GREENLINK
MARINE ENVIRONMENTAL IMPACT ASSESSMENT REPORT- IRELAND

APPENDIX K

Magnetic Fields and the Induced Voltages caused by the Greenlink HVDC Circuit

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Greenlink Interconnector
- connecting the power markets in Ireland and Great Britain

Greenlink
INTERCONNECTOR

Magnetic Fields and the Induced Voltages caused by the Greenlink HVDC Circuit

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Introduction

This document accesses the effect that the Greenlink HVDC circuit would have on the existing telecom cables that it runs parallel to or crosses. There are two locations where the Greenlink circuit run parallel to or crosses the existing telecom cables ESAT1 and Solas and these are shown in Figure 1 or 2. In both locations the distance between the Greenlink circuit and the telecom cables are considerable (i.e. 650 m) and both cable crossings are at right-angles.

Figure 1: *Greenlink Cable crosses the ESAT1 cable at KP 102.5.*
Minimum distance where the circuits run parallel is greater 650m

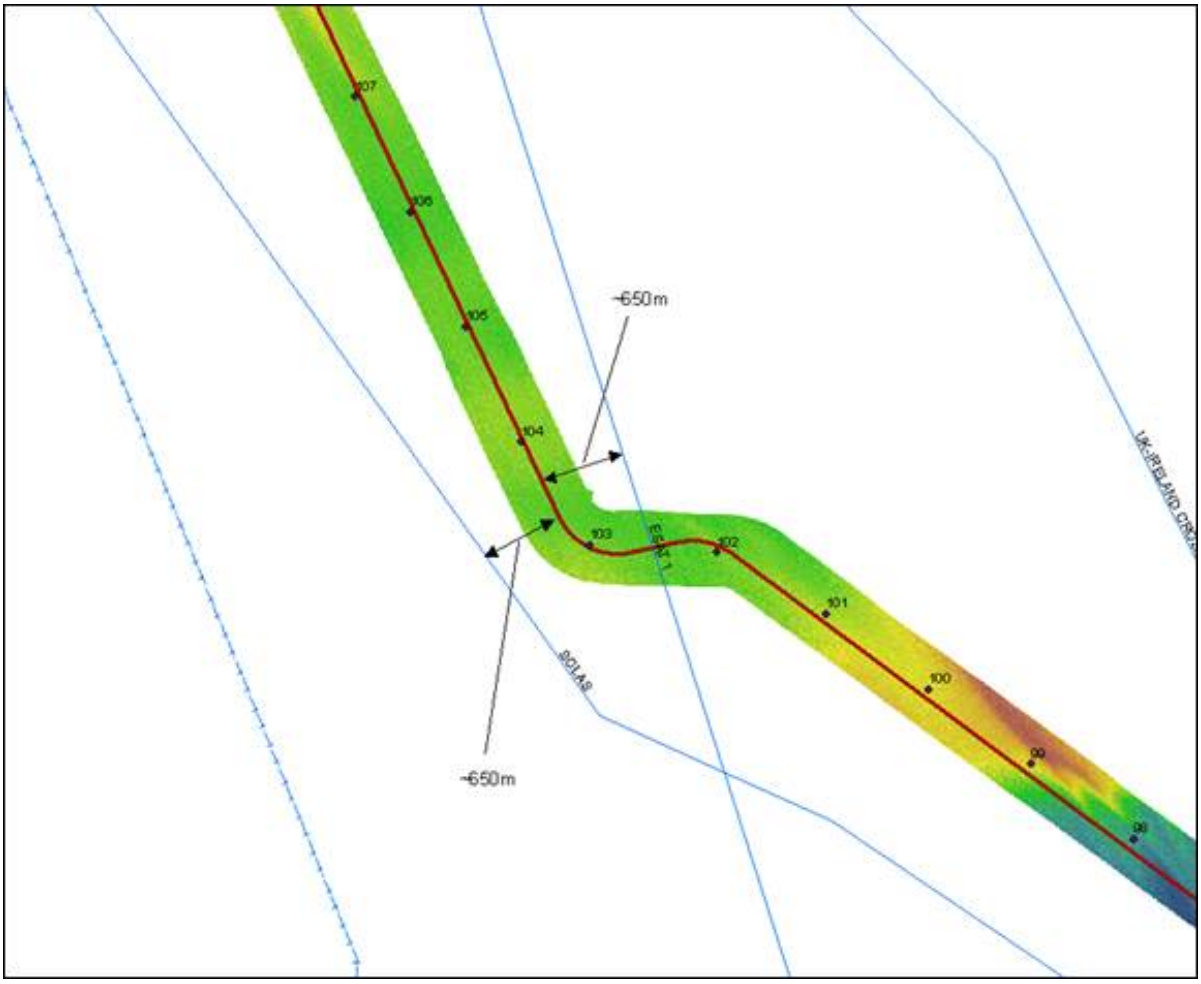
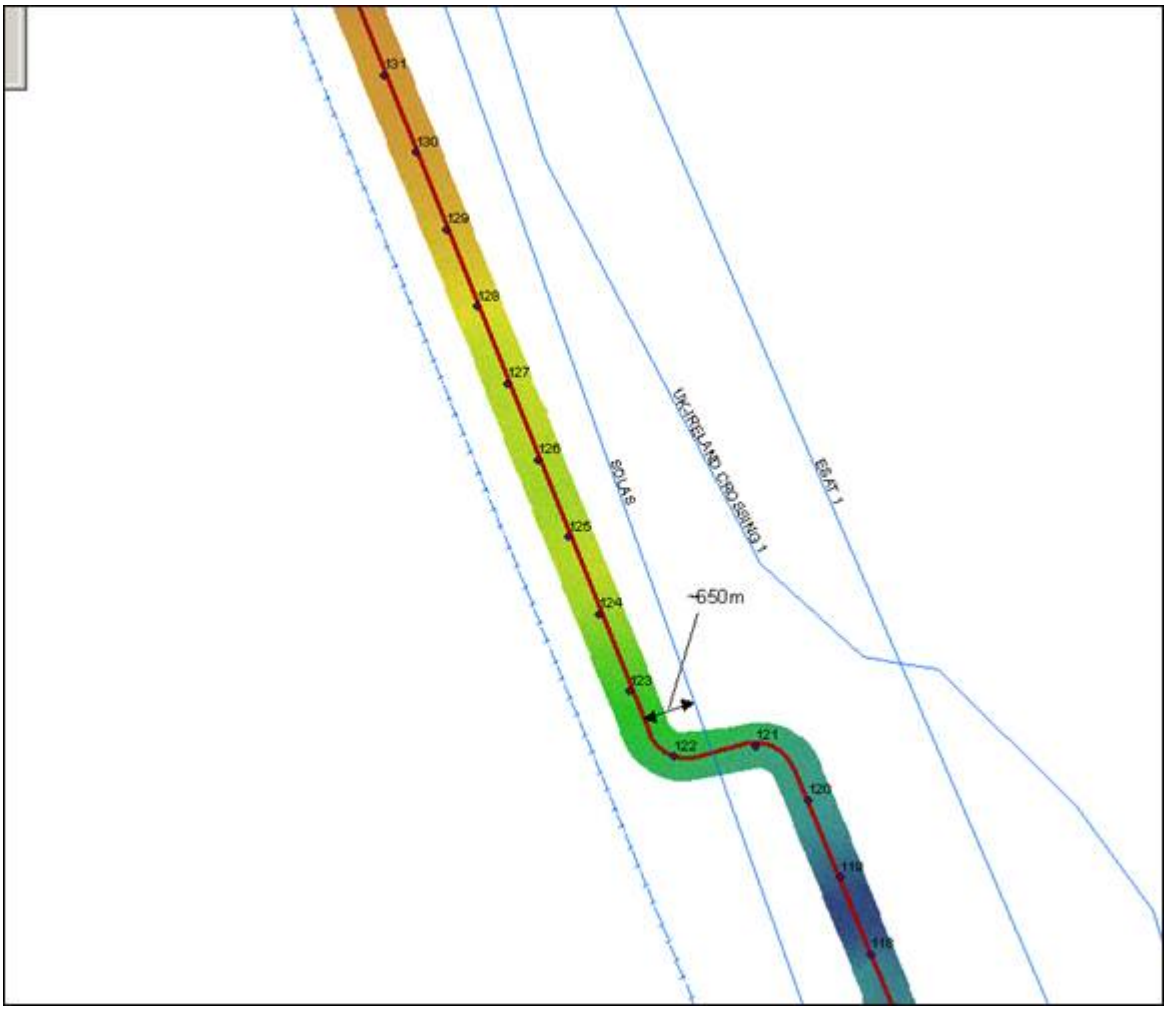


Figure 2: Greenlink Cable crosses to Solas Cable at KP 121.6
Minimum distance where the circuits run parallel is greater 650m



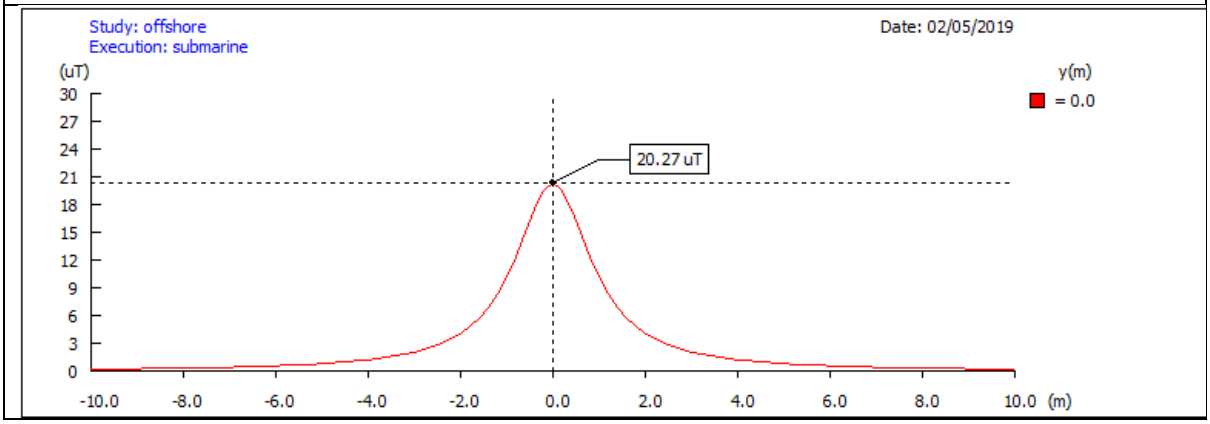
Magnetic Field and Induced Voltages

Power cables with electrical current flowing in the conductor would produce a magnetic field. It is feasible that a changing magnetic field produced by a power cable can induce a voltage / current into a telecom cable with metallic components. For a voltage to be induced into the metallic components of a telecom cable the following must occur.

- There must a rapidly changing magnetic field from the power circuit (due to changing electrical currents in the power cable).
- The power circuit must run parallel to the telecom cable for a long distance (i.e. many km).
- The distance between the power cables and the telecom cable is close (i.e. a few metres).

The Greenlink circuit is a direct current (DC) circuit and magnetic field produced by each cable is equal and opposite. With cables bundled together under normal operating conditions the magnetic fields produced by each cable tends to cancel each other out. The resultant magnetic field is very low (i.e. approx 21 micro-Tesla on the seabed immediately above the cables) and within 10 metres from the power circuit the resultant magnetic field is negligible. Please refer to diagram in Figure 3 showing the resultant magnetic field under the maximum load conditions.

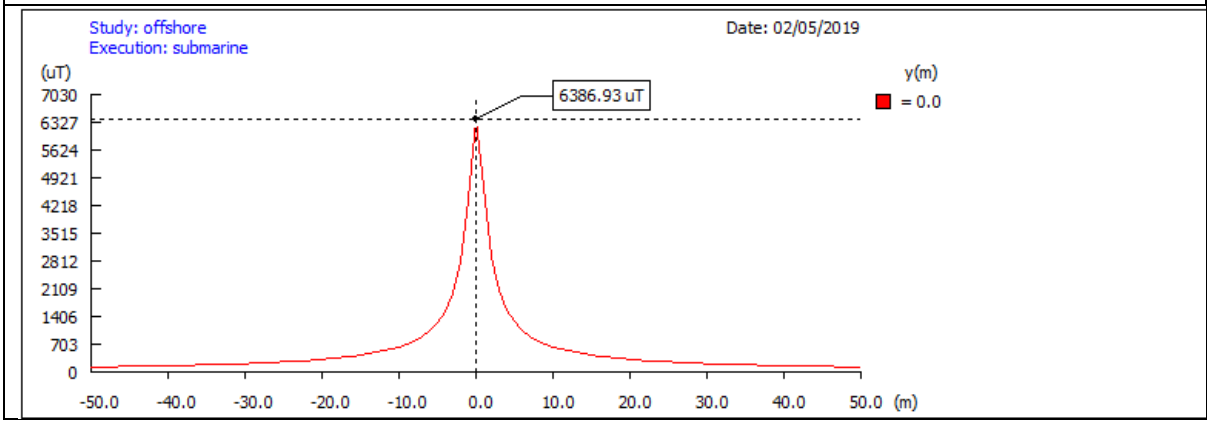
Figure 3: Greenlink Circuit, Magnetic field under full load condition



Please note, for DC circuits under normal operating conditions the magnetic field is stable (i.e. not rapidly changing) and therefore the induced voltages in the parallel telecom cables would be negligible.

Fault currents, which can occur once or twice in the lifetime of the circuit, do produce a rapidly changing high magnetic field. However, even this magnetic field would become negligible within 50 metres (please refer to Figure 4).

Figure 4: Greenlink Circuit, Magnetic field under fault condition



Therefore, even under fault conditions, because of the very large distance between the parallel telecom cables and the Greenlink circuit (i.e. 650 m), induced voltages would be negligible.

Where the Greenlink circuit would cross the existing telecom cables, the cables would cross at right-angles (to minimise parallelism) and therefore at crossing locations the voltages induced into the telecom cables would be zero even under fault conditions.

Conclusion

The Greenlink cable would induced negligible voltages into the parallel telecom cables.

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