Report

Greenhills Renewable Energy Park EMF/EMC Impact Assessment Report

Document Number:

Author: AB\PT\DM

Approved for Release: Rev 4.0 KH **Date:** 24/10/2025

Document Filename: *Greenhills Renewable Energy Park EMF/EMC Impact Assessment.*

Executive Summary

This EMF/EMC Assessment Statement has been prepared by Ai Bridges Ltd on behalf of Orsted Onshore Ireland Midco Limited. It is prepared as part of a planning application to obtain permission for the proposed Greenhills Renewable Energy Park in Co Cork. The purpose of this study is to:

i) Assess the potential impact of the proposed development due to EMF (Electromagnetic Fields).

ii) Assess the potential impact of the proposed development due to EMC (Electromagnetic Compatibility).

For the EMF assessment, International Guidelines and Standard were used to assess the potential impact of EMF on human health and other sensitive receptors. The guidelines indicate that the EMF levels that would be emitted from the proposed Loop-in OHL, and UG cables would be well below recommended levels. Table 1 below provided a summary of expected EMF impacts due to the proposed development.

Assessment	Summary	Impact of Proposed Development
EMF	EMF levels due to the proposed OHL, UG cables, transformer stations, etc., would be significantly lower than the basic restriction level which is the level at which radiation is potentially harmful to humans as published in the ICNRIP guidelines. There are no sensitive receptors (Human, Telecommunication Networks, Broadcast Networks, Aviation etc.) that would be impacted by EMF issues due to the proposed Energy Park and mitigation measures for EMF are not required.	No issues.

Table 1. Summary EMF Impacts

For the EMC assessment, a desktop survey was carried out to identify the telecom infrastructure in the vicinity of the proposed development. The desktop survey results found that there are four telecom mast-sites within 5 km of the proposed development site (i.e. Ballinteosig, Foxhole, Ballymacask and Clashdermot). Analysis indicates that electro-magnetic emissions due to the proposed development will dissipate rapidly and as the telecoms mast-sites are sufficiently far from the proposed development there will be no EMC impacts.

Consultations with the telecom operators who have network infrastructure at the mast-sites were also undertaken to determine if they have any concerns regarding EMC. The responses received from the telecom operators can be found in Section 3.1.1 of this report. None of the operators contacted have raised any concerns regarding EMC due to the proposed development. Table 2 below provided a summary of expected EMC impacts due to the proposed development.

Assessment	Summary	Impact of Proposed Development
EMC	The EMF signals due to the proposed development would be very low and would be negligible at the telecoms mast-sites at Ballinteosig, Foxhole, Ballymacask and Clashdermot. The relevant telecom operators with network equipment at the mast-sites at Ballinteosig, Foxhole, Ballymacask and Clashdermot have been notified of the proposed development, and no issues have been raised regarding EMC. There are no sensitive receptors (Human, Telecommunication Networks, Broadcast Networks, Aviation etc.) that would be impacted by EMC issues due to the proposed Energy Park and mitigation measures for EMC are not required.	No issues.

Table 2. Summary of EMC Impacts.

Sections

Section 1 - Renewable Energy Park Site Information

1. Introduction

In this section a brief summary of the proposed development site is provided. Details regarding the site's geographic location and the nearest Telecom Operator Mast-sites are presented.

1.1 Renewable Energy Park Site Information

Orsted Onshore Ireland Midco Limited intend to apply for a 10-year Planning Permission for a solar farm and energy storage compound with a total area of circa 323 hectares in the townlands Knocknagappagh, Barnaviddane, Ballyneague, Ballydaniel, Youghalpark, Ballydaheen and Cornaveigh in County Cork. The working title for the project is "*Greenhills Renewable Energy Park*". The development will include:

- A Solar Array - which consists of four distinct areas on agricultural lands.
- Inverter/transformer stations
- Battery energy storage system (BESS) - comprising a linear array arranged in 14 rows of 16 containers.
- 220kV substation - grid connection to loop into the existing Knockraha-Cullenagh 220kV overhead line which runs through the southern side of the site.

The operational lifespan of the solar farm will be 40 years and planning permission is to be requested for this duration. The proposed development is adjacent to the R364 road approximately 7 km northwest of Youghal, Co. Cork and is shown below in Figure 1.

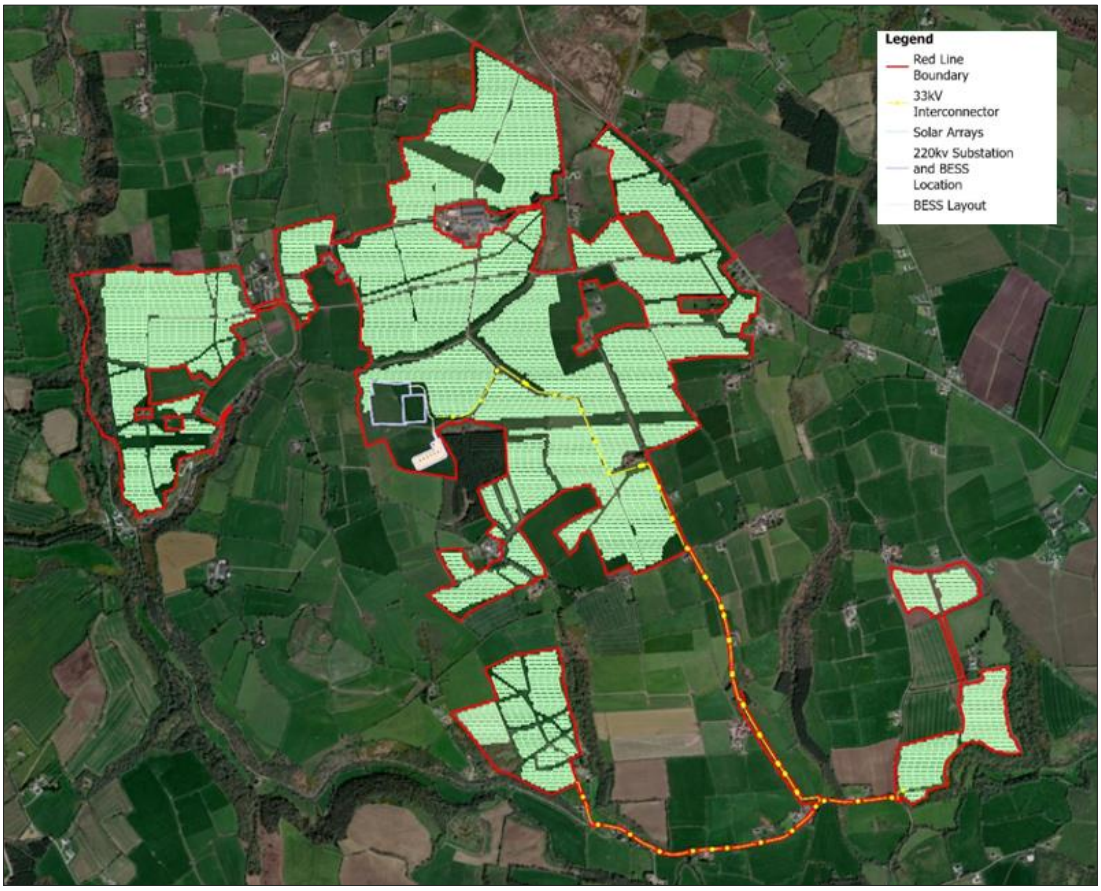

Figure 1. Location of proposed development

All works will be undertaken to EirGrid / ESB specifications where relevant, and in full compliance with environmental and other mitigation measures contained in the final Construction and Environmental Management Plan.

The southern parcels of the proposed development are likely to interconnect to the substation via a 33kV underground (UG) cable. The UG cable route runs along public roads as shown in Figure 3. Field Surveys of the UG cable route found that there should be no EMF/EMC issues due to the proposed 33kV UG cables. The results of the UG Cable Route Field survey are presented in Appendix C of this report.

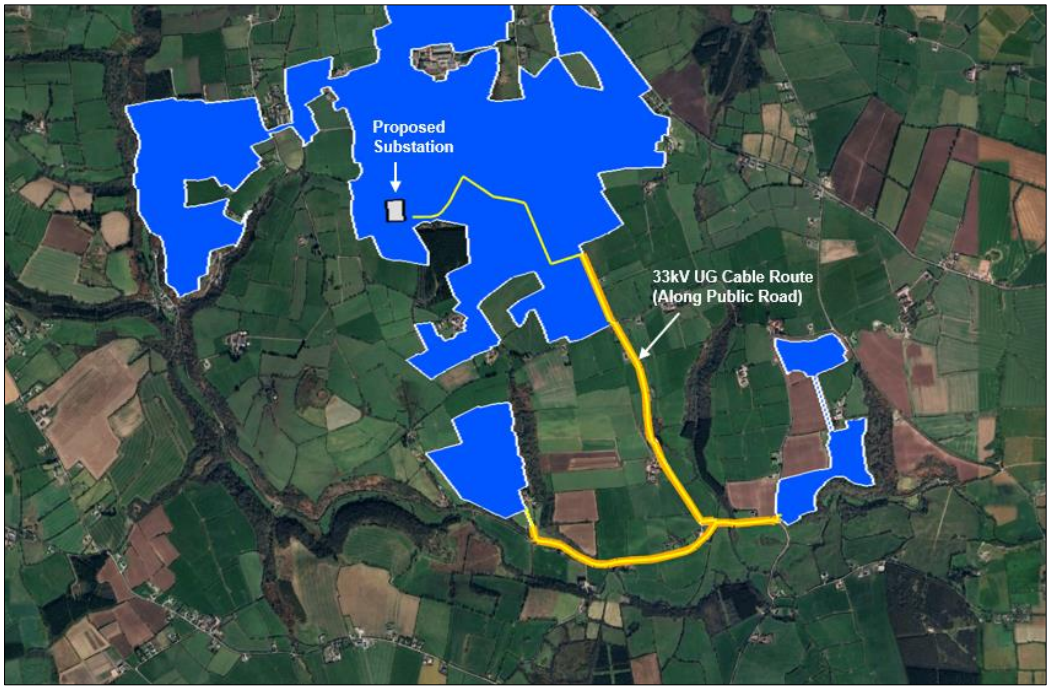

Figure 2. 33kV UG Cable Route

Section 2 - EMF (Electromagnetic Fields) Impact Assessment

2. EMF (Electromagnetic Fields)

The Environmental Protection Agency describes Electromagnetic fields (EMF) as follows:

> *Electromagnetic fields (EMF) together with optical radiation, which includes infrared, visible light, and ultraviolet radiation, collectively make up the non-ionising radiation (NIR) spectrum. This type of radiation does not have enough energy to break up (ionise) atoms or molecules. It is therefore different to ionising radiation, such as X-rays or radioactive sources, which can break up molecules and is known to cause damage to human cells.*
>
> *EMF are generated by everyday items such as mobile phones and electrical appliances. EMF are intentionally produced and used to transmit information wirelessly over great distances or to heat things such as food. So, we use EMF every time we listen to the radio, watch television, warm up food in a microwave oven or use our mobile phone. EMF are also generated when electricity is produced (e.g. power plants) and distributed (e.g. power lines), and whenever we use an electric appliance at home or in work.*
>
> *EMF sources also occur in nature and include the earth's magnetic field, which causes compasses to point north, or the electric fields produced in the atmosphere during lightning storms. EMF are also emitted by the sun, and even by our own bodies.*

The Electromagnet Spectrum is illustrated in below Figure 4. As the figure shows, the EMF generated by electrical powerlines are low frequency and are in the non-ionising end of the spectrum.

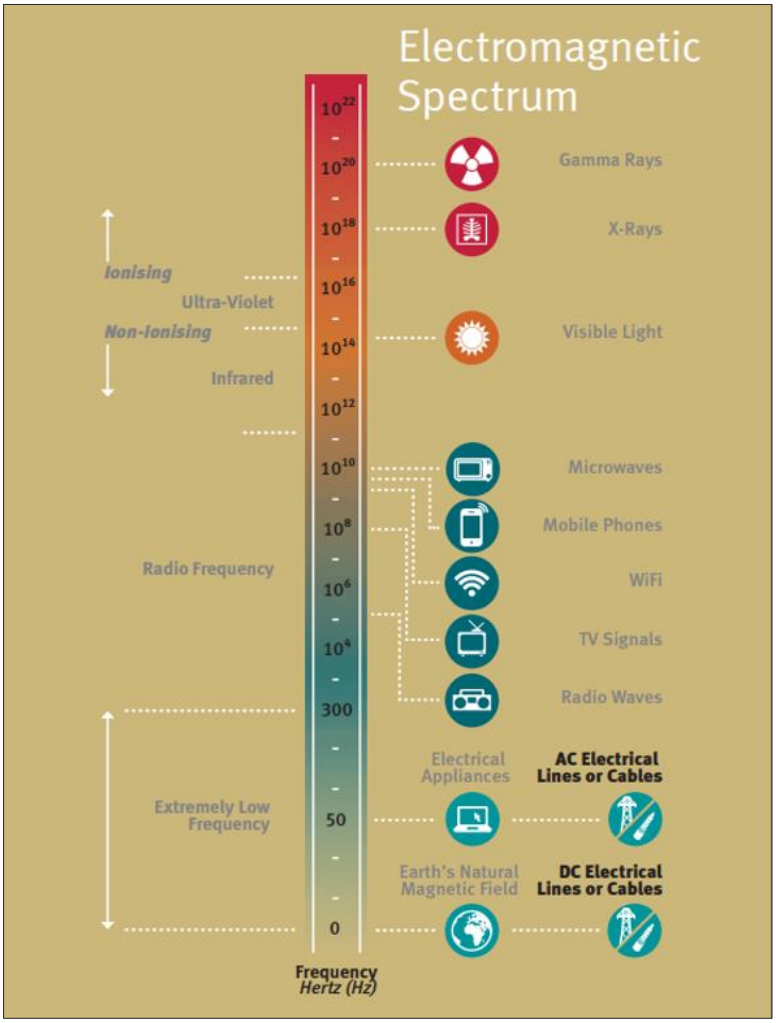

Figure 3. Electromagnetic Spectrum

2.1 OHL (Overhead Lines)

The largest potential source of electric field at the proposed development would be the 220kV Loop-in lines, which would connect the proposed development to the existing OH power transmission line. These OH Loop-in cables are relatively short and internal to the site. As Figure 5 shows, the strength of the magnetic field from AC lines dissipates rapidly with lateral distance from the cable.

The proposed development would pose no issue to human health or any other sensitive receptor, as emissions from the OHL cables at the proposed development would dissipate rapidly within the proposed site, and would be considerably lower than the recommended levels as set out in the 1998 ICNIRP* guidelines.

It should be noted that the proposed Loop-in would connect to the existing 220kV OHL which has its own electric and magnetic fields.

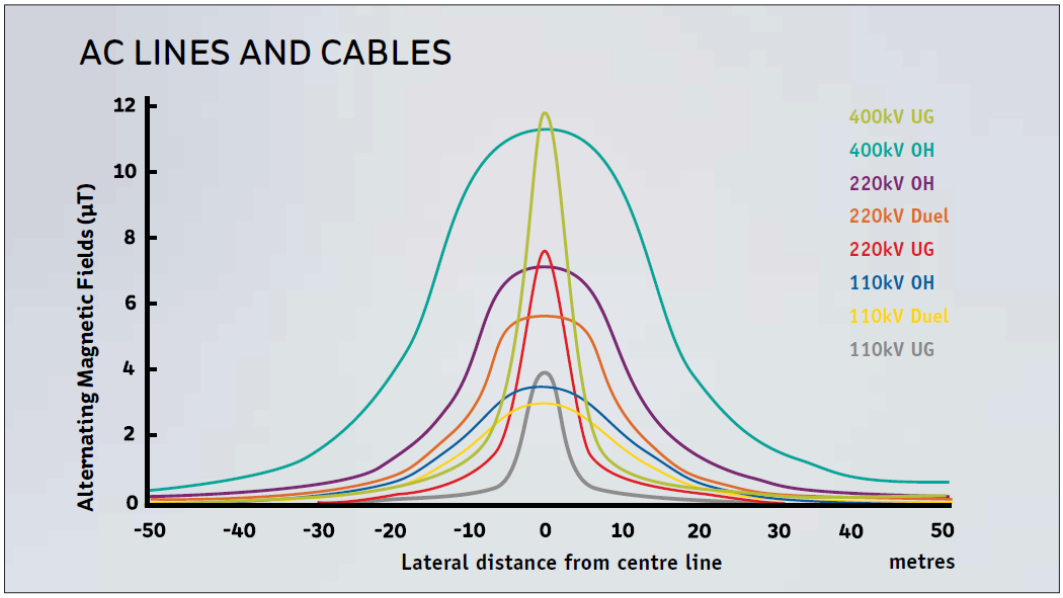

Figure 4. Magnetic Field from AC OHL Cables**

2.2 UG (Underground Cables)

The UG (underground) cables at the proposed development would not emit an electric field as electrical UG cables are shielded, hence there would be no issue relating to electric fields. There would be a magnetic field associated with the UG cables, as a magnetic field would occur when electric charges flow through the cables. However, this is usually limited to the immediate vicinity of the cable and will be low for a 33kV cable, and well within the recommended levels as set out in the 1998 ICNIRP guidelines.

*** ICNIRP (International Commission on Non-Ionizing Radiation Protection)*
** Image from ESB Document "EMF& You"*

Section 3 - EMC (Electromagnetic Compatibility) Impact Assessment

3 EMC (Electromagnetic Compatibility)

EMC concerns the ability of electrical / electronic systems and devices to function properly when in close proximity to each other.

3.1 Impacts of EMC

High levels of Electromagnetic Fields can cause Electromagnetic Interference (EMI) to electrical devices and telecommunications systems. A desktop survey was carried out to identify the nearest telecommunications infrastructure to the proposed development site. The results of the desktop survey found that there are four telecom mast-sites within 5 km of the proposed solar farm site boundary. The telecom mast-sites are shown below in Figure 6.

Using the ComReg database of telecom operators, the following operators were found to have network infrastructure at these mast-sites: Eir, Imagine Broadband, Three Ireland and Vodafone. Field surveys of the mast-sites were also carried out, the results of which are presented in Appendix B of this report.

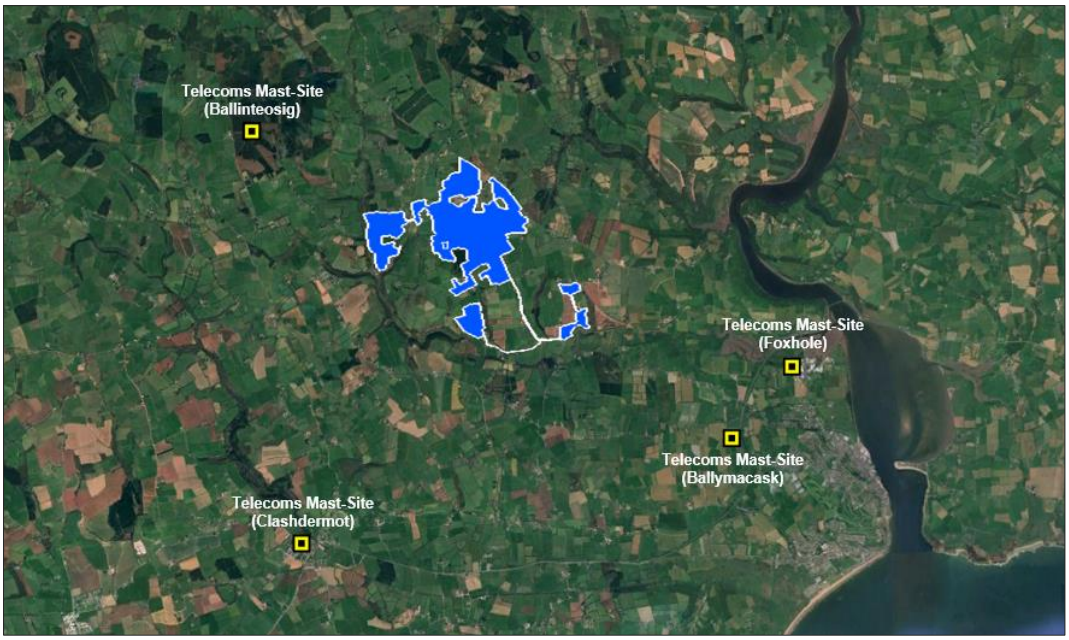

Figure 5. Telecoms Mast-Sites within 5 km of the proposed development site

Telecoms Mast ID	Approximate Distance from Solar Farm Site Boundary	Telecom Operator(s) with infrastructure at mast-site
Ballinteosig	3 km	Eir, Three Ireland, Imagine Broadband
Foxhole	4 km	Three Ireland
Ballymacask	3 km	Vodafone
Clashdermot	5 km	Vodafone

Table 3. Telecom Mast-sites within 4 km of the proposed development site

As outlined in Section 2.1 of this report, the level of EMF from the proposed development will be very low and no impacts are expected on the telecom operator networks at Ballinteosig, Foxhole, Ballymacask and Clashdermot; however, consultations were carried out with the relevant operators. The consultation process is outlined in Section 3.1.1 that follows.

3.1.1 Telecom Operator Consultations

Consultations beginning in October 2025 were undertaken with the relevant telecom network operators at the Ballinteosig, Foxhole, Ballymacask and Clashdermot mast-sites. The operators were requested to raise any concerns they may have regarding EMC impacts to their networks due to the proposed solar farm development.

Table 4 lists the Telecom Operators contacted, and the issues raised by the operators. The responses received from the each of the Telecom Operators are provided in Sections 3.1.1.1 to 3.1.1.4 below.

ID	Operator	Response Received (Yes/No)	Issues raised by Operator \ Observations.
1	Eir	Yes	No EMC issues raised by Eir.
2	Imagine Broadband	Yes	No EMC issues raised by Imagine Broadband.
3	Three Ireland	Yes	No EMC issues raised by Three Ireland.
4	Vodafone	Yes	No EMC issues raised by Vodafone.

Table 4. Telecom Operators Consulted

3.1.1.1 Eir Response to Consultations

Eir have raised no concerns regarding the proposed development. The Eir response to consultations is provided below:

> *"We have no issue with the addition of the solarfarm, we have no sites or links within close vicinity*.

3.1.1.2 Imagine Broadband Ireland Response to Consultations

Imagine Broadband have raised no concerns regarding the proposed development. The Imagine Broadband response to consultations is provided below:

> *"We will have no issues with this deployment."*

3.1.1.3 Three Ireland Response to Consultations

Three Ireland have raised no concerns regarding the proposed development. The Three Ireland response to consultations is provided below:

> *"Developments in this area will have no impact on our transmission network."*

3.1.1.4 Vodafone Response to Consultations

Vodafone have raised no concerns regarding the proposed development. The Vodafone response to consultations is provided below:

> *"This development would not impact Vodafone transmission. It is well over 3km to the nearest site."*

Section 4 – Mitigation Measures

4 Mitigation Measures

In this section the sensitive receptors listed below have been assessed to ascertain if mitigation measures are required to offset the potential impacts of EMF/EMC due to the proposed development.

- Humans (Human Health)
- Telecommunications Networks (Transmission networks)
- Broadcast Networks (TV and radio transmitters)
- Aviation (Transmission networks and navigational aids)
- Industrial (Industrial facilities sensitive to EMF emissions).
- Medical / Pharmaceutical (Medical or pharmaceutical facilities sensitive to EMF emissions).

4.1 Mitigation Measures and Residual Impacts

The mitigation measures and associated residual impacts for each of the sensitive receptors assessed during this study are provided below in Table 5.

Sensitive Receptor	EMF/EMC Assessment	Mitigation Measures	Residual Impacts
Humans	The level of emissions from the OHL, UG cables, transformers etc. would be well with all recommend national and international guidelines and would pose no risk to human health.	None Required	No impacts.
Telecommunications Networks	Each of the telecom operators with radio transmission links within 5km of the proposed energy park have been contacted and they have raised no issues with the proposed development.	None Required	No impacts.
Broadcast Networks	There are no Broadcast transmitters (TV or radio) operating in close proximity to the proposed site, and the proposed development will have no impacts to Broadcast networks.	None Required	No impacts.
Aviation	There are no aviation transmission networks or navigations aids operating in close proximity to the proposed site, and the proposed development will have no impacts to Aviation operations.	None Required	No impacts.
Industrial	There are no industrial facilities that are sensitive to EMF emissions, in close proximity to the proposed site, and the proposed development will have no impacts to Industrial facilities.	None Required	No impacts.
Medical / Pharmaceutical	There are no medical or Pharmaceutical facilities that are sensitive to EMF emissions, in close proximity to the proposed site, and the proposed development will have no impacts to Medical / Pharmaceutical facilities.	None Required	No impacts.

Table 5. Mitigation Measures and Residual Impacts.

Section 5 - Conclusions

5 Conclusions

From the findings made in this report the following conclusions have been made:

- The EMF impacts due the proposed development are shown below in Table 6.

Assessment	Summary	Impact of Proposed Development
EMF	EMF levels due to the proposed development and associated underground cables would be significantly lower than the basic restriction level which is the level at which radiation is potentially harmful to humans as published in the ICNRIP guidelines. There are no sensitive receptors that would be impacted by EMF due to the proposed Energy Park and mitigation measures would not be required.	No issues.

Table 6. EMF Impacts due to proposed development.

- The EMC impacts due the proposed development are shown below in Table 7.

Assessment	Summary	Impact of Proposed Development
EMC	The EMF signals due to the proposed development would be very low and would be negligible at the telecoms mast-sites at Ballinteosig, Foxhole, Ballymacask and Clashdermot. The relevant telecom operators with network equipment at Ballinteosig, Foxhole, Ballymacask and Clashdermot have been notified of the proposed development, and no issues have been raised regarding EMC. There are no sensitive receptors that would be impacted by EMC due to the proposed Energy Park and mitigation measures would not be required.	No issues.

Table 7. EMC Impacts due to proposed development.

APPENDIX A – References

Appendix A – References

The following standards, guidelines and documents were referenced in this report.

- ComReg Document 08/51R2, Programme of Measurement of Non-Ionising Radiation Emissions

- International Commission on Non-Ionising Radiation Protection 'Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300GHz)'. Health Physics 74 (4): 494-522; 1998.

- EU Council 'Recommendation on the limitation of exposure of the general public to electromagnetic fields' (0Hz to 300GHz) 1999/519/EC.

- ICNIRP 'Guidelines for limiting exposure to time varying electric and magnetic fields (1Hz–100kHz) Health Physics' 99(6):818-836; 2010.

- Directive of the European Parliament and of the Council on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) 2013/35/EU.

- EirGrid Document: XDS-GFS-00-001-R4 Functional Specification 110/220/400 kV Substation General Requirements

- EirGrid Document: "*The Electricity Grid and your Health*"

- EirGrid Document: "*Your guide to understanding electric and magnetic fields (EMFs) in the electricity transmission system*"

- ESB Document: "*EMF & You*"

- EPA https://www.epa.ie/environment-and-you/radiation/emf/what-is-emf/

- EPA https://www.epa.ie/environment-and-you/radiation/emf/emf-and-your-health/

APPENDIX B – Telecoms Mast-Site Field Survey Findings

Appendix B – Mast-Site Field Survey Findings

The telecom mast-sites surveyed for this EMF/EMC Study are shown relative to the proposed development in the figure below.

Figure 6. Telecom Mast-Site(s) shown relative to proposed development.

The findings from the field surveys of each of the mast-sites are presented below.

Mast-Site A (Ballinteosig)

Telecommunications Mast-Site A is located in the townland of Ballinteosig, Co Cork and is approximately 3 km northwest of the proposed development site. A photo of the mast at this location is shown in the figure below. The Telecom Operators who have telecommunications equipment at this mast-site are listed in Table 8.

Figure 7. Mast-Site A

Mast ID	Telecom Operators
Mast A	Eir, Three Ireland, Imagine Broadband

Table 8. Field Survey Summary – Mast-Site A

Mast-Site B (Foxhole)

Telecommunications Mast-Site B is located in Foxhole, Co Cork and is approximately 4 km southeast of the proposed development site. A photo of the mast at this location is shown in the figure below. The Telecom Operators who have telecommunications equipment at this mast-site are listed in Table 8.

Figure 8. Mast-Site B

Mast ID	Telecom Operators
Mast B	Three Ireland

Table 9. Field Survey Summary – Mast-Site B

Mast-Site C (Ballymacask)

Telecommunications Mast-Site C is located in the townland of Ballymacask, Co Cork and is approximately 3 km southeast of the proposed development site. Access into this mast-site was not possible on the day of survey; however, the mast-structure at Ballymacask is clearly visible in the aerial view of the site shown below. The Telecom Operators who have telecommunications equipment at this mast-site are listed in Table 10.

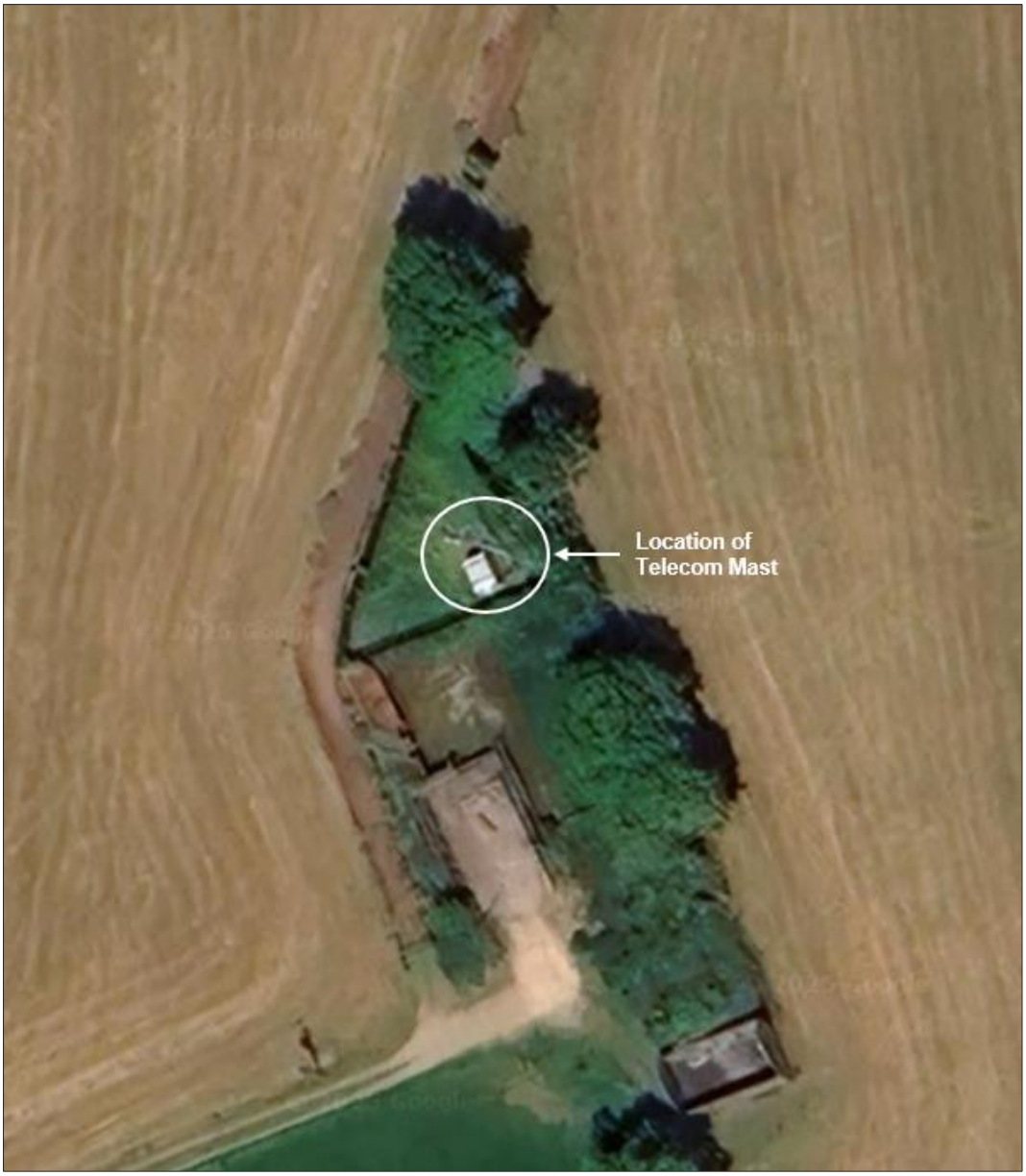

Figure 9. Mast-Site C

Mast ID	Telecom Operators
Mast C	Vodafone

Table 10. Field Survey Summary – Mast-Site C

Mast-Site D (Clashdermot)

Telecommunications Mast-Site D is located in Clashdermot, Co Cork and is approximately 5 km southwest of the proposed development site. A photo of the mast-structure at this location is shown in the figure below. The Telecom Operators who have telecommunications equipment at this mast-site are listed in Table 11.

Figure 10. Mast-Site D

Mast ID	Telecom Operators
Mast D	Vodafone

Table 11. Field Survey Summary – Mast-Site D

APPENDIX C – UG Cable Route Field Survey Findings

Appendix C – UG Cable Route Field Survey Findings

The UG Cable Route surveyed for this EMF/EMC Study is shown below in Figure 13. Survey points were chosen along the route and photographs were taken. At each survey point an assessment was made for any potential EMF/EMC impacts.

During the field survey, OH (over-head) telephone wires (Eir) and OH power cables (ESB) were observed along the roads between the southern parcels of the proposed development and main development site. The proposed 33kV UG cable run is expected to have no EMF/EMC on these existing OH cables. A summary of the UG cable route field survey findings is shown in Table 11.

Figure 11. UG Cable Route Surveyed

Survey Point ID	Expected issues due to EMF/EMC
SP1	None
SP2	None
SP3	None
SP4	None
SP5	None
SP6	None
SP7	None
SP8	None
SP9	None
SP10	None
SP11	None

SP12	None
SP13	None
SP14	None
SP15	None
SP16	None

Table 12. UG Cable Route Field Survey Summary

UG Cable Route Field Survey Photomontage

The photographs which were taken along the survey route are provided below in Figure 14 to Figure 29.

Figure 12. Roadside View from Survey Pt A1 (Youghal Park Road – L3808)

Figure 13. Roadside View from Survey Pt A2 (Youghal Park Road – L3808)

Figure 14. Roadside View from Survey Pt A3 (Youghal Park Road – L3808)

Figure 15. Roadside View from Survey Pt A4 (Youghal Park Road – L3808)

Figure 16. Roadside View from Survey Pt A5 (Youghal Park Road – L3808)

Figure 17. Roadside View from Survey Pt A6 (Youghal Park Road – L3808)

Figure 18. Roadside View from Survey Pt A7 (Youghal Park Road – L3808)

Figure 19. Roadside View from Survey Pt A8 (Youghal Park Road – L7829)

Figure 20. Roadside View from Survey Pt A9 (Youghal Park Road – L7829)

Figure 21. Roadside View from Survey Pt A10 (Youghal Park Road – L7829)

Figure 22. Roadside View from Survey Pt A11 (Youghal Park Road – L7829)

Figure 23. Roadside View from Survey Pt A12 (Youghal Park Road – L7829)

Figure 24. Roadside View from Survey Pt A13 (Youghal Park Road – L7829)

Figure 25. Roadside View from Survey Pt A14 (Youghal Park Road – L7829)

Figure 26. Roadside View from Survey Pt A15 (Park Hill Road – L7829)

Figure 27. Roadside View from Survey Pt A16 (Park Hill Road – L7829)