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Mullingar 110 kV Project

Constraints and Route Corridor Report - Executive Summary

April 2011

Phase 2 Reports
Executive Summary
Constraints and Route Corridor Report
Appendix 1 - Constraints and Route Corridor Figures
Appendix 2 - Detailed Environmental Reports

Plan Design Enable

Mullingar 110 kV Project

Constraints and Route Corridor Report

Executive Summary



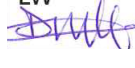

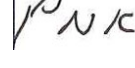




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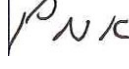



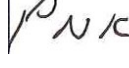

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List of Reports

Executive Summary

Constraints and Route Corridor Report

Appendix 1- Constraints and Route Corridor Figures

Appendix 2- Detailed Environmental Reports

Glossary of Terms

BoCCI	Birds of Conservation Concern in Ireland
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
DAU	Development Applications Unit
DoEHLG	Department of Environment, Heritage and Local Government
NPWS	National Parks and Wildlife Service
NHA	Natural Heritage Area
pNHA	Proposed Natural Heritage Area
SAC	Special Area of Conservation
SPA	Special Protection Area
MVA	Mega Volt Ampere (unit used for apparent power in electrical measurement)
Amps	Ampere (a unit of electrical current)
ACSR	Aluminium Conductor Steel Reinforced (Overhead Line conductor design)
XLPE	Cross-linked polyethylene (Underground cable design)
OPGW	Optical Ground Wire
EMF	Electro-magnetic fields

1. Introduction

- 1.1 EirGrid plc is the statutory operator of Ireland's national electricity grid (also called the 'Transmission System'). EirGrid is an independent, state-owned company.
- 1.2 EirGrid has several roles:
- To operate a safe, reliable, economical and efficient national electricity grid;
 - To plan and develop the grid infrastructure needed to support Ireland's economy;
 - To supervise the security of the national grid;
 - To schedule electricity generation with power generators and stations; and
 - To facilitate the market for renewable electricity in Ireland.
- 1.3 It is in this capacity that EirGrid is proposing the Mullingar – Kinnegad/Derryiron 110 kV electricity reinforcement.
- 1.4 The proposed scheme is required to ensure the security of electricity supply to the Mullingar region. Electricity demand in the region has placed continued strain on the transmission network, with the result that the existing 110 kV network is approaching its technical limit. As future load increases, this limitation will manifest itself as a decline in network performance and quality of the electricity supply in the region. This degradation will be observed as lower voltages, and the increased potential for voltage dips or supply failure, which may result in damage to customer equipment (depending on equipment type) or compromise customer manufacturing in the region.
- 1.5 Mullingar is currently supplied by only two 110 kV Overhead Lines. This proposed project will deliver a third circuit to reinforce power supply to the area. The introduction of a third circuit is the standard security approach for a town of Mullingar's size, without which there is a risk to supply in the region.
- 1.6 For example, if one of the two existing 110 kV lines is out of service for maintenance and the second line has a fault; supply to the area may be lost and would clearly affect both residential and business customers. The addition of the proposed 110 kV circuit to the existing transmission network, will significantly improve the quality and security of supply to the study area.

2. Terms of Reference

- 2.1 In May 2008, Atkins was appointed as lead consultants by EirGrid for the Mullingar 110 kV project in accordance with the EirGrid Framework Contract, ENQEIR078.
- 2.2 Atkins was engaged to support EirGrid in the design and achievement of planning consent for the project in three phases:
- Phase 1 & 2 will be combined and will comprise the constraints and route corridor report for a new 110 kV circuit from the existing Mullingar 110 kV transmission station, Irishtown, Co. Westmeath to either the existing Derryiron 110 kV transmission station in Rhode Co. Offaly or to the existing Kinnegad 110 kV transmission station at Killaskillen, Co. Meath; and
 - Phase 3 will be the production of an Environmental Impact Statement (EIS)/ Environmental Report (ER) and submission of the planning application for the preferred route for the new circuit (this is a future project phase and not considered in this report).
- 2.3 This report is concerned with Phase 1 & 2 works only and is reported in four volumes in accordance with the Project Road Map:
- Executive Summary;
 - Constraints and Route Corridor Report made up of Part A, B and C;
 - Appendix 1 – A3 Figures; and
 - Appendix 2- Detailed Environmental Reports.

Executive Summary provides a high level overview of the project, the background, rationale and summary of the methodology and findings to date.

The Constraints and Route Corridor Report is subdivided up into three Parts; A, B and C;

Part A provides a more detailed report as to the context, key considerations and the approach taken in undertaking the study, introducing the key constraints and identification of the preliminary circuit route corridors selected for evaluation;

Part B provides a more detailed report of the engineering elements associated with providing the new circuit along the proposed corridors and compares options between overhead line and underground cable solutions in terms of both engineering and environmental considerations; and

Part C provides a detailed summary of the findings and presents the preferred route corridor.

Appendix 1 includes all of the A3 figures which are referred to throughout Parts A, B and C Constraints and Route Corridor Report.

Appendix 2 contains a copy of the detailed environmental route selection reports in the key areas of Landscape and Visual, Flora and Fauna and Cultural Heritage.

3. Description of the Mullingar Project

Grid25

- 3.1 Ireland faces the challenge of providing continued reliable, secure and affordable electricity services in the coming decades. EirGrid is the independent electricity Transmission System Operator (TSO) in Ireland and it is EirGrid's role to "*deliver quality connection, transmission and market services to electricity generators, suppliers and customers utilising the high voltage electricity system*". EirGrid's Grid25 Strategy is a critical element to facilitating a reliable, secure and sustainable power supplies in Ireland. The Strategy outlines how the transmission network will be developed in anticipation of Ireland's long term needs and how it is going to meet the country's growing demand for electricity. The strategy will involve upgrading the high voltage system in Ireland and an investment of approximately €4 billion over the period up to 2025.
- 3.2 EirGrid regard the protection of the health, safety and welfare of the general public and its staff as a core company value. The Irish Transmission and Distribution Systems are designed, constructed and operated in accordance with all national and EU Safety Regulation and in accordance with best international practice. Extensive studies have been undertaken on the health risks associated with high voltage circuits. Guideline reference levels for exposure to electro-magnetic fields (EMF) have been set by the International Commission on Non-Ionising Radiation Protection (ICNIRP) who advises the World Health Organisation (WHO) on non-ionising radiation matters. EirGrid will adhere to international and national standards and guidelines.
- 3.3 The transmission network in Ireland consists of a meshed network of high voltage lines and cables for the transmission of bulk electricity supplies around Ireland. The transmission system comprises 400 kV, 220 kV and 110 kV networks linked through Transmission Stations.
- 3.4 Grid25 and other studies carried out by EirGrid have identified development requirements in each region of the country. Power Systems studies undertaken by EirGrid have forecasted that the Mullingar voltage will be outside Transmission Planning Criteria (TPC) standards in the coming years. The nature of the voltage problems are described below:
- From winter 2010, low voltage violations will occur at Mullingar 110 kV station during an outage of Lough Ree Power generator at Lanesboro 110 kV station and the subsequent trip of the Corduff – Mullingar 110 kV line;
 - By winter 2015, low voltage violations will occur for a single contingency (N-1) loss of either of the two 110 kV lines feeding Mullingar; and
 - The level of demand at Mullingar will be such as to put the station at risk of voltage collapse in winter 2019 for the maintenance-trip combination of the Lough Ree Power generator and the Corduff – Mullingar 110 kV line.

Mullingar 110 kV Project

- 3.5 The Mullingar to Kinnegad/Derryiron 110 kV Project will be carried out in line with Grid25. The Project will provide a sustainable solution to existing deficiencies by ensuring that adequate electricity supplies are available within Mullingar and its environs to support economic activity and growth in a manner that is fully compatible with national energy and environmental strategy and policies. Mullingar is currently supplied by only two 110 kV Overhead Lines. This proposed project will deliver a third circuit to supply power to the area. This is the standard security approach for a town of Mullingar's size and without this circuit there is a risk to supply in the region. For example, if one of the two existing 110 kV lines is out of service for maintenance and the second line has a fault; supply to the area may be lost. This would affect both residential and business customers.

- 3.6 The closest stations on the transmission network are Kinnegad and Derryiron. By adding the proposed 110 kV circuit to the existing transmission network feeding into Mullingar 110 kV Transmission Station via Kinnegad/Derryiron Transmission Stations, it will significantly improve the quality, power flow and security of supply to the study area. This phase of works is part of EirGrid's project proposal to energise the circuit by approximately 2014

Strategic Planning Context

- 3.7 The proposed electricity infrastructure must be considered in context of current regional and Local Planning Policy. The context for energy infrastructure is set within the framework of the Energy Policy Framework 2007-2020, National Development Plan 2007-2013, Midland Regional Authority - Regional Planning Guidelines and the County Development Plan of County Westmeath.

- Strategic Infrastructure Act (2006);
- The Energy Policy Framework 2007 – 2020 - Delivering a Sustainable Energy Future for Ireland;
- National Spatial Strategy (NSS) 2002-2020;
- National Development Plan (NDP) 2007-2013;
- Midlands Regional Planning Guidelines 2010-2016;
- Draft Regional Planning Guidelines 2010 - 2022 for the Midlands Region; and
- Westmeath County Development Plan 2008-2014.

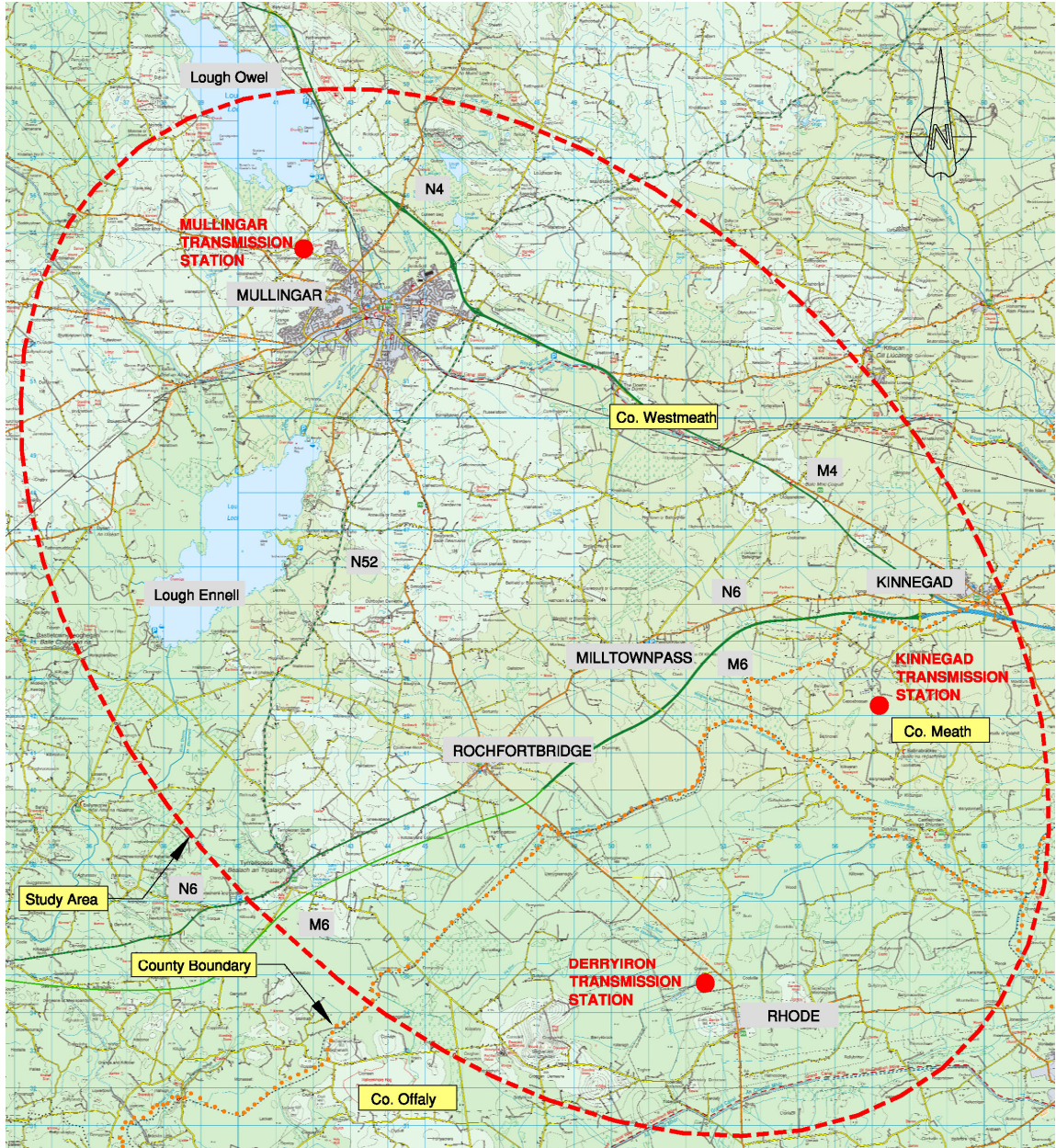
- 3.8 Subsequent to the above planning policy review the following conclusions were drawn:

- The Energy Policy Framework 2007 – 2020 - Delivering a Sustainable Energy Future for Ireland highlights that security of energy supply is crucial for the economy and society and states that we need robust networks and electricity generating capacity to ensure consistent supply to consumers and all sectors of the economy;
- Mullingar is part of the Midlands Gateway which is made up of Mullingar, Athlone and Tullamore. This Gateway is defined by the NSS as having a “*strategic location, nationally and relative to their surrounding areas, and providing national scale social, economic and support services*”. In other words Mullingar is strategically important and thus delivery of strategic infrastructure is key to its development and success;
- In this context the NDP, NSS and the Midland Regional Authority all highlight the requirement for upgrading and developing the energy transmission network in the region while the Westmeath County Development Plan recognises that electricity networks in the region are undergoing major refurbishment programs;
- The Grid25 Strategy is endorsed in the Midland Regional Planning Guidelines 2010-2022 and therefore the importance of strategic infrastructure in this Region is acknowledged; and
- It is considered that the objectives of the NDP remain valid, despite the current economic downturn.

4. Study Area

4.1 The study area extends over parts of three counties, Westmeath, Meath and Offaly covering approximately 548.6 km² as shown Figure 4.1 below. The study area is bounded to the north of Mullingar by Lough Owel and to the south of the study area by the location of the Grand Canal.

Figure 4.1- Location of the Study Area



Affected Transmission Stations

Mullingar 110 kV Transmission Station

- 4.2 Mullingar 110 kV Transmission Station is located approximately 2 km north of Mullingar Town in Co. Westmeath. It is situated in the townland of Walshestown. The station is located in a quiet residential area adjacent to the local road. The Route Corridors approach the Transmission Station either from the east or the west with each circuit entry being constrained by existing urban areas, 110 kV, 38 kV and LV lines and major infrastructure such as railways and primary highways.

Derryiron 110 kV Transmission Station

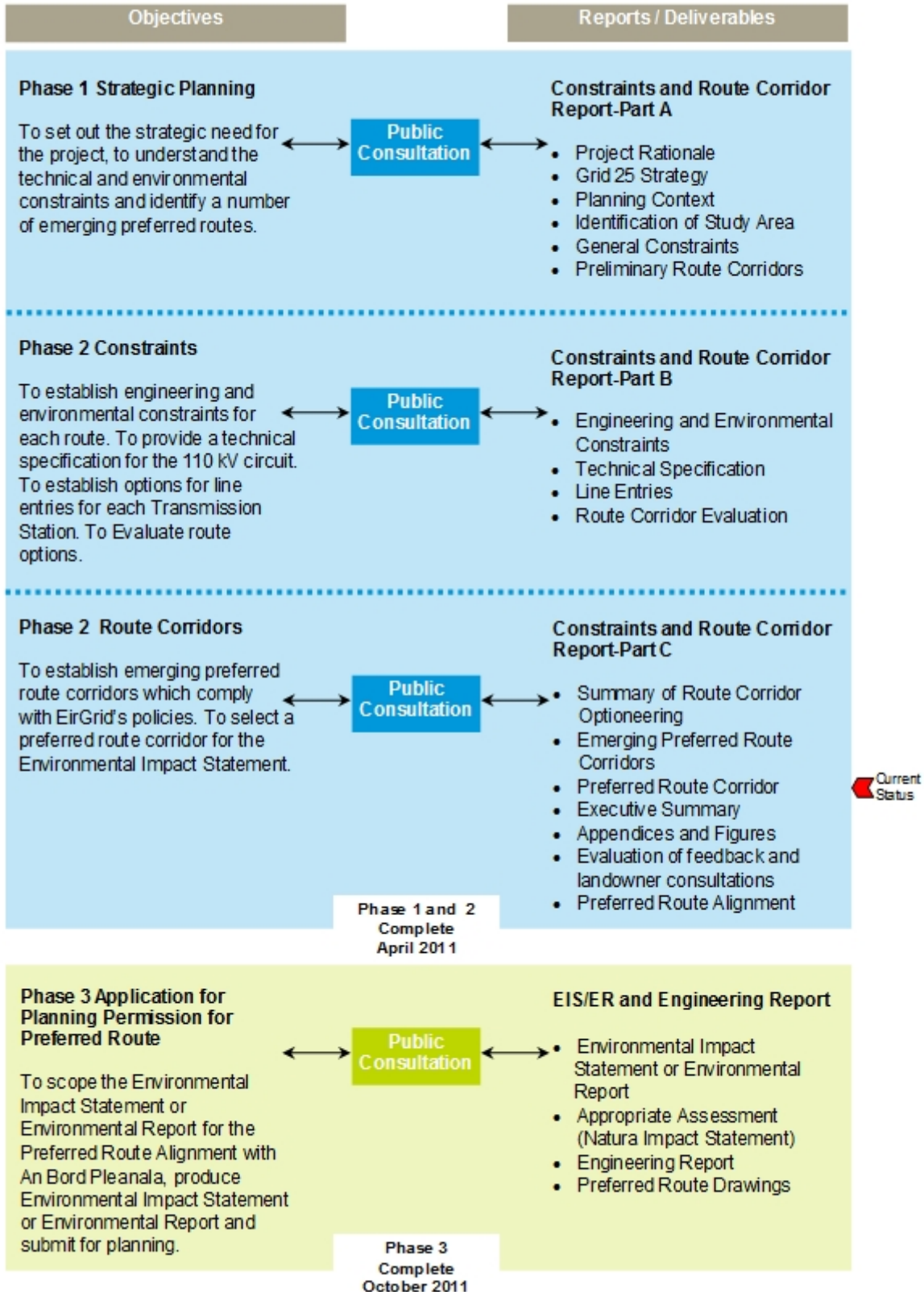
- 4.3 Derryiron 110 kV Transmission Station is located approximately 1.5 km north of Rhode village in Co. Offaly. The Transmission Station is situated in the townland of Derryiron and located at the end of the existing local access road into a privately owned power plant. The Offaly County Development Plan 2009-2015 indicates that area to the north of the plant will be developed. Plans include the construction of an industrial park and access roadway. Works are currently ongoing at this location. At Derryiron the new circuit entry is constrained by the existing 110 kV circuits with options for the new circuit entry either to cross over an existing 110 kV line or to terminate the new circuit in proximity to the Transmission Station and install a section of underground cable into the proposed line bay. These options are discussed further in **Part B Constraints and Route Corridor Report Chapter 12**.

Kinnegad 110 kV Transmission Station

- 4.4 Kinnegad 110 kV Transmission Station is located approximately 4 km south of Kinnegad Town Co. Meath. The Transmission Station is situated in the townland of Killaskillen. The Transmission Station is located on a large open quarry operated by Lagan Cement Ltd. Access into the site is via a private road into the Lagan Cement Factory lands to the south of the Transmission Station. At Kinnegad the new circuit entry is constrained by the quarry operations. The only possible entry to the Transmission Station is from the western boundary and to terminate the circuit onto a gantry structure. These options are discussed further in **Part B Constraints and Route Corridor Report Chapter 12**.

5. Project Delivery Road Map

Figure 5.1- Project Delivery Road Map



Current Status

6. Output Summary: Phase 1 & 2 Objectives

Phase 1 & 2: Identification of Study Constraints and Route Corridors

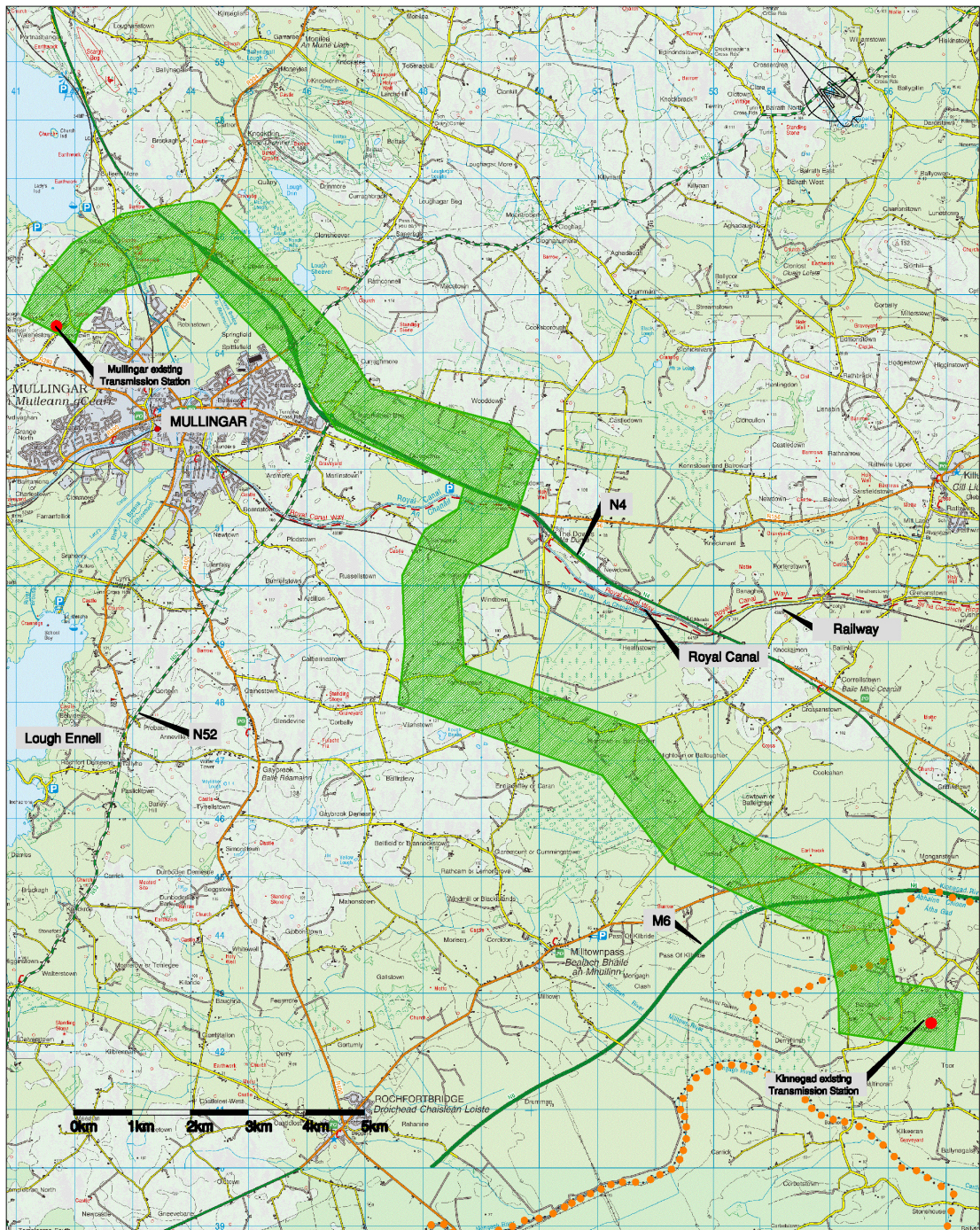
- 6.1 The initial task of the project was to define the proposed study area. The preliminary desktop study detailed the major physical and environmental constraints within the study area and these were mapped and assessed.
- 6.2 Subsequently it has identified eight preliminary route corridors (plus minor variants) within the study area; these include five preliminary Overhead Line and three preliminary Underground Cabling options. Each Route Corridor is approximately 1 km wide. The Overhead Line Route Corridors area shown in **Appendix 1 Figure 3-Overhead Line Route Corridors** and the Underground Cabling Route Corridors are shown in **Appendix 1 Figure 4-Underground Cabling Route Corridors**.
- 6.3 The Route Corridors were identified using the 'Holford Rules' for consideration and evaluation within the context and constraints of major infrastructure, land use and planning issues, environmental designations, visual amenity and built environment within the Study Area. Key engineering and environmental constraints were identified during the desktop review of the study area, which included driving each route corridor to check all road and river crossings and to verify any potential constraints identified during the desktop study.
- 6.4 Specialist environmental studies were carried out in the fields of Landscape and Visual, Fauna and Flora and Cultural Heritage. These studies are included within **Appendix 2**.
- 6.5 Aerial surveys were undertaken to assist in the identification of features of environmental and engineering interest and the An Post GeoDirectory was obtained for the study area to identify all properties, schools and hospitals within the preliminary route corridors.

Emerging Preferred Route Corridors and Line Entries

- 6.6 Of the eight preliminary route corridors (plus minor variants) which were identified within the study area; Overhead Lines Route Corridors 4, 5A and 5B emerged as preferred Route Corridors from work carried out to date. These three Route Corridors are shown in **Appendix 1 Figure 36-Emerging Preferred Route Corridors**.
- 6.7 All three Overhead Line Route Corridors comply with EirGrid's policies and practices for the use of High Voltage Overhead Line and Underground Cable in Ireland.
- 6.8 All three Route Corridors link the existing Mullingar 110 kV Transmission Station to the existing Kinnegad 110 kV Transmission Station.
- 6.9 Overhead Line Route Corridors 4, 5A and 5B were assessed as acceptable routes by the Landscape and Visual and Fauna and Flora specialists with predicted Negligible/Imperceptible or Low/Slight residual impacts which can be mitigated within 1 km wide corridors. The number of residential properties, schools and hospital affected by the proposed routes was lower for Overhead Line Route Corridors 4, 5A and 5B and these routes were also preferred by this aspect. These routes were presented at the second public consultation on the 2nd November 2010.
- 6.10 Overhead Line Route Corridors 5A and 5B were preferred by the Cultural Heritage specialists and Overhead Line Route Corridors 4, and 5A were preferred in relation to the Engineering aspects considered.

- 6.11 Following further consideration of the constraints affecting the three emerging Preferred Route Corridors it was concluded that the western section of Route Corridor 4 represents potential problems for the development of an Overhead Line. Just north of Lough Ennell near Lacy's Bridge Route Corridor 4 is categorised as 'very high in landscape sensitivity' across the entire 1 km width of the corridor. For this reason the western portion of Route Corridor 4 was not considered further within the current Route Corridor Assessment. The eastern section of Route Corridor 4 is common to Route Corridor 5A remains within the Route Corridor Assessment process.
- 6.12 A further review of Route Corridors 5A and 5B was carried out to understand any additional constraints i.e. Environmental, Engineering or Man-made /Human aspects which would assist in selection of the Preferred Route Corridor. Lough Sheever Fen/Slevins Lough Complex pNHA runs parallel to and within the north western section of Route Corridor 5 (an area common to both Route Corridor 5A and 5B). The future Overhead Line would not be designed to enter into the pNHA area therefore the Route Corridor was realigned between in a south easterly direction by approximately 400 m and between the N4/R394 and N4/N52 junctions to avoid this ecologically sensitive area. No significant environmental constraints were noted within the area of the realigned corridor.
- 6.13 A further review was carried out of the distribution of schools and residential properties in Route Corridors 5A and 5B. Route Corridor 5A had fewer schools and residential properties and less regional and local roads with residential property on either side. Additionally the existing Overhead transmission and distribution network is less extensive in Route Corridor 5A than 5B and thus fewer alterations to the existing network and mitigating designs (e.g. extra height structures at crossing locations) on the proposed 110 kV Overhead Line are likely to be required.
- 6.14 On balance, Route Corridor 5A has been identified as the single preferred route corridor emerging from specialists studies carried out to date. Route Corridor 5A is shown in Figure 6.1 overleaf.

Figure 6.1- Preferred Route Corridor



Conclusions on the Preferred Route Corridor

- 6.15 Following an assessment of the Overhead Line Route Corridors, Route Corridor 5A was identified as the Preferred Option for the Mullingar 110 kV Line. Overhead Line Route Corridor 5A will be presented at the 3rd Public Consultation which will take place in April 2011.

7. Next Step

- 7.1 The next step in the project will include the full scoping of the Environmental Impact Statement/Environmental Report for the Preferred Route in association with An Bord Pleanála; production of the EIS; public consultation and submission the formal Planning Application for the new circuit, as can be seen from the 'Project Delivery Road Map' with the Phase 3 element of the project.



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