RPS

The Grid Link Project

Prepared for EirGrid by RPS Group

Study Area Paper

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rpsgroup.com/ireland

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1 INTRODUCTION

EirGrid, as Transmission System Operator (TSO)[1], is obliged, to develop, operate and maintain a safe, secure, reliable, efficient and economic transmission system while having due regard to the environment.

In carrying out this role, EirGrid is also required to ensure compliance with a set of technical standards known as the *Transmission Planning Criteria* (available at www.eirgrid.com). The *Transmission Planning Criteria* sets out objective reliability standards to which the transmission system must perform and are developed in line with best industry practice.

Based on these criteria, EirGrid identifies the needs of the system and also the solutions to meet these needs. It is in this context that EirGrid has identified a need to strengthen and expand the transmission network in the south and east of Ireland and is now developing what is known as The Grid Link Project.

1.1 PURPOSE OF PAPER

This paper has been prepared by RPS Group on behalf of EirGrid. The intention of this paper is to outline the *proposed study area* for the project and record the relevant considerations and deliberations on the path to defining the study area. The *proposed study area* presented at the end of this paper will form the basis of public consultation and the submissions received during this consultation process together with the other considerations outlined in this paper will inform the final *project study area* brought forward.

1.2 APPROACH TO IDENTIFICATION OF STUDY AREA

In defining a study area for the Grid Link Project a two step approach has been adopted. In the first instance, general principles have been applied to ensure the study area is extensive enough to cater for the project needs. In other words, the study area takes account of the identified nodal points of connection to the existing transmission network for the project and caters for the outline technical solutions. Secondly administrative and physical boundaries have been explored to assist in refining the area. This *proposed study area* will be the subject of a formal public consultation (See **Section 6** for further details of consultation opportunities).

[1] Refer to Statutory Instrument 445 (2000)

1.3 STUDY TEAM

The Grid Link study team comprises **EirGrid** as the client and overall Project Developers together with its consultants **RPS Group** (Engineering, Planning, Communications and Environment Consultancy – www.rpsgroup.com), **BPI** (Power System Planning and Design Consultancy - www.bpienergy.com) and **LSTC** (Survey Design and Engineering Consultancy - www.lstc.co.uk). The team represents the key disciplines for the project as follows:

- Environmental Impact – RPS
- Planning Process – RPS
- Stakeholder Engagement – RPS
- Technical Engineering Grid Design – LSTC
- Technical Engineering Station Design – BPI

The terms of reference for identification of the *proposed study area* have been set by EirGrid i.e. connecting to three nodal points on the transmission network. Identification of the actual boundary of the study area has been carried out by RPS, LSTC and BPI through consideration of relevant environmental, planning and technical issues.

2 PROJECT OVERVIEW

2.1 WORK TO DATE – DEFINING A PROJECT

In order to ensure the adequacy of the transmission network (both now and in the future) and to ensure its timely development, EirGrid undertakes a broad range of detailed studies which predominantly address the technical, economic and strategic aspects necessary to identify the network solutions that are to be brought forward. This internal process identifies potential projects that meet transmission requirements in an efficient and cost effective manner and are in compliance with the principles of the Transmission Planning Criteria. The process is broadly outlined in Section 2.5.1 in EirGrid's Transmission Development Plan 2010 (refer to www.eirgrid.com).

The work includes:

- Identification of the technical limits of the transmission system and the drivers for reinforcements;
- Identification of the viable reinforcement options;
- Multi-criteria analysis of the identified options using the criteria of: technical performance, capacity for extension, economic value, and strategic alignment; and
- Identification of a reinforcement solution.

When assessing options, EirGrid considers *inter alia* the impacts of each possible option on other potential development needs. In order to optimise network development, EirGrid seeks to find single development projects to meet multiple network requirements where possible.

In the case of this project, once EirGrid identified a need to strengthen and expand the transmission network in the south and east of Ireland, it proceeded to give due consideration to various network and technical options, which had the potential to address particular deficiencies and strategic objectives for the network. The broad network and technical options explored and the evaluation process undertaken is summarised in **Chapter 3** of this paper.

Arising from this evaluation process, a project known as the Grid Link Project, has been defined. This identifies a new 400 kV transmission circuit linking the transmission substations at Dunstown in Co. Kildare to Knockraha in Co. Cork via Great Island in Co. Wexford. It is noted that associated infrastructure e.g. additional stations, for this circuitry may be required and located remotely from the three mentioned connection points. In studying the options that could meet the needs of the project, EirGrid has concluded that the project should proceed as a High Voltage Alternating Current (HVAC)

link (See **Chapter 3**) and this has focused the terms of reference for the identification of a *proposed study area*.

Following a rigorous and robust evaluation process, EirGrid has determined that the project is a 400 kV HVAC circuit linking the transmission substations at Dunstown in Co. Kildare to Knockraha in Co. Cork via the Great Island in Co. Wexford.

2.2 CONTEXT FOR THE GRID LINK PROJECT

The following sections outline the need for the project and the specific drivers in more detail to provide context to the project.

2.2.1 Grid25

Grid25[2] outlines a strategy for major investment in the transmission grid in order to meet the long term needs of the country and is consistent with the Government's renewable generation target of having 40% of electricity generated from renewable resources by 2020. The implementation of the Grid25 strategy is essential to:

- Supporting growth in the regions and ensuring continued reliability and security of supply;
- Providing a high quality, high voltage power supply that will enable the different regions to attract new industry and boost existing industry;
- Maximising Ireland's natural renewable sources of energy (e.g., wind, wave and tidal); and
- Reducing Ireland's carbon emissions by transmitting renewable energy. A key driver is the need to provide access for renewable generation up to the levels required to meet the Ireland's renewable target of 40%. The strategy also highlights the need for extensive upgrading of the transmission grid over the next 10 – 15 years to meet long-term demands of the transmission network

The consequence of non-action, as set out in Grid25 includes *inter alia*:

- There will be no capacity in the network to allow further renewable generation to be connected particularly in renewable-rich regions; this will have severe consequences on the

[2] Grid25. A Strategy for the Development of Ireland's Electricity grid for a Sustainable and competitive Future. (www.eirgrid.com)

ability of Ireland to meet its renewable targets that seek to ensure its long-term sustainable energy supplies;

- Access to the energy market will not be possible for all low cost generators thereby limiting competitiveness in the energy market;

- Opportunities for further international interconnection would be limited; and

- There will be no capacity in the network to cater for new customers and the reliability of supply to existing customers could be compromised which could lead to supply interruptions.

2.2.2 Strategic Drivers for the Grid Link Project

In the south and east of Ireland, EirGrid has identified a need to strengthen and expand the transmission network. This expansion would provide capacity for connections of both future generation and demand and improve the efficiency of the system. The specific drivers for this strengthening and expansion are set out below.

Renewable Generation

The transmission network is fed by a series of power generators located throughout the Country. It is estimated that Ireland will need a total installed wind capacity of between 3,500 and 4,000 MW by 2020 to meet its 40% renewables target. An additional circa 1,300 MW will also be needed by Northern Ireland to meet its 40% renewables target[3]. This additional generation will require extensive upgrading of the transmission grid because *inter alia*:

- The physical location of renewable generators is often different from existing conventional generation plant and remote from load or demand centres (i.e., centres of population). This typically means that generators are often located in areas with inadequate transmission infrastructure to carry electricity in bulk to where it is required; and

- The addition of new generation capacity alters the power flows across the network requiring additional and / or upgraded grid infrastructure.

This will require *inter alia*:

[3] All Island Generation Capacity Statement 2012 – 2021

- New connections connecting the generator directly to the grid; and

- Reinforcement to strengthen the system for the transfer of power across the grid to the load or demand centres.

EirGrid is responsible for providing connections to the transmission grid for generation developments. Since December 2004 a Group Processing Approach (GPA) or 'gate' approach has applied to applications for connection offers to the transmission system for renewable electricity generators. This approach was approved by the Commission for Energy Regulation (CER) following public consultation. The GPA allows for a strategic view to be taken of network requirements and serves to put in place efficient connection solutions to cater for large number of applications and to ensure optimum network development, minimising network costs and, where possible, avoidance of network bottlenecks.

Approximately 1,600 MW[4] of renewable generation is expected to connect to the electricity network in the south of the country as part of the Gate 3 process. In addition, there is potential for future renewable generation in the area that is not part of the Gate 3 process, and which would also require connection to the grid. Consequently, network reinforcements that would ensure that the planned and future generation can be accommodated are required.

The Grid Link Project is a crucial element of the reinforcement of the grid required to facilitate the integration and transmission of new renewable energy to where demand is located on the grid.

Conventional Generation

The transmission network is also fed by a series of power generation stations located throughout the country which utilise a variety of conventional fuel or energy sources – including gas, oil, coal, peat and hydro. As with renewable generation, the transmission network delivers the generated power to the supply transfer points or "nodes" nationwide where the power can be taken onwards on the lower voltage distribution system.

Ireland's transmission system must offer security of supply for all electricity consumers and, as such, is designed to ensure that power can flow freely to where it is needed and that if one power plant, power line or transmission station is non-operational, whether due to a fault, for maintenance or for any other reason, there are other power plant options or transmission routes available to maintain the supply. The system is also designed and operated to ensure balance, i.e. that power generation matches customer demand on an instantaneous basis. Managing this process is a complex task as demand

[4] As of April 2012

varies on an hourly, daily, weekly and seasonal basis and the process involves the dispatch of power generators to match this varying demand.

At present, because of network limitations, the dispatch capabilities of generators are constrained resulting in system inefficiencies. Specific to the south and east of Ireland, there are a number of existing large conventional generators in the Cork area that are constrained in periods of high wind as there is not enough capacity on the existing transmission network to carry the electricity from these generation points to demand centres.

Future thermal generation anticipated at Great Island i.e. the Endesa Combined Cycle Gas Turbine (CCGT) will also encounter similar network limitations. At Great Island, the existing Endesa Heavy Fuel Oil plant has a maximum power output of 216 MW. This plant is connected to the grid via the existing 220 kV network. Planning permission has been granted to Endesa to construct a natural gas fired CCGT at Great Island that would increase the power output to 430 MW. Due to existing limitations on this network the additional dispatch capabilities at Endesa are expected to have to be constrained.

Providing access to a new 400 kV circuit for conventional generators in the south and east facilitates the efficient use of these generators (in terms of maximising dispatch capabilities) while also releasing capacity in the existing 220 kV network.

Reliability of Supply in the Region

EirGrid, in its Grid25 strategy has identified pressure on the transmission network in the south and east of Ireland. This sets out:

> *"Over the next five to ten years…the reliability of supply to existing customers will fall below national standards"*
>
> (EirGrid's Grid25 page 39*)*

In relation to the capacity of the network to accommodate further generation, EirGrid in its Transmission Forecast Statement 2011-2017 has identified limited capability of the transmission network in the southern region.

In practical terms, both the 110 kV and 220 kV networks in the south and east are under pressure, resulting in a lack of voltage stability and reduced quality of supply. Notwithstanding that demand has dropped in recent years, the local network is expected to operate beyond its limit by 2025 unless the Grid Link reinforcement is implemented. The long lead-in time for the planning, development,

construction and commissioning of transmission infrastructure means that such forecasted requirements need to be addressed at this point in time.

EirGrid has identified that a new 400 kV transmission circuit would be the most efficient way of transmitting power within this region thereby relieving the existing 110 kV and 220 kV network and hence as far as possible avoiding multiple major new circuits at these voltages.

Future Interconnection

EirGrid has a statutory obligation to explore and develop opportunities for interconnection of its system with other systems. Given the proximity of the south and east of Ireland to Great Britain and France, regional reinforcements such as the Grid Link Project must take into account requirements to ensure compliance with this statutory obligation.

Enhanced security of supply, increased competitiveness, ability to integrate greater quantities of renewable generation resources and development of a significant renewable energy export industry are the potential benefits of further interconnection between the transmission grids of Ireland, Great Britain and mainland Europe. A number of studies are exploring different aspects of the feasibility of additional interconnection and these will feed into the decision of future interconnection investment.

The Grid Link Project will provide the necessary network reinforcement to facilitate future interconnection from the south and east to Great Britain or France ensuring compliance with statutory obligations to explore and develop opportunities for interconnections with other systems.

2.2.3 Node Points

As noted in **Section 2.1** of this paper, EirGrid has identified a need to strengthen and expand the transmission network in the south and east of Ireland. In order to identify possible network solutions EirGrid had to consider existing connection / transfer points or “nodes” on the network having regard to the drivers of the project (**Section 2.2.2)** and specifically the physical location of existing and proposed renewable and conventional generation plant, the primary load / demand centre and the potential for future interconnection.

Arising from this analysis, the following three strong nodes on the current grid were selected:

- The Knockraha substation at Co. Cork was selected as it represents a strong point of common coupling for the Cork area (i.e. the majority of existing 220 kV circuits and six 110 kV circuits in the area are connected into the substation). The node also links directly with local generation and local Cork demand;

- Similarly, Great Island substation at Co. Wexford was selected as it represents a strong point of common coupling for the area (i.e. the majority of existing 220 kV circuits and 110 kV circuits in the area are connected into the substation) and there is the potential of additional thermal generation from the Endesa CCGT and possible future interconnection with Great Britain or France connecting to the node; and

- To provide a supply point into Dublin, the existing Dunstown 400 / 220 kV substation was considered as the most logical connection point due to its geographic location and strong connection to the 400 / 220 kV network in Dublin and offers proximity to demand.

It is noted that associated infrastructure e.g. additional stations, for this circuitry may be required and located remotely from the three mentioned connection points.

3 TRANSMISSION OPTIONS AND IMPLICATIONS FOR THE STUDY AREA

3.1 TECHNICAL SCREENING STUDIES

As set out in **Section 2.1** of this paper, EirGrid undertakes a broad range of detailed studies to identify the network solutions that are to be brought forward.

A broad range of possible network reinforcement and technical options for the south and east of Ireland were developed in order to address the project drivers. Each of the options resulted in very different power flows on the transmission system as a result of different generation dispatches (type and location); interconnection operation (import and export) and corresponding demand levels.

The transmission network planning approach is to identify as broad a range of potential reinforcement options and then, through an initial screening process, rank the options in order to identify those options that merit more detailed investigation.

The options at this initial technical screening stage for the south and east network included *inter alia*:

- Uprating existing 110 kV / 220 kV voltage transmission circuits;
- New 110 kV / 220 kV voltage circuits with and without additional reinforcements to the existing transmission circuits;
- New high capacity 400 kV circuits with and without additional reinforcements to the existing transmission circuits;
- High Voltage Alternating Current (HVAC) and High Voltage Direct Current (HVDC) technologies; and
- Onshore and offshore circuitry.

On completion of the initial screening studies, a significant number of potential options were identified. These options were then simulated and assessed by EirGrid having due regard to Transmission Planning Criteria. Of these, a reduced number of options were brought forward for further analysis based on their technical performance.

This reduced number of options was then evaluated, having regard to EirGrid's statutory requirements, i.e. to develop, operate and maintain a safe, secure and reliable, efficient and economic transmission system, while having due regard to the environment, with the objective of identifying a further reduced

set of options that would then be subjected to further detailed analysis. The criteria used in the evaluation were:

- Technical Performance; and;
- Economic Performance.

This further reduced the potentially feasible options to six.

3.2 DETAILED TECHNICAL ANALYSIS

The six shortlisted reinforcement solution options were considered, based on their technical and economic performance, in terms of meeting identified transmission network needs and having regard to the specific objectives for the project. These options were also subject to a high level appreciation of environmental themes to ensure that critical issues were considered in the analysis process. These options were then subjected to further detailed technical and economic evaluation including scenario and sensitivity analyses. The options at this point included:

- A combination of new 110 kV and 400 kV HVAC over head line circuits and uprating of existing 110 kV circuits;
- A combination of new 110 kV and 220 kV HVAC over head line circuits and uprating of existing 110 kV circuits;
- New 320 kV HVDC circuits; and
- New 110 kV and 220 kV circuitry and phased development of new 400 kV circuit.

The evaluation included consideration of the following:

- **Technical performance:** The ability of the option to solve the technical issues (i.e. to alleviate circuit overloads and voltage stability issues) that were seen in the south and east of Ireland;
- **Economic performance:** The net present value of the investment should be maximised;
- **Future extensibility:** The ability of the option to maximise the future extensibility of the transmission network or generation growth; and
- **Strategic issues:** The option should be in line with EirGrid's grid development strategy, Grid25.

The solution identified was considered to best accommodate the specific drivers of the need to reinforce the south and east of Ireland, based on the balance of the above and relevant considerations therein.

3.3 SOLUTION IDENTIFIED

Based on the above robust network development planning process, the option which was considered to meet EirGrid's statutory obligations and best accommodate the specific drivers of the need to reinforce the south and east of Ireland was considered to be:

- **A 400 kV HVAC overhead line (OHL) linking transmission substations of Dunstown, Co. Kildare and Knockraha, Co. Cork via Great Island, Co. Wexford.**

As part of the detailed technical analysis for the region, EirGrid identified a number of reinforcement requirements which are common across all shortlisted options. As a result, these will be pursued as part of normal routine business in due course. In addition a 110 kV circuit associated with the proposed solution has been identified as a requirement beyond 2025 which will be pursued in the future.

With respect to the Grid Link Project the following specific technical considerations are of particular relevance:

- As part of its network development planning process for the Grid Link Project, EirGrid considered a range of network reinforcement options including lower voltage options relating to uprating the existing transmission network and / or new lines; however, at 400 kV it is considered the Grid Link Project can deliver the additional high capacity circuitry required in the region, because *inter alia*:

    ⇒ A strategic driver for the Grid Link Project is to provide deep reinforcement of the grid to facilitate the integration and bulk transfer of renewable generation to the load or demand centres. The nature of wind generation is that it is variable and with large amounts of wind to be connected it is essential that the transmission system in the south and east will be able to facilitate the power transfers required;

    ⇒ A new 400 kV transmission circuit is the most efficient way of transferring power through the south and east of the country thereby de-loading the existing 110 kV and 220 kV network;

⇒ Providing access for generation plant to the grid by a new 400 kV circuit will facilitate their efficient use (in terms of maximising dispatch capabilities) while also de-loading the existing 220 kV network; and

⇒ At 400 kV the Grid Link Project also meets EirGrid's Grid25 policy that new bulk transmission lines will be built at 400 kV as building at 400 kV, in particular, is considered to be more efficient, provides greater carrying capability and avoids the need for building a multiplicity of lower voltage (e.g. 220 kV) lines.

- The existing meshed electricity system in Ireland is, as is typically the case around the world, a high voltage alternating current (HVAC) system. The electricity that is generated by Ireland's power stations is also alternating current. The link between the power stations and the distribution network is provided for by the high voltage alternating current transmission grid. It is reasonable therefore to develop new projects for operation on the existing meshed electricity grid with alternating current technology.

- As noted above the existing meshed electricity system in Ireland is, as is typically the case around the world, a high voltage overhead line system. This approach is consistent with EirGrid's policies and practices relating to the planning and development of OHL and underground cable (UGC) transmission infrastructure which are set out in Appendix A of Grid25. This policy confirms that in a meshed network, OHL is the standard form of transmission throughout the world and for reasons of technical and operational reliability and capital cost is EirGrid's preferred form of high voltage transmission. For the (HVAC) meshed network UGC will generally only be considered where an OHL solution is not practical or environmentally feasible, for example:

  ⇒ In densely populated areas and where no alternative exists;

  ⇒ In congested areas of infrastructure where no alternative exists;

  ⇒ Where it is necessary to cross water and no alternative exists; and

  ⇒ Where no alternative exists but to route through an environmentally sensitive area and undergrounding is deemed to be less of an impact to the environment.

3.4 SUMMARY OF TECHNICAL CONSIDERATIONS

Based on the information available at this time, the solution identified for the south and east of Ireland brought forward is:

- A 400 kV HVAC overhead line (OHL) between transmission substations of Dunstown, Co. Kildare and Knockraha, Co. Cork via Great Island, Co. Wexford.

This provides the terms of reference for the Grid Link Project to proceed to preliminary design, environmental impact assessment and preparation of planning application, However, EirGrid will undertake regular reviews of its technology assumptions during the lifecycle of the Grid Link Project to make sure they remain valid.

4 DEFINITION OF THE PROPOSED STUDY AREA

4.1 INTRODUCTION

The purpose of defining a suitable study area is to facilitate the identification of key constraints within that study area, to examine reasonable alternatives, to develop feasible corridor options and to carry out a systematic assessment of these options leading to the selection of a solution which will form the basis for the detailed design to follow.

A two step approach was used to define the *proposed study area*. In the first instance, general principles were applied to ensure the area would be wide enough to cater for project needs. Secondly administrative and physical boundaries were explored to help define the area.

Figure 1 shows the *proposed study area* for consultation. It should be noted that the study area shown may be amended (increased/reduced) following consultation and as studies proceed and additional information becomes available.

As HVDC has been identified as sub optimal at this point in time for the project, the option of a fully installed off shore solution is discounted therefore influencing the extent of the proposed study area.

4.2 STEP 1 – GENERAL PRINCIPLES

The general principle used to define the location and extent of the *proposed study area* for the Grid Link Project was that it should be large enough to capture the following:

- The strategic objectives of the project;
- A range of technical options; and
- Three specified nodes.

These are discussed below.

4.2.1 Strategic Objectives of the Project

As set out in **Section 2.2** the strategic objectives of the project are:

- To facilitate connection of approximately 1,600 MW of Gate 3 renewable generation in the South of the country;

- To facilitate the potential for future interconnections with either Great Britain or France connecting in the south and east of the country;

- To facilitate the efficient connection of thermal generation in the south, for example the planned Endesa 430 MW CCGT at Great Island and other existing generation plant in Cork; and

- To facilitate long term reliability of supply demand growth and economic recovery in the south and east of Ireland.

4.2.2 Range of Network Reinforcement and Technical Options

As set out in **Chapter 3**, EirGrid considered a range of network reinforcement scenarios and technical options to deliver the required network reinforcement and concluded that the best available solution is a 400 kV HVAC onshore circuit linking Dunstown to Knockraha via Great Island.

This has strongly influenced the eastern extent of the *proposed study area*.

4.2.3 Connection Nodes

Three nodes (see **Section 2.2.3** for further details) have been identified for the project:

- Dunstown
- Knockraha
- Great Island

These nodes have strongly influenced the extent of the *proposed study area* to the north, south and east.

4.3 STEP 2 – JURISDICTIONAL / PHYSICAL BOUNDARIES

In drawing the actual boundary for the *proposed study area*, the general principle used was to broadly follow significant jurisdictional or physical boundaries, and specifically:

- To the North, the M50 Motorway;
- To the East, the coastline and near shore areas broadly including estuaries, harbours and bays;
- To the West the South East Regional Planning Authority Boundary and the M7/N7 and M8/N8 Roads; and

- To the South, the coastline and near shore area broadly including estuaries, harbours and bays.

It is noted that while these boundaries offer a broad outline to the study area for the proposed project, they should not be considered fixed or rigid. The study area may be altered to reflect more detailed information as the project develops such that the preferred solution may not be entirely within the original defined study area.

4.4 DESCRIPTION OF THE STUDY AREA

The *proposed study area* has been derived based on the approach identified above and is illustrated in **Figure 1**. The boundary of the study area broadly follows the coast to its eastern and southern extents and includes the major estuaries along the south eastern coastline and in particular Waterford and Cork harbours to ensure that route options in the vicinity of Great Island and Knockraha strategic nodes can be fully explored.

The study area moves inland after Cork harbour, where the boundary extends to the east of the Cork City boundary after which it broadly follows the route of the M8/N8 and M7/N7 roads along the western extents of the study area and then follows an easterly direction along the vicinity of the M50 and onwards to the coastline.

The existing transmission system has also been considered in the development of the study area with the boundary of the study area taking cognisance of the major existing transmission lines in the region to ensure all reasonable alternatives can be fully considered in the development of project solutions.

Finally, although not specifically used to define the study area, international designations, such as Special Areas of Conservation or Special Protection Areas, have been broadly considered in refining and delineating the boundary in so far as an effort has been made to either fully include or exclude these sites rather than transect them. This has not always been possible, e.g. in the case of riverine sites. Full and detailed consideration will be given to any such sites within the *proposed study area* as part of the constraints study phase.

The study area includes all of Counties Carlow, Waterford, Wexford and Wicklow, most of Kilkenny, and to a lesser extent Cork, Dublin, Kildare, Laois, and Tipperary. A small portion of County Limerick is also included within the study area. The gateway city of Waterford is located within the study area as are the major hub centres of Kilkenny City and Wexford Town.

There are numerous environmental designations in the area as identified in the Strategic Environmental Assessment for the Grid25 Implementation Programme. In terms of extent, the Wicklow Mountains SAC/SPA is the largest; other significant upland designations include the

Comeragh Mountains and Blackstairs Mountains SACs. Many of the environmental designations in this sector are river based and tend to traverse long linear corridors which, whilst difficult to avoid, represent only a relatively small area over which to traverse. Designated rivers include the River Barrow/Nore SAC, River Nore SPA, Slaney River Valley SAC, the Lower River Suir SAC and the River Blackwater SAC. There are also major designations included within the estuarine waters of the study area including Cork Harbour SPA, Wexford Harbour and Slobs SPA, Dungarvan SPA and the Bannow Bay SPA.

4.5 GIS BASED APPROACH

The establishment of the study area has been facilitated through the use of a Geographic Information System (GIS) and the following layers have been used in the definition of the study area boundary:

- County Boundaries;
- Ireland Coastline;
- Regional Planning Boundaries;
- Major National Roads;
- Electricity Transmission Lines – 400 kV, 220 kV, 110 kV;
- Electricity Transmission Stations – 400 kV, 220 kV, 110 kV;
- International and National Environmental Designations – SAC, SPA, Ramsar, NHA, National Parks, Nature Reserves, UNESCO sites;
- Main Cities and Towns; and
- Gate 3 and Pre-Gate 3 Generators

In each case, the layers were overlaid in the GIS workspace to develop an interim composite workspace. The intention of the *proposed study area* is not to produce a hard line which follows these existing jurisdictional boundaries and infrastructure exactly but rather uses them to produce a more fluid space. As such the boundary drawn in **Figure 1** broadly flows along and around the features noted above.

The main output from the GIS has been the *proposed study area* boundary which, subject to consultation, will be the geographical area upon which the constraints identification and constraints model will be based.

4.6 IMPLICATIONS OF THE STUDY AREA

At this stage a *proposed study area* has been developed and consultation will now commence on this and constraints within this area. This will feed into the next stage in project development -

identification of constraints. Refinement of the study area is a dynamic and iterative process which will be refined based on feedback from stakeholders and as more information is gathered, e.g. environmental constraints.

It is anticipated that the *proposed study area* is of a reasonable size to allow for the identification of a suitable alignment as the project moves forward. At this stage no decisions on routing have been taken but it is likely that with constraints (physical, technical, environmental), significant portions of the study area may be excluded.

Following this stage the project team will examine reasonable alternatives, develop feasible route options and carry out a systematic assessment of these options leading to the selection of a solution which will form the basis for the detailed design to follow. Development of route options will include further consultation with stakeholders.

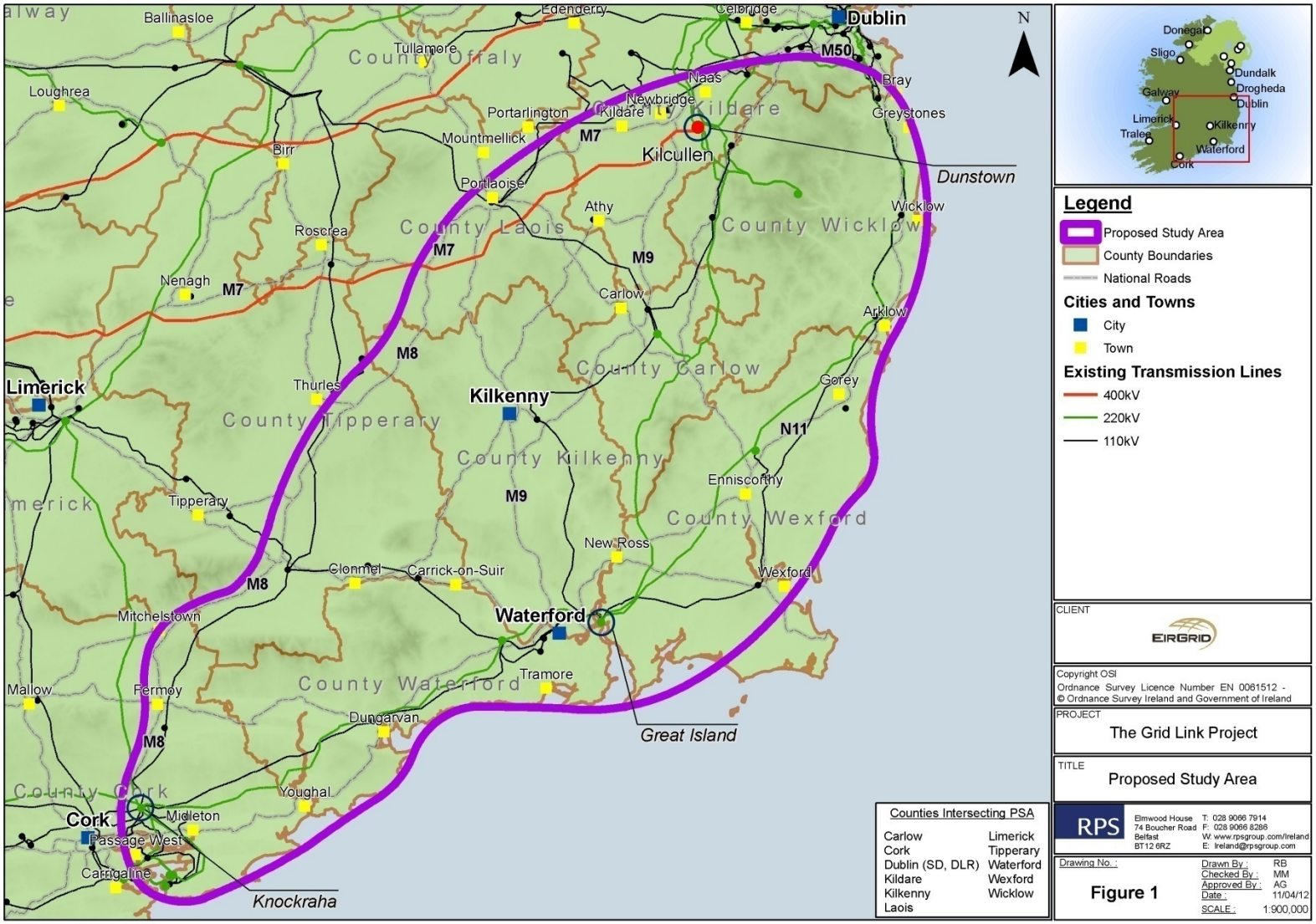

Figure 1 – Proposed Study Area

5 CONSULTATION

Public consultation is a critical component of EirGrid's plans for the development of the Grid Link Project. At key stages of the project development, EirGrid will consult stakeholders on certain aspects of the project. The first such consultation has been scheduled to coincide with the definition of the *proposed study area* and this position paper forms part of the supporting documentation.

5.1 FIRST STAGE OF PUBLIC CONSULTATION

The first stage of public consultation on the Grid Link Project will be to receive comment on the *proposed study area* and seek feedback in terms of identifying locally important issues and constraints within this area. This will feed into the next stage in project development - identification of constraints.

The following broad categories of Constraints will be considered:

Natural Environment: Landscape and ecology including landscape features and views, topography, water bodies, ground conditions, and European and nationally designated sites and species.

Cultural Environment: Archaeology, architecture and cultural heritage, including protected monuments, protected structures, demesnes, and Architectural Conservation Areas;

Built Environment: Land use, settlements and infrastructure, including roads, railways, ports, and utilities.

This stage of public consultation will run for an eight week period commencing with the public launch of the project and will engage members of the public through the use of print and online materials, an information service, information centres within the study area, as well as public open days.

This is a non-statutory consultation that will provide all interested stakeholders an opportunity to feed into the early development of the project.

All submissions and feedback will be reviewed and considered by the project team and a full consultation report on this phase of the project will be produced following the close of the consultation period.

This first stage of public consultation is focusing on the proposed study area and on the identification of constraints. The consultation will solicit views on the following:

Comment on the proposed Study Area map: Has EirGrid considered all relevant issues when determining the study area? Should anything else have been considered?

Identify constraints that should be considered for further review: Are you aware of any locally or regionally important features that you believe should be considered as the project develops? Constraints can be anything from natural features in the landscape to cultural or archaeological structures. They are mapped in the study area and taken into account when corridors are identified. How do you think these features should be considered as the Grid Link Project progresses?

Provide feedback on how corridors should be developed: How should constraints or features in the landscape be taken into account when corridors are defined for the project?

Any other issues? If you have any other issues that you think should be taken into account at this stage of the project EirGrid would welcome your input.

How would you like to be involved or communicated with, as the project progresses?

6 NEXT STEPS

Definition of a study area is the first step in the route selection process. It is followed by identification of significant constraints within the defined study area. These constraints are documented and mapped so that feasible route options can be designed to avoid such constraints, where possible. As part of the first formal consultation, people are being asked what constraints they think are relevant to the project. Where appropriate, these will be included in an overall constraints report and on associated mapping. All of the constraints will then be taken into consideration during the route identification process.