 15 V threshold will be at a distance of approximately 14 m from the source. From Table 12 we can see that there are no pipelines closer than 134 m from possible sources of fault current on the windfarm. No precautions are required at the existing pipelines.

15. Recommendations

1. Measure the soil resistivity at selected locations to verify the assumed soil resistivity value of $30 \Omega \cdot m$. Phase 2 of our proposal.
2. Carry out datalogging at TP 77-3-77, 77-3-78, and 7-32 7-31B. Phase 2 of our proposal.
3. Install a 1 cm^2 coupon at the existing test posts TP 77-3-77, 77-3-78, and 7-32 7-31B
4. Establish a formal liaison with Gas Networks Ireland to manage the electrical interference risks.
5. Ensure that the HDPE duct is not damaged during construction and that the ends are sealed with a visco-elastic (or similar) filler to prevent any ingress of soil and moisture. The filling method and materials must be suitable for the design life of the windfarm.
6. Revise this document when the detailed design is complete. Phase 3 of our proposal.
7. Repeat the datalogging after the windfarm is commissioned. Phase 4 of our recommendation.

16. Quality Assurance & Quality Control

Corroconsult UK Ltd is independently accredited to ISO 9001:2015 for its Integrated Management System (IMS). All personnel involved in the engineering aspects of the project are qualified and certificated cathodic protection specialists (EN ISO 15257).

17. Environmental

Corroconsult UK Ltd is independently accredited to ISO 14001:2015 for its Integrated Management System (IMS).

18. Health & Safety

Corroconsult UK Ltd is independently accredited to ISO 45001:2018 for its Integrated Management System (IMS).