ESB International
ESBI Energy Innovation

West Galway 110/38kV Substation

EirGrid

Site Selection

Review of Environmental Constraints

ECG/EG/KN

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Note

1 Introduction

EirGrid requires a new 110/38kV electricity substation west of Moycullen, Co. Galway. The substation is necessary to facilitate the connection of renewable energy which will be generated from permitted and planned windfarms in the Uggool and Seecon areas (approx. 7km to the west), to the permitted Salthill-Screeb 110 kV overhead line. A suitable site is required west of the N59 between Moycullen and Oughterard in relative close proximity to the permitted wind farms. The study area is located within the Galway County Council administrative area.

The purpose of this report is to provide baseline environmental information in relation to a number of possible locations where the substation could be located and to provide an indication of potential environmental impacts associated with the various options considered.

Site surveys and desktop studies have been undertaken as part of this information gathering and appraisal process.

Having considered the environmental constraints within the Study Area, three general locations in close proximity to the permitted Salthill - Screebe 110 kV overhead line were appraised, these are referred to as:

- The Northern Location
- The Middle Location
- The Southern Location

The potential locations are shown in Figure 1.

The Northern location is located approximately 1km southwest of the townland of Doon, approximately 6km northeast of Moycullen, on the slopes of one of the small hills east of Knocknalee Hill in the immediate vicinity of the permitted Salthill-Screeb 110 kV overhead transmission line.

The Middle location is also situated on one of the small hills east of Knocknalee Hill, northwest of the townland of Shanballyoghery, approximately 6km northwest of Moycullen, in close proximity of the permitted Salthill-Screeb 110 kV overhead transmission line.

The Southern location is situated in the eastern part of the townland of Knockranny, approximately 4.8km northwest of Moycullen, in close proximity to the permitted Salthill-Screeb 110 kV overhead transmission line.

Having regard to the site surveys it was considered that the potential for environmental impacts is lower at the southern location. This resulted in appraisal of a number of possible sites in that location.

At the southern location five possible site options were considered as follows: (see Figure 2):

- Option 1
- Option 1A
- Option 2

- Option 2A
- Option 3

ESBI Environmental Group initially undertook a site visit on the 9th November 2011 to all three possible substation locations as part of the preparation of the Stage 1 Information Collection Report.

An ecology survey was subsequently undertaken by Biosphere Environmental Services Ltd in January 2012 and a site visit to assess the potential for visual impact assessment was made by URS (Landscape Consultants) in January 2012 also.

This Environmental Constraints Report identifies the constraints associated with the Study Area.

This report is based on site visits to the potential substation locations and draws from information sources listed below.

- ESBI Connemara Site Visit November 2011
- Proposed Substation near Moycullen, County Galway Identification of preferred substation location, January 2012, URS
- Connemara substation Options Ecological Assessment January 2012 prepared by Biosphere Environmental Services Ltd.
- Western River Basin District, River Basin Management Plan 2009 – 2015 (http://www.wfdireland.ie)
- Corrib Water Management Unit (http://www.wfdireland.ie)
- Regional Planning Guidelines for the West Region 2010 - 2022
- Galway County Council County Development Plan 2009 -2015
- Landscape and Landscape Character Assessment for County Galway 2009 - 2016
- County Galway Wind Energy Strategy 2009 – 2016
- National Parks and Wildlife Data

2 Policy Context

2.1 Introduction

This section details the environmental context, including policies and objectives, which are relevant to the development of the proposed West Galway 110/38 kV substation, as the proposed development must have regard to these policies and objectives.

2.2 Regional Planning Guidelines

In relation to the *Regional Planning Guidelines for the West Region*, adopted by the West Regional Authority, section 5.5 on Energy & Utilities supports the development of renewable energy and associated transmission networks as follows:

Regional Planning Guidelines for the West Region: Policies
IP41: Support the investment required to facilitate renewable energy projects and conventional generating station deployment. All energy generation plans and projects will be subject to Habitats Directive Assessment and/or other relevant environmental assessment. (Please refer to CO14, CO15 & IO54). **IP42:** Support investment to upgrade the existing transmission and distribution network and to build new circuits as required (Section 5.1.1 applies).

Table 2-1: Regional Planning Guidelines for the West Region

The proposed substation is generally consistent with the Regional Planning Guidelines.

2.3 Galway County Development Plan 2009 - 2015

Section 9.4 of the County Development Plan contains the following policies and objectives in relation to landscape conservation and management:

Galway County Development Plan: Policies - Landscape Conservation and Management
Policy HL93: The consideration of Landscape Sensitivity Ratings shall be an important factor in determining development uses in areas of the County. In areas of high Landscape sensitivity, the design and the choice of location of proposed development in the landscape will also be critical considerations.
Policy HL94: Preserve and enhance the character of the landscape where, and to the extent that, in the opinion of the Planning Authority, the proper planning and sustainable development of the area requires it, including the preservation and enhancement, where possible of views and prospects and the amenities of places and features of natural beauty or interest. This shall be balanced against the need to develop key strategic infrastructure to meet the strategic aims of the Plan.
Policy HL95: Preserve the status of traditionally open/unfenced landscape. The merits of each case will be considered in light of landscape Sensitivity Ratings and views of amenity importance.

Objective HL44: The Planning Authority shall have regard to the Landscape Sensitivity Classification of sites in the consideration of any significant development proposals and, where necessary, require a Landscape/Visual Impact Assessment to accompany such significant proposals.
Objective HL45: Development that would have a detrimental effect on listed views and prospects will generally not be permitted.

Table 2-2: Policy and Objectives for Landscape Conservation and Management

The substation must comply with the Landscape Conservation and Management policy and objectives of the County Development Plan.

2.4 Wind Energy Strategy

County Galway Wind Energy Strategy 2009 - 2016 as adopted on 26th September 2011 supports the development of renewable energy and associated transmission infrastructure within the county (see Figure 3).

Relevant Policies and Objectives in the strategy include:

Policies
Policy WE6: Wind Energy Infrastructure: Proposals for the development of infrastructure for the production, storage and distribution of electricity through the harnessing of wind energy will be considered in appropriate sites and locations, subject to relevant legislation and policy, environmental landscape and amenity considerations, electricity infrastructure, settlement patterns and wind energy potential and the guidance in the WES. This will include, inter alia, requirements and considerations in relation to Natura 2000 sites and the Habitats Directive (in particular Article 6 (3) and (4)), biodiversity and the SEA Directive and the objectives of the WRBD River Basin Management Plan

Table 2-3: County Galway Wind Energy Strategy – Policies

The proposed substation development fits within Policy WE1, WE6 and WE7.

Objectives
Objective WE6: Wind Energy Development and Guidance: Facilitate wind energy developments and necessary support infrastructure in appropriate sites and locations, subject to relevant policy, legislation, environmental, landscape and amenity considerations. This shall include the guidance in this WES and other relevant guidance where applicable, including, *inter alia*, the *Guidelines for Planning Authorities on Wind Energy Development* (DoEHLG, 2006), the *Best Practice Guidelines for the Irish Wind Energy Association* (IWEA & SEI, 2008), the *European Best Practice Guidelines for Wind Energy Development* (EWEA, 2002) and the *Guidance Document: Wind Energy Developments and Natura 2000* (EC, 2010)
Objective WE9: Electricity Infrastructure: Support the development and expansion of infrastructure for the generation, storage, transmission and distribution of wind energy in suitable locations in County Galway. In particular, support the extension and increased capacity of the electricity transmission and distribution grid, including the development of new lines, pylons and substations

Objectives
as required, to support the development of the Strategic Areas as a first priority followed by the Acceptable in Principle Areas in the County Suitably manage development within and along existing and potential strategic infrastructure corridors to protect their scope for development. The Council will support the provision of energy networks provided it can be demonstrated that: • The development is required in order to facilitate the provision or retention of significant economic or social infrastructure. • The route proposed has been identified with due consideration for social, economic, environmental and cultural impacts through relevant environmental assessment. • The design is such that will achieve least environmental impact consistent with not incurring excessive cost. • Where impacts are identified mitigation features have been included. • Where it can be shown the proposed development is consistent with international best practice with regard to the materials and technologies that will ensure a safe, secure, reliable, economic and efficient, high quality network.
Objective WE10: Habitats Directive Assessment: Having regard to the provision of the Habitats Directive (92/43/EEC), ensure that: • All activities derived from the adoption of the Wind Energy Strategy that may give rise to significant adverse direct, indirect or secondary impacts on the qualifying interests and conservation objectives of Natura 2000 sites, (either individually or in combination with other plans of projects), will be subject to Habitats Directive Article 6 Assessments, and • Permission will only be granted where project level Article 6 Assessment conclude that no likely significant effects will occur.

Table 2-4: County Galway Wind Energy Strategy - Objectives

The proposed substation will be developed in accordance with these policies and objectives.

2.5 Water Framework Directive and the River Basin Management Plan

The Western River Basin District contains details on water policy:

The study area is located within the Western River Basin District (WRDB) as defined under the European Communities (Water Policy) Regulations, 2003. This is the enabling legislation of the European Communities Water Framework Directive (Directive 2000/60/EC of the European Parliament and of the Council, establishing a framework for Community action in the field of water policy). A full description of the river basin and its characteristics as well as the WFD objectives can be found on www.wfdireland.ie.

The WFD rationalises and updates existing water legislation by setting common EU wide objectives for water. It provides for a new, strengthened system for the protection and improvement of water quality and dependent ecosystems. In brief, the legislation provides for the protection of the status of all waters (surface and groundwater), the establishment of “river basin districts” (RBDs), co-ordination of

actions by all relevant public authorities for water quality management in an RBD including cross-border RBDs, characterisation of each RBD, establishment of environmental objectives and the development of programmes of measures and river basin management plans (RBMP).

Galway County Council is the coordinating local authority for the WRBD set out in the legislation.

The Western River Basin Management Plan (2009 - 2015) was adopted by Galway County Council in 2010 and establishes four core environmental objectives to be achieved generally by 2015, as follows:

- Prevent deterioration of water status.
- Restore good status.
- Reduce chemical pollution.
- Achieve water related protected areas objectives.

These include the objective to maintain water status for High and Good status waters and to restore all waters to at least Good status by 2015. The Environmental Objectives (Surface Waters) Regulations, 2009 and the Environmental Objectives (Groundwater) (Amendment) Regulations, 2011 give effect to the measures needed to achieve surface water and groundwater environmental objectives established in RBMPs. The Regulations place a legal obligation on public authorities to aim to achieve those objectives in the context of their statutory functions.

The development of the substation should not result in a deterioration of existing water body status or chemical pollution of the water bodies in the area. The Plan also requires that no impact on the water quality elements of protected areas should occur.

2.6 Birds and Habitats Directive Requirement

The European Union's Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna), in conjunction with the Birds Directive (Council Directive 79/409/EEC on the conservation of wild birds) is the basis of the European Union for nature conservation. The Habitat Directive seeks to establish "Natura 2000", a network of protected areas throughout the European Community. Member States are required to maintain or restore at 'favourable conservation status' the habitats and species of Community importance listed in Annex I and II of the Directive. The areas chosen as Special Areas of Conservation (SAC) in Ireland cover an area of approximately 13,500km^2. There are 121 Special Protected Areas (SPAs) designated in Ireland.

The proposed substation location areas are not located within any Natura 2000 site but are located in their vicinity and as such these directives apply.

Article 6.3 of the Habitats Directive states:

'any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other

plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives'

The three main location areas are all connected through their hydrology to the Ross Lake and Woods cSAC and pNHA. As a result a Stage 1 Screening Report Appropriate Assessment under Article 6.3 of the EU Habitats Directive will be required. This will form part of the application documents which will be submitted to the Planning Authority.

3 Baseline Information

3.1 Introduction

The Study Area is located within Galway County Council administrative area, to the west of Lough Corrib, approximately 6km outside Moycullen village (see Figure 1). Development in the area is governed by the Galway County Development Plan (GCDP) 2009 – 2015. The GCDP sets out policies and objectives for the development of the county and it guides how and where development will take place in the county.over the plan period.

The policies and objectives of the plan are therefore relevant to the Stage 1 Information Gathering process for the West Galway substation.

The study area encompasses the townlands of Doon, Knockaunranny and Knockranny. The area is outside of any specific zoning maps of the Development Plan as it is in a rural setting.

This section provides baseline environmental information for the Study Area. Possible substation locations have been appraised against this information and preferred locations for the substation against the relevant environmental constraint have been indicated.

3.2 Landscape Sensitivity Rating, Value Rating and Character Rating

The landscape sensitivity, value and character rating are based on the landscape character assessment of County Galway which forms part of the GCDP. The landscape section of this environmental report was prepared by URS (Landscape Consultants). The URS report is provided at Appendix 1.

Landscape sensitivity is a measure of the ability of the landscape to accommodate change or intervention without suffering unacceptable effects to its character and values. Section 9.4.2.3 of the GCDP classifies the landscape of the County into five classes of sensitivity as follows:

- Class 1 - Low sensitivity
- Class 2 - Moderate sensitivity
- Class 3 - High sensitivity
- Class 4 - Special
- Class 5 - Unique

The possible substation locations are located in an area of Class 3 which is high sensitivity, as shown in Figure 4.

The control of permissible development should generally be in accordance with the policies as they relate to the five sensitivity classes of landscape. The GCDP deems the following types of development to be generally acceptable in the various areas of sensitivity as set out in Table 3-1 below:

Class	Sensitivity	Description
Class 1	Low Sensitivity	all developments consistent with settlement policies
Class 2	Moderate Sensitivity	various developments, which are of appropriate scale and design and are in compliance with settlement policies
Class 3	High Sensitivity	Few developments, including those with substantiated cases for such a specific location and which are in compliance with settlement policies
Class 4	Special Sensitivity	Restricted to essential residential needs of local households and family farm business
Class 5	Unique Sensitivity	Negligible alteration will be allowed only in exceptional circumstances

Table 3-1: Landscape Sensitivity Areas

Figure 4 shows Landscape Character areas as set out in the GCDP. The possible substation locations are located within landscape character area 10, East Connemara Mountains (Moycullen, Recess to Glinsk). Landscape sensitivity is classed at 3 which is *high*, with pockets of class 4 which is *special*. The landscape character assessment states that:

"Development is prohibited in the areas (indicated as class 4 on the landscape sensitivity map) that carry a statutory nature designation. In the remaining mountainous areas (indicated as class 3 on the landscape sensitivity map), development should not protrude above the existing ridgelines in order to maintain long distant views of the Connemara Mountains. Similarly long distance views to Galway Bay and the Aran Islands from elevated roads on the mountainsides should not be obscured; development along these routes should be located on the northern side of the N59 road to maintain views for tourist traffic. Where possible development should be set within existing forestry or surrounded by coniferous forestry for screening."

The GCDP defines landscape values as *"responses of the perceptions that communities have of the landscape they inhabit. The perceptions arise from intrinsic attributes such as visual beauty, ecology, archaeology, social history, religious sites, mythology and traditional settlement patters and community values".*

Landscape values can be described as the environmental or cultural benefits - including services or functions - that are derived from various landscape attributes.

Landscape values introduce a subjective qualifying, and potentially constraining, influence on some types of development when they are associated with landscape change.

In ecological terms, none of the possible sites are within areas designated under the Habitats Directive 92/43/EEC, the Birds Directive 79/409/EEC of the Wildlife Acts (1976 &200). However, the hydrology leading from the proposed sites does flow into the Ross Lakes and Woods cSAC and pNHA.

The GCDP indicates the possible substation locations as having a high landscape value rating, on a scale running from low to medium to high to outstanding as shown in Figure 5. It is noted that this landscape value rating applies to the south

Connemara area as a whole, and does not present the level of detail required to assess the specific locations. This rating is therefore considered applicable to the broader landscape in the vicinity of the possible substation locations, but not necessarily within the entirety of the specific sites or their immediate surrounds.

3.2.1 Visual Assessment

In January 2012, URS carried out a site assessment on the three possible substation site locations (northern, middle and southern). The URS Report is attached as Appendix 1.

3.2.2 Approach and Methodology

In order to provide further information on the on-site visibility of the three general possible substation locations a survey was carried out on 5th January 2012. This task involved an outline investigation of potential landscape and visual effects arising as a result of the proposed development. The following main aspects were surveyed for each possible site location:

- Setting of site within the wider landscape context
- Elevation of proposed site
- Availability of existing panoramic views from the site
- Visibility of the site from surrounding areas
- Degree of existing screening provided by vegetation and topography
- Proximity to settlements
- Capacity of the landscape to accommodate the proposed development
- Distance to permitted 110 kV overhead transmission line
- Other site specific characteristics

A number of photographs indicating the actual nature of visibility from within and towards the site locations have been taken and are shown on Photosheets 1-7 and the URS Report Figure 1 – Viewpoint Location map, in Appendix 1. AIS is at this point the emerging technology for this project, therefore a scenario based on AIS has been taken into account, this assumes a maximum structure height of 20m. It should be noted that the landscape (as shown on Photosheets 1-7) would be altered when the permitted 110 kV overhead transmission line is constructed. This has been considered in the landscape and visual appraisal.

This preliminary landscape and visual assessment outlines the main characteristics of all three locations and relevant site options and classifies each in terms of potential landscape and visual effects in order to identify a preferred substation location.

3.2.3 Review of Substation Locations

Northern Location (refer to Photosheet 1 – Plate 1)

This area is located approximately 1km southwest of the townland of Doon, approximately 6km northeast of Moycullen, on the slopes of one of the small hills east of Knocknalee Hill in the immediate vicinity of the permitted 110 kV overhead transmission line.

Photosheet 1 contains photographs of the site and of views towards the site. Each photoplate contains notes on the nature of actual potential visibility.

This location is an exposed landscape on a hill slope with no vegetation of any significant height. The elevated position results in panoramic open views from the site of north-eastern, eastern and south-eastern lower lying areas. The absence of vegetation in this location would result in high visibility within 1km of the site, but the topography limits close range views from the west, north and south. In the wider landscape, views are potentially possible from a large area to the east, northeast and southeast. The site survey indicated that intervening vegetation would screen most of the potential views. Where views would be possible, the proposal would be seen against the hill range in the background, reducing the magnitude of visual effects.

Middle Location (refer to Photosheet 1 – Plate 2)

This area is also situated on one of the small hills east of Knocknalee Hill, northwest of the townland of Shanballyoghery, approximately 6km northwest of Moycullen, in close proximity of the permitted 110 kV overhead transmission line. Due to flooding of the local access road, the site was inaccessible on the day of the site survey, but the surveyor was able to observe the site from a distance of 600m.

Photosheet 2 contains photographs of the site and of views towards the site. Each photoplate contains notes on the nature of actual potential visibility.

Similar to the northern location, this location is situated in an exposed landscape on a hill slope with no vegetation of any significant height. The elevated position would also result in panoramic open views from the site of north-eastern, eastern, and south-eastern lower lying areas. The absence of significant vertical vegetation in this location would result in high visibility within 2km of the site, but the topography limits close range views from the west. In the wider landscape, there are views potentially possible from a large area to the north, east and southeast. The site survey indicated that intervening vegetation would screen most of the potential views from lower lying areas. Where views would be possible, the proposal would be seen against the hill range in the background, reducing the magnitude of visual effects.

Southern Location (refer to Photosheet 2 – Plates 3 & 4)

This location is situated in the eastern part of the townland of Knockranny, approximately 4.8km northwest of Moycullen, in close proximity to the permitted 110 kV overhead transmission line.

Photosheet 3 contains photographs of the site and of views towards the site. Each photoplate contains notes on the nature of actual potential visibility.

This location is situated within an area enclosed by higher ground with screening provided by surrounding hills and hummocks. This location is partially located within a natural depression containing a small stream and rises steadily towards the south-western, north-western and north-eastern boundaries. Further screening of the location is provided by bands and pockets of low woodland, scrub and coniferous plantations. The topography and vegetation limits localised visibility to approximately 700m. In the wider landscape, views are potentially possible from a large area to the northeast and a smaller area to the southeast. The site survey indicated that intervening vegetation would screen most of these potential views. Where views would be possible, the upper parts of the proposal would be seen against the hill range in the background, reducing significantly the magnitude of visual effects.

3.2.4 Preferred Substation Location

URS considers that the southern location is preferred due its topographical location and to the screening provided by surrounding topography and vegetation. It is considered that this location has the capacity to absorb the proposed development better than the northern and middle Locations. The southern location would also be the least visible location in long distance views from lower lying areas to the northeast, east and southeast of the substation locations *(refer to Photosheet 3 – Plates 5-8)*.

The introduction of mitigation measures to partially screen the proposed development at the northern and middle location would itself create significant adverse visual effects and would most likely result in high landscape effects due to the absence of any existing high vegetation in the locality. Required mitigation elements would be totally uncharacteristic when set within the attributes of the receiving environments of the northern and middle locations.

3.2.5 Review of Substation Site Options

Assessment of substation site options within Southern Location

Having regard to the findings in relation to all possible locations, more detailed consideration of specific sites within this location were undertaken. Five site options have been identified within the Southern Location. The following assesses each site individually based on the methodology described in section 3.2.2:

Site Option 1 *(refer to Photosheet 4 - Plates 9 & 10 and Photosheet 7 - Plates 15 & 16)*

Location characteristics:

- Located within a mostly flat part of the Southern Location

- Majority of site is covered by drained and undrained grassland with small pockets of scrub and low woodland
- A small stream diagonally crosses the site
- Views to the site would be possible from within 200m of the site but not from areas at a greater distance
- It is unlikely that the proposed substation would not break the skyline in long distance views from the east
- There is an existing small woodland planting within close proximity of the site option boundary
- Existing surrounding vegetation would help to integrate proposed substation buildings
- Further mitigation planting would reduce visual impact

Site Option 1A *(refer to Photosheet 4 - Plate 10 and Photosheet 7 - Plate 15)*

Location characteristics:

- North-eastern section of the site located within a mostly flat area crossed by a small stream in the northern corner, the south-western section is located on gently rising ground
- Views to the site would be possible from within 200m of the site but not from areas at a greater distance
- It is unlikely that the proposed substation would break the skyline in long distance views from the east
- North-eastern part is covered by drained and undrained grassland with small pockets of scrub and low woodland while the south-western section extends into a coniferous plantation
- Existing surrounding vegetation would help to integrate proposed substation buildings
- Further mitigation planting would reduce visual impact

Site Option 2 *(refer to Photosheet 5 - Plates 11 & 12 and Photosheet 6 – Plates 13 & 14)*

Location characteristics:

- Located within a mostly flat area but the site gently rises towards its south-western boundary
- Views to the site would be possible from within 200m of the site but not from areas at a greater distance
- It is unlikely that the proposed substation would break the skyline in long distance views from the east

- Majority of site is covered by cutover blanket bog with rock outcropping in the centre. The south-western part is located adjacent to a coniferous plantation
- Existing bands of scrub and low trees along the north-western and north-eastern boundary would help to integrate proposed substation buildings
- Further mitigation planting would reduce visual impact

Site Option 2A *(refer to Photosheet 6 - Plates 13 & 14)*

Location characteristics:

- Located on gently rising ground in the south-western part of the Southern Location
- Views to the site would be possible from within 200m of the site but not from areas at a greater distance, although the potential for visibility of the proposed structures increases, due to the slightly higher elevation of the site
- It is unlikely that the proposed substation would break the skyline in long distance views from the east
- Majority of site is covered scrub and coniferous forestry
- Existing vegetation could provide screening along the south-eastern, south-western and north-western boundaries
- Further mitigation planting would reduce visual impact

Site Option 3 *(refer to Photosheet 4 - Plate 9 and Photosheet 7 - Plates 15, 16 & 17)*

Location characteristics:

- Located on the slopes of a small hill on higher ground than the other four options
- Majority of site is covered by drained and undrained grassland and surrounded by bands of low scrub and woodland
- Views to the site would be possible from within 1km of the site, due to its location and elevation
- Distant views of proposed structures would be more likely due to the elevation of the site
- It is unlikely that the proposed substation would break the skyline in long distance views from the east
- Existing surrounding vegetation would be less effective in terms of screening due to its elevated location
- Further mitigation planting would reduce visual impact
- Distant views of proposed structures would be more likely due to the elevation of the site

3.2.6 Preferred Substation Site Options within Southern Location

The preliminary assessment of the preferred substation site option within the Southern Location is based on the methodology as described in section 3.2.2 and observations made during the site survey of the 5th January 2012, which results in the following ranking of preferred site options in terms of landscape and visual impact (Table 3.2):

Ranking	Substation	Reasons for ranking
1	Site Option 2	• Minimum visibility of substation against the skyline due to the low site elevation • Minimum visibility of tall structures from distant views • Maximum opportunities for enhancement of existing boundary planting in close proximity • Local stream would remain unaltered • Close location to permitted overhead transmission line
2	Site Option 1A	• Increased visibility from within the vicinity due to its location and the absence of existing screening vegetation to its north-eastern boundary • Minimum diversion of stream passing through the north-eastern corner • Increased distance to permitted 110 kV overhead line • Minimises visibility of substation against the skyline
3	Site Option 1	• Maximum diversion of a section of the stream passing diagonally through the site • Minimises visibility of substation against the skyline • Good opportunities for enhancement of existing boundary planting in close proximity Close location to permitted overhead transmission line
4	Site Option 2A	• Increased visibility in close proximity due to its location on rising ground • Maximum distance from permitted 110 kV overhead transmission line within the Southern Location • Existing coniferous plantation could be used and enhanced along all but the north-eastern boundary
5	Site Option 3	• Maximum visibility of substation within the Southern

Ranking	Substation	Reasons for ranking
		Location and maximum possible visibility against the sky due to elevated location when seen from within the Southern Location • Maximum visibility of tall structures from distant areas • Minimum distance to permitted 110 kV overhead transmission line • Minimum opportunity to use existing surrounding vegetation for screening the proposed structures

Table 3-2: Visual Impact Ranking of Options

3.2.7 Visual Impact Conclusions and Recommendations

At this stage the following conclusions and recommendations can be made:

Site Option 2 and Site Option 1A are the preferred locations in terms of minimising landscape and visual effects.

Careful siting of the substation to take advantage of the screening effects of existing vegetation, local topography and the establishment of additional screening vegetation can further reduce visual impact. While Site Option 3 would require the minimum length of connection between the permitted 110 kV line and the proposed substation, the elevated location and lack of existing screen planting would result in higher landscape and visual effects when viewed from the vicinity and from a greater distance.

3.3 Ecology

The Study Area is located in an extremely rural part of East Connemara. The Corine 2006 land use map indicates agriculture, woodland scrub and peat bogs (see Figure 6) as the landuse types in this location.

An ecological assessment was carried out by Biosphere Environmental Services at all the site locations (see APPENDIX 2). It is noted that this assessment does not constitute a full botanical assessment of the sites, as visits would be required within the period April to September for a more comprehensive assessment. Nevertheless, the ecology survey does provide a basis for preliminary assessment and comparison of the site locations and options.

The Study Area does not include any areas designated by the National Parks and Wildlife Service (NPWS) as Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or Natural Heritage Areas (NHAs). However, there are a number of designated areas within 2km of the Study Area (see Figure 7).

3.3.1 Northern Location

The Northern location as can be seen from Figure 6 is Peat bog. It was confirmed by site visit and in the ecology report that the bog is relatively intact and is classified as upland blanket bog and/or wet heath.

Ecology Evaluation

The bog is dominated by such species as ling heather, deergrass, purple moorgrass, bog cotton (both *Eriophorum angustifolium* and *E. vaginatum*) and carnation sedge. Bog mosses and other bryophytes are well distributed.

A small stream on the site flows to Lough Parkyflaherty, which is within the Ross Lake and Woods cSAC.

The habitats at this site location are dominated by blanket bog and wet heath. Both appear relatively intact and have linkages with the EU Habitats Directive Annex I habitats Blanket bog and Wet Heath.

This site is part of a larger peatland expanse that is likely to be at least of Local Importance, higher value or possibly of County Importance.

Potential impacts on terrestrial ecology

Development of a site in this area would likely require the removal of a substantial area of peat bog that supports blanket bog and/or wet heath vegetation (both listed on Annex I of EU Habitats Directive). Depending on the exact location and the quality of habitats at that location etc., this impact would certainly be of some significance.

A potential significant impact is the proximity of the site to a local stream which flows to Lough Parkyflaherty, which is within the Ross Lake and Woods cSAC. Strict measures would be required to ensure that water quality of the stream is maintained during both the construction and operation phases.

3.3.2 Middle Location

The middle location as can be seen from Figure 6 is also Peat bog. It was confirmed by site visit and in the ecology report that the bog is relatively intact (though cutting has occurred in wider area) and is classified as upland blanket bog and/or wet heath.

Ecology Evaluation

The bog is dominated by such species as ling heather, deergrass, purple moorgrass, bog cotton (both *Eriophorum angustifolium* and *E. vaginatum*) and carnation sedge. Bog mosses and other bryophytes are well distributed. The habitats at this site location are dominated by blanket bog and wet heath. Both appear relatively intact and have linkages with the EU Habitats Directive Annex I habitats Blanket bog and Wet Heath.

The site is part of a larger peat land expanse that is likely to be at least of Local Importance, higher value or possibly of County Importance.

Potential impacts on terrestrial ecology

Development of a site in this area would likely require the removal of a substantial area of peat bog that supports blanket bog and/or wet heath vegetation (both listed on Annex I of EU Habitats Directive). Depending on the exact location and the quality of habitats at that location etc., this impact would certainly be of some significance.

While the site is not located in the immediate vicinity of the watercourse, measures would be required to ensure that water quality of local watercourses is maintained during both the construction and operation phases.

3.3.3 Southern Location

The study area is located in the eastern part of Connemara. It is within 3 km of the N59 and is accessed by a third class road which ends a little further to the west. The local landscape is characterised by a series of low hills which would originally have been covered with blanket bog and heath. Whilst peatland habitats (bog and heath) are still widespread in the area, much of these have been cut and grazed to varying degrees. Agricultural land, mostly improved or semi-improved grassland, occurs in scattered pockets though becomes the dominant landuse towards the N59. A further main landuse in the area is forestry, with very extensive plantations further to the west. Small stands of native woodland and scrub, which includes oak and hazel, are a feature of the area. The wider landscape is studded with small lakes, while there are numerous rivers and streams which flow eastwards towards Ross Lake and Lough Corrib.

Having regard to the findings in relation to all possible locations, more detailed consideration of specific sites within this location were undertaken. An assessment of five options located at the southern location was undertaken.

(i) Option 1

Landuse Evaluation - Option 1 Site:

This site is fairly evenly divided from east to west by a tributary stream of the Knockbane River (see Plate 1 in Ecology Report, Appendix 2). The stream was observed to be generally less than 1 metre in width, with a gravel bottom. At the time of survey water clarity was good.

The southern sector of the site (between the public road and the stream) is semi - improved or improved grassland. This has a wet character in places.

The sector north of the stream can be divided into three main habitats. The western part is further improved grassland, while the eastern sector is wet grassland, dominated heavily by rushes (mostly *Juncus effusus*) (see Plate 2 in Appendix 2).

Between the wet grassland and improved grassland, there is a small area of remnant peatland habitat that is dominated by poor fen or flush vegetation (considered as 'poor fen and flush'). This extends from the woodland strip just to the north of the site, across the site to the stream where it enters as two small

channels. The area is extremely wet and supports a range of sedges and rushes (see Plate 3) and would undoubtedly be species rich during summer. The source of the wetness is not known but is likely to be a spring or seepage line.

The north and north-west boundary of the site is close to field boundary that is composed of a strip of scrub dominated by blackthorn, hawthorn, hazel and willows.

Ecology Evaluation - Option 1 Site:

The only part of this site that is of ecological interest is the poor fen/flush. This would have formerly been a component of the blanket bog landscape but is now surrounded by improved or semi-improved land. Nevertheless, it is of ecological interest though a survey in summer would be required to establish its full value. Tentatively, this feature is rated as Local Importance (higher value) on the basis of it being a semi-natural habitat with expected high biodiversity in a local context.

The stream was not assessed in the study but it can be assumed to be of some local value and would provide a corridor for the movement of otters across the landscape.

(ii) Option 1A Site

Landuse Evaluation - Option 1A Site:

The site is fairly evenly divided between grassland and a conifer forest. The grassland is divided by a drainage channel which flows north-east to the main stream (see Plate 4). This channel originates within the adjoining forest.

The grassland is semi-improved but becomes wet as one moves west towards the forest edge. The north-west sector of the grassland is more heath in character (i.e. has not been improved as the rest) and is classified as wet grassland/wet heath.

The conifer forest is separated from the grassland by a deep ditch. It is a mix of Sitka spruce and Lodgepole Pine and is at least 10 years planted.

Ecology Evaluation - Option 1A Site:

Generally this site has no significant ecological interests. It is noted that the grassland fields to the south of the stream and associated drainage channel have long been improved (shown as fields on old OS large scale maps).

The planting of conifers has destroyed the former bog or heath habitat that would presumably have occurred there.

The drainage channel and the small remnant of wet grassland/wet heath have minor local value (rate Local Importance, lower value).

(iii) Option 2 Site

Landuse Evaluation - Option 2 Site:

This site was formerly dominated by upland blanket bog and/or wet heath (similar vegetation but wet heath of shallow peats). However, the presence of cut peat banks (now well vegetated) to the east and south-east of the site suggests that most of it had been cut in the past and can probably now be best classified as

cutover bog. Some uncut blanket bog still occurs on the higher ground in the south-west of the site (adjoining the forestry plantation) and some may extend into the north-east sector of the site. A rocky knoll with scrub occurs in the central area of the site.

Ecology Evaluation - Option 2 Site:

There has been no peat cutting on site in recent times and the entire site is well vegetated (apart from some poaching and trails by cattle in vicinity of entrance gate). Generally the vegetation on site is dominated by species characteristic of blanket bog and wet heath (see Plate 5), with ling heather (*Calluna vulgaris*), cross-leaved heath (*Erica tetralix*), deer grass (*Trichophorum cespitosum*), common bog cotton (*Eriophorum angustifolium*), carnation sedge (*Carex panacea*), purple moorgrass (*Molinia caerulea*), bog asphodel (*Narthecium ossifragum*) and bog myrtle (*Myrica gale*) present. Devil's-bit scabious (*Succissa practensis*) appears common throughout much of the site. Rushes are dominant in the north-west of the site (a strip c.30 m wide parallel to road), with soft rush (*Juncus effuses*) the main species. This strip, while on peat, is more characteristic of wet grassland (see Plate 6).

The site is generally wet and supports a good bryophyte flora. Bog mosses (*Sphagnum spp*.) occur in localised patches. Lichens (*Cladonia spp*.) are occasional.

The rocky knoll is dominated by scrub, with gorse (*Ulex europaeus*), blackthorn (*Prunus spinosa*), hawthorn (*Crataegus monogyna*), holly (*Ilex aquifolium*), willow (*Salix spp.)* and some rowan (*Sorbus aucuparia*) (see Plate 7).

The extreme south-western strip extends into a conifer forest which is separated from the bog habitat by a stone wall. Some willow scrub occurs along the margin of the forest.

A drainage channel occurs along the north-west margin of the site (parallel to road) and flows northwards into the nearby stream.

Several snipe were flushed from the site. The site would almost certainly support the common frog and has some potential for the marsh fritillary butterfly (due to the frequency of its food plant, devil's-bit scabious).

Whilst this site is classified largely as cutover bog, the cutting is not recent and it is still dominated by vegetation typical of blanket bog and wet heath. The small uncut remnants of upland blanket bog and/or wet heath could loosely be associated with the Annex I habitats blanket bog and wet heath. The presence of a small patch of native scrub adds diversity to the site.

Overall, this site is rated as having a Local Importance (at least lower value, possibly close to higher value) on the basis of containing semi-natural habitats with high biodiversity in a local context. .

As the food plant of the marsh fritillary butterfly is widespread within the site, there is some chance that this rare butterfly could occur on site (as it is known from Connemara – see www.butterflyireland.com/MarshFritillaryMap.htm). Confirmation of the use of the site by the Marsh Fritillary would increase the conservation value

of the site significantly (as marsh fritillary is listed on Annex I of the EU Habitats Directive).

(iv) Option 2A Site

Landuse Evaluation - Option 2A Site:

The option 2A site is centred on a commercial conifer plantation. This is Sitka spruce planted at least 10 years. The trees were planted on former blanket bog.

This option overlaps slightly with Option 2 to include a sliver of blanket bog to the other side of a stone wall.

At the south-western end, the site extends slightly into a further area of blanket bog. However, the bog here is poorly developed as it is on steep ground with much exposed rock and there are trails from cattle usage.

Ecology Evaluation - Option 2A Site:

The former ecological interest at this site has essentially been destroyed due to the planting of conifers. The sliver of bog at the north-eastern margin (within the option 2 site) has local ecological interest while that at the south-western margin is of poor quality.

Overall, apart from the sliver of bog at the north-eastern margin, this site is not of ecological interest.

(v) Option 3 Site

Landuse Evaluation - Option 3 Site:

The option 3 site is located on higher ground to the north-west of Option 2 site. This is essentially a large field of improved grassland that is intensively managed (i.e. fertilised and reseeded) (see Plate 8). It is surrounded almost entirely by a strip of narrow woodland, with blackthorn, hawthorn, hazel and oak.

Ecology Evaluation - Option 3 Site:

Improved grassland is not of any conservation value.

The marginal woodland which surrounds the field is at least of Local Importance (lower value).

3.3.4 Southern Location: Ranking of Options

There follows a ranking of the five options described above. This lists the sites from the lowest to the highest ecological value based on available information:

- Option 3
- Option 2A
- Option 1A

- Option 1 (ranking based largely on poor fen/flush which requires further assessment)
- Option 2

3.3.5 Summary of Potential Impacts on Terrestrial Ecology

There follows a summary table of likely or potential/possible impacts by development for each possible site. Full assessment would require details of proposed works and will be undertaken as the project proceeds.

Table 3-3: Summary table from Ecological Assessment

Summary of potential impacts by development of sites
Option 2
Substantial loss of habitats of local conservation value (i.e. well vegetated cutover bog, some remnant uncut blanket bog/wet heath, native scrub)
Loss of habitat for possible fauna species of interest, especially the common frog (almost certain to occur) and marsh fritillary (some possibility of occurring)
Potential for pollution of nearby stream during construction works (stream flows into the Ross Lake and Woods SAC)
Option 2A
Possible loss of minor areas of blanket bog to either side of plantation (though these could probably be excluded from construction area)
Potential for pollution of nearby streams during construction works (which flow into the Ross Lake and Woods SAC) especially as works would require extensive excavations due to slope
Option 1
Loss of flush habitat which is of some local conservation value
Significant disturbance to stream by re-diversion
Potential for pollution of stream during construction works (stream flows into Ross Lake and Woods SAC)
Option 1A
Loss of habitats of minor local conservation value (i.e. drainage channel, small area of wet grassland /wet heath
Potential for pollution of nearby stream during construction works (stream flows into Ross Lake and Woods SAC)
Option 3
Loss of habitats is not an issue here though some scrub/woodland may need to be removed for an

access road
While the site is not in immediate proximity to the local stream, drainage is ultimately to this watercourse and precautions would be required to prevent run-off etc. during the construction phase (as stream flows into the Ross Lake and Woods SAC)

The north and middle locations have substantial ecological interests by way of the presence of relatively intact blanket bog and wet heath habitats (both listed on Annex I of the EU Habitats Directive). Development at these locations could have substantial adverse impacts on these important habitats. Further, the northern location is close to an upland stream which flows into the Ross Lake and Woods cSAC – strict measures would be required to maintain water quality in this stream.

Five separate options were considered for the southern location. Option 2 is dominated by bog habitats and has substantial local ecological interests. There is also some possibility that the rare marsh fritillary butterfly (Annex II listed) could occur as its food plant is widespread on the site. Option 1 is of little interest other than the presence of a wet area of poor fen/flush to the north of the stream. This is of some local ecological interest though would require a summer survey to assess its full value. Option 2A and option 1A locations are of relatively low ecological interest and development at either of these sites is unlikely to result in any significant adverse ecological impacts (though attention to the maintenance of water quality in the local stream is required). Option 3 is the site of least ecological interest and no constraints on development here would be anticipated (though again attention is required in relation to the potential for run-off to the local stream).

3.4 Bedrock Geology

Geology underlying all locations was obtained from GSI's 1:100,000 scale bedrock geology map (Figure 8).

Northern location – site lies on or close to the boundary between two formations, both of which comprise crystalline metamorphic rocks. In the south is orthogneiss, metamorphosed granitic rock and in the north Cashel Schist comprising paragneiss, migmatite and pebble beds; paragenisses derive from intense metamorphism of sedimentary rosk and migmatites represent the melting of the parent rock due to metamorphic forces.

Middle location – site is underlain by crystalline metamorphic comprising orthogneiss

Southern location – site is underlain by crystalline igneous rock comprising porphyritic megacrystic granite, i.e. a granite rock containing mainly large crystals, that contains many xenoliths (thermally altered 'rafts' of country rock that have been entrained in the igneous intrusion.

Structural Geology

The structural geology of the region is complex and has resulted in a number of phases of deformation, earlier mountain building events metamorphosed rocks that have been further deformed by the intrusion of granitic bodies. The geological mapping for the area indicates a WNW-ESE fault in close proximity to the northern site; both the middle and southern locations are within approximately 0.5 km of NE-SW trending faults.

3.5 Soils

The main soil associations within this part of Co. Galway belong to the "Mountain and Hill" broad physiographic division. The main Quaternary sediments identified in this area of Galway are peat deposits with some glacial till. A summary of the main Quaternary deposits are shown in Figure 9 below.

The "General Soil Map of Ireland" is the reference source for description of the soil of the area. All three locations are shown to be covered by low level blanket peat associated with the *Rolling Lowland* broad physiographic division.

3.6 Peat Stability

The issue of peat stability is significant. ESBI undertook two site visits in November and December 2011 in order to collect geotechnical information in relation to peat. Preliminary information in relation to peat depths and possible disposal areas was collected on these site visits. Probes were made of some of the site locations in order to provide baseline information. Not all site locations in the southern location were physically accessible for probing. Adequate information is however available to reach preliminary conclusions.

The purpose of the geotechnical assessment was to determine peat depths at various locations across the sites and to assess the likelihood of peat slippage. Deeper peat depths will result in higher construction costs and will require larger volumes of excavated peat to be managed.

3.6.1 Observations of Site Visit in Relation to Peat Excavation/Storage

Northern Location

The general site area is located on sloping ground close to a watercourse. A peat probe taken in the general area revealed a depth of peat of approximately 0.4m indicating an estimated peat volume of approximately 6,000m^3 for excavation. Additional volumes of material other than peat would need to be excavated and disposed of offsite to cut the substation site into the topography. A bermed peat storage structure would need to be constructed on suitable level permanent peat storage in close proximity to the site to pursue this option. The size of the peat storage site would be significant.

Middle Location

The general site area is located on sloping ground. A peat probe taken in the general area revealed a depth of peat of approximately 1.1m indicating a peat volume of approximately 18,000m^3 for excavation. A bermed peat storage structure would need to be constructed on a suitable level permanent peat storage site in close proximity to the site to pursue this option. The size of the peat storage site would be significant.

Southern Location - Option 1 Site

The estimated volume of peat to be excavated is approximately 5,000m$^{3.}$ It is likely that a similar quantity of fill material would be imported to raise site levels after the peat is excavated. In general it is unpractical to store excavated peat in excess of 1m height. After excavation and preparation of the main substation compound, it is unlikely that there would be sufficient space left to store the peat on the remaining part of the field the site is located in. A possible option would be to prepare an area in the option 2 site for peat disposal. A bermed peat storage structure would need to be constructed on a suitable level permanent peat storage area in close proximity to the site to pursue this option. Assuming the small watercourse in the centre of the site could be diverted, this site would be the more preferable of the two Southern location sites.

Southern Location - Option 2 Site

The estimated volume of peat to be excavated is 11,000m^3. It is likely that a similar quantity of fill material would be required to be brought into the site to raise site levels after the peat is excavated. In general it is unpractical to store excavated peat in excess of 1m height. After excavation and preparation of the main substation compound, there would not be sufficient space left to store the peat on the remaining part of the field the site is located in, unless the peat could be stacked several metres high. This is because the site is constrained by the adjacent watercourse, roadway and forestry. Also the remainder of the site has deep peat which is unsuitable for stockpiling peat on. A suitable level permanent peat storage site would have to be located in close proximity to the site to pursue this option. The size of the peat storage site would be significant. During the bulk peat excavation it is likely that significant dewatering would be required. Discharge of this groundwater may be an issue given the proximity of a watercourse to the site.

Probing was carried out on Option 3 site but soft ground, indicating the presence fo peat, was not encountered at the locations probed.

3.7 Water

The annual average rainfall at the site is approximately 1,448mm, which is above the average rainfall figure of 1,200 mm for Ireland.

Northern location

The Northern location is drained by small streams which flow into Lough Cait and subsequently to Lough Pakyflaherty and the northern part of Ross Lake.

Middle location

There are no drainage streams identified in the EPA rivers database leading directly from the proposed location. However, the general topography of the area indicates that any runoff from the area would drain directly to Lougaunmuckmore which outflows to the Sruthán Chnocán Raithni a tributary of the Knockbane river which flows into the Southern part of Ross Lake.

Southern location

The southern location is located adjacent to the Knockbane river outflowing from Adereen Lough.

A small stream flows through Option 1 to join the Knockbane river. This stream passes through the northeast part of Option 1A also. A large field drain at the Option 1 and Option 1A drains directly to this small stream.

The stream forms the north eastern boundary of Option 2 which is also bounded on the southeastern side by the Knockbane river. Option 2A appears to drain in to Option 2 through the old forestry drainage system.

Run off from Option 3 drains into the tributary of the Knockbane river flowing through Option 1.

3.7.1 Surface water quality status

All rivers in the catchments lead to Ross Lake a designated cSAC and pNHA lake.

The study area is located in two adjacent surface water bodies, as shown in Figure 10. These are denoted IE_WE_30_2290 and IE_WE_30_3093 as defined by the EPA under the Water Framework Directive system. An analysis of the EPA ENVision mapping system indicated the following.

- Both of these water bodies have been classed as having Good Status by the EPA in 2010. The objective for these water bodies is to maintain status.
- The water body status of Ross Lake (IE-WE_30_345) has been assigned as Moderate by the EPA (April 2011). Indicating that improvement in water quality status of this lake is required.

The Biological Quality Rating (Q-Rating) is a pollution rating index, which has been developed to measure the response of certain key macro invertebrate species or groups to pollution, as outlined in Table 3-4.

Quality Rating	Quality Class	Pollution Status	Condition
Q5, Q4-5, Q4	Class A	Unpolluted	Satisfactory
Q3-4	Class B	Slightly Polluted	Unsatisfactory
Q3, Q2-3	Class C	Moderately Polluted	Unsatisfactory
Q2, Q1-2, Q1	Class D	Seriously Polluted	Unsatisfactory

Table 3-4: EPA Q Rating System

There is one EPA biological quality (Q site) monitoring site on the Knockbane river before it enters Ross Lake.

- Knockaunranny St - Bridge at upper stream of Ross Lake (Station 30K020200) The Q value at this location was rated as Q4 in 2009. The EPA classified the river water body (IE_WE_30_3093) as Good status in 2009.

3.7.2 Groundwater body status

The study area itself is located in one groundwater body, denoted Maam-Clonbur (IE_WE_G_0006) groundwater body. The EPA classed this water body as Good status in 2009. The objective for this groundwater body is to maintain status.

Ross Lake is located in a different water body, denoted Ross Lake (IE_WE_G_0010) ground water body). The EPA classed this water body as Poor status in 2009 due to nutrient loading (MRP) and chemical results. See Figure 11 for groundwater Status. The objective for this groundwater body is to restore status to at least good.

3.7.3 Fisheries

A WFD surveillance monitoring fish stock survey was carried out on Ross Lake (Co. Galway) from 31st August to 2nd September 2010 by staff from Inland Fisheries Ireland (http://www.wfdfish.ie/wp-content/uploads/2010/10/Ross_report_2010.pdf.)

Ross Lake has a surface area of 139ha, a mean depth of >4m, a maximum depth of 14m and is categorised as typology class 12 (as designated by the EPA for the purposes of the Water Framework Directive), i.e. deep (>4m), greater than 50ha and high alkalinity (>100mg/l CaCO3).

The lake is a coarse fishery and holds stocks of roach, bream, roach x bream hybrids and pike. The presence of zebra mussels was confirmed in Ross Lake in May 2007.

Roach was the dominant species in terms of abundance (Catch per unit effort CPUE) and pike was the dominant species in terms of biomass (Biomass per unit effort BPUE) identified in the survey.

Using a multimetric fish ecological classification tool (Fish in Lakes – 'FIL2') Ross Lake has been assigned an ecological status of Poor/Bad based on the fish populations present. The ecological status assigned to the lake based on the 2007 survey data was Moderate.

The EPA have assigned Ross Lake an overall ecological status of Moderate, based on all monitored physico-chemical and biological elements, including fish in 2009. Status classification will be revised by the EPA as further fish status data becomes available.

3.7.4 Potential impacts on water quality

An assessment of potential impacts on water quality was made based on available data and a site visit on the 9th November 2011.

Northern Location

The proposed location sites are adjacent to two small first order streams, which form the natural drainage of the area. These could potentially be impacted by site construction works from site excavation and excavated material storage. Sediment and silt released from the site construction works could impact on Lough Parkyflaherty and in a worst case scenario on Ross Lake. The potential for impact could be mitigated by well designed sediment control to prevent silt entering the small stream system.

Middle Location

There will significant peat excavation and storage requirement associated with this option and runoff management will be critical to minimising potential impact to surface waters. There are no small streams in the area but the topography indicates that flow will enter the stream flowing to Lougaunmuckmore. There is a risk to water quality associated with construction at this location but the risk can be mitigated by good construction practice and silt control measures. The risk at this location would be lower than at the northern route.

Southern Location - Option 1

This site is located on a tributary of the Knockbane River. This river flows directly to Ross Lake a designated cSAC area and proposed NHA (Site Code 001312) listed as a good example of a hard water lake. Ross Lake is also a managed coarse fishery by Inland Fisheries Ireland (IFI). The lake forms part of the Lough Corrib system a designated Salmonid Lake. The site is relatively dry and appears to be situated largely on mineral soil. The stream running through the centre of the site appeared in good condition with clean gravel beds.

The following are the issues identified at this location

- The proposed footprint of the substation at Option 1 indicates that the tributary stream of the Knockbane River that flows through the site would need to be moved. A preliminary informal discussion with IFI indicated that this is not impossible but would require very significant justification. There have been precedents to alteration of stream courses beforehand. Under the Water Framework Directive significant justification would be required as it would constitute a morphological impact on the stream.
- Possible loss of fish habitat. The value of the stream in terms of fishery would need to be evaluated and assessed based on electrofishing and aquatic quality surveys. It will be necessary to apply for a Section 14 electrofishing licence to the Inland Fisheries Ireland for a site on this stream and also a number of sites on the main Knockbane River as part of the overall study of the area. It is recommended that this assessment be undertaken post April 2012 following consultation with the IFI.

- Relocation of the stream would have to be by agreement of the IFI and under their supervision. A management plan for the stream relocation would need to be agreed with IFI.
- Relocation of the stream could give rise to significant levels of silt into the stream and Knockbane River impacting on the fisheries habitat in the river and also in Ross Lake. Mitigation using silt control measures and good construction practice would significantly reduce the risk of this occurrence.
- Similarly the construction of the substation would generate significant mineral silt which would need to be managed.
- Chemical pollution for accidental spillages of oils associated with construction machinery and transport vehicles could also lead to contamination of waters and impact on the ecology of the Knockbane river and Ross Lake. Good construction practice will effectively mitigate against this occurrence.

Southern Location - Option 1A

This site overlaps with Option 1. At this location no or limited diversion of the stream flowing in the northeastern boundary of the site would be required. There will be less risk of impact on the existing water courses. The main threat to water quality would be:

- Runoff of silt leading to increased suspended solids in the small stream, Knockbane river and Ross Lake in a worst case scenario. is less potential for chemical contamination of waters leading to impact on aquatic species and fish in the rivers and lakes.
- Removal of scrub and small trees at the south-western portion of the site.

Southern Location - Option 2

This site is located on the opposite side of the road to Option 1. The site is bounded to the west by the tributary stream flowing into the Knockbane River and to the south by the Knockbane River itself.

The site is located on deep peat and rock outcrop. At the time of inspection the site was very wet. It was noted that drainage enters the site from forest stands located to the west. The most significant issue on this site will be the control of peat silt as significant excavation will be required for the substation.

The main issues based on the proposed footprint are:

- The site will require extensive excavation of peat which has the potential to lead to significant runoff of peat silt with impact on the Knockbane River and Ross Lake. Significant silt control measures will be required. It is probable that large silt ponds will be required for the construction period. This may result in a significant site constraint in terms of available area.
- There will be a high risk of suspended solids entering the river system and design of construction will be critical to minimise the risk.
- Peat disposal off site will be required and may give rise to water quality issues at the disposal area.

This option poses a significantly higher risk to water quality than the other options examined.

Southern Location - Option 2A

This option is located west and south of Option 2 and partially overlaps Option 2. Construction on this site would require forest stand clearance off the site. The forest area drains to the Knockbane river through a forest drainage system. There is therefore some potential for runoff of silt during construction. Peat depths are much lower at this location than Option 2. The main potential impacts that could occur are

- Silt into the stream and Knockbane River during construction impacting on the fisheries habitat in the river and also in Ross Lake. Mitigation using silt control measures and good construction practice would significantly reduce the risk of this occurrence.
- Nutrient loss to the river and lake system. Forest brash (branches) if left on site post forest clearance could generate nutrient loss in the form of phosphorous. This could lead to enrichment of Ross Lake which favours cyprinid species in the lake and contribute to poor status

Southern Location Option 3

This option is located at higher elevation on sloping grassland to the north of Option 1. Construction of the substation would require significant excavation and storage of excavated materials. Runoff from this location would occur through the southern boundary field drain to the small stream flowing through Option 1 to the Knockbane river. The main threats to water quality are:

- Silt into the stream and Knockbane River during construction impacting on the fisheries habitat in the river and also in Ross Lake. Mitigation using silt control measures and good construction practice would significantly reduce the risk of this occurrence.
- Accidental chemical or oil spillage causing impacts on aquatic organisms and fish life.

The site is located on sloping mineral soil type and good silt control measures will be needed to be effective in reducing the risk of impact.

3.7.5 Conclusion & Recommendation - Water

The main threat to water quality relates to the risk of silt runoff and chemical pollution from the proposed substation location construction areas. This in turn is related to the connectivity to the receiving waters and the extent of potential silt generation at each site, the nature of silt generated and the increasing difficulty of effective mitigation. Peat silts are more difficult to trap in silt control measures than mineral sediments for example. Taking these factors into consideration the ranking of sites with respect least potential for impact on water quality is provided in Table 3-5.

Ranking	Reason
Southern location Option 3	Sloping ground on mineral soil. High settle ability with good silt control measures
Middle location	No direct connectivity to surface water courses. Peat silt runoff settlement required
Southern location Option 1A	Field Drainage to small stream flowing through Option 1 Some risk of silt runoff to stream and Knockbane river.
Southern location Option 2A	Site runoff through vegetated forest drains. Forest clearance required with some risk of nutrient loss to the Knockbane river
Southern location Option 1	Stream relocation and drain relocation required giving rise to temporary sediment loss. Risk of silt loss to Knockbane river and Ross Lake Possible loss of fish habitat in small stream
Southern location Option 2	Proximity of stream and river to site. Large quantity of peat excavation required. Silt control measures constrained by site. High risk of silt runoff from site to river and lake
Northern location	Direct connectivity to streams. Large quantity of excavated material and high risk of peat silt runoff.

Table 3-5: Ranking of sites in terms of potential to impact on water quality

Consultation with Inland Fisheries Ireland is recommended with regard to Option 1 and 1A at the southern location should this option be selected, to determine the acceptability of altering the stream course flowing through the proposed site.

An assessment of the fishery potential of the small stream should be completed and the data provided to IFI to facilitate decision making.

Water quality monitoring (turbidity, suspended solids etc.) should be undertaken prior to and during construction to inform management of the silt control measures.

3.8 Hydrogeology

The groundwater section of the GSI website classifies the bedrock underlying the sites as a Poor Aquifer (Pl) with bedrock which is generally unproductive except for localised zones. A regionally important aquifer lies to the east of the N59 main road within the Karstified carboniferous limestone. The aquifer classification is shown in Figure 12.

The granites in this area are generally unproductive due to low fissure permeability. They may produce enough water for a domestic supply (10-20 m^3/d), although failed wells may be expected. Most groundwater moves within the upper fractured zone, more permeable beds of limited extent and along fault or fracture zones. The low storage in these strata is usually balanced by the higher rainfall in the uplands. However, during long dry spells, streams and springs may quickly dry up as baseflow is reduced. Well yields of up to $100m^3/d$ would be expected within the fault zones with much smaller yields elsewhere.

There are four groundwater wells registered on the GSI website within 2km of the possible sites, however only one of the wells is located within the granite aquifer approximately 1500 m northeast of the site, the others being within the limestone to the east of the N59. Due to the local topography and drainage, the construction and operation of the substation should have no effect on these wells. The locations of the wells are shown in Figure 13. There are no known source protection zones within West Galway or Connemara.

Groundwater in these rocks is relatively soft with a total hardness of less than 150mg/l (as $CaCO_3$) and often less than 100mg/l. High iron and manganese concentrations are a common problem.

Groundwater vulnerability, as defined by the GSI, is the term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater could be contaminated by human activities.

The vulnerability of an aquifer to contamination is influenced by the leaching characteristics of the topsoil, the permeability and thickness of the subsoil, the presence of an unsaturated zone, the type of aquifer, and the amount and form of recharge (the hydrologic process where water moves downwards from surface water to groundwater). Groundwater vulnerability is determined mainly according to the thickness and permeability of the subsoil that underlies the topsoil, as these properties strongly influence the travel times and attenuation processes of contaminants that could be released into the subsurface from below the topsoil (as in the case of contaminants from landfills, septic tank systems and underground storage tanks). The type of recharge is also considered where indirect recharge (termed ‘point recharge’ in Ireland) can occur through swallow holes or sinking streams.

The GSI distribution of vulnerability for the southern location is shown in Figure 14. Groundwater vulnerability is classified as being 'high to extreme' due to the shallow nature of the bedrock in these areas.

The assessed vulnerability for southern location is shown in Table 3-6. The table illustrates the standard ratings of vulnerability used by the GSI, with the existing site conditions highlighted based on the findings of the site investigations.

Vulnerability Rating	**Hydrogeological Conditions**		
	Subsoil Permeability (Type) and Thickness		
	High Permeability (Sand/gravel)	**Moderate Permeability (e/g/, Sandy soil)**	**Low Permeability (e.g., Clayey subsoil, clay, peat)**
Extreme (E)	0 - 3.0 m	0 - 3.0 m	0 - 3.0 m
High (H)	> 3.0 m	3.0 - 10.0 m	3.0 - 5.0 m
Moderate (M)	Not applicable	> 10.0 m	5.0 - 10.0 m
Low (L)	Not applicable	Not applicable	> 10 m

Table 3-6: Groundwater Vulnerability at Southern Location

Option 2 site: Based on the findings from the peat probes carried out by ESBI, the sub-soil thickness on the site is generally 0 to 4 m, hence the assessed vulnerability for the site is 'High to Extreme', in agreement with the GSI classification. This suggests that any contamination will encounter limited attenuation prior to reaching bedrock. The Resource Protection Zone associated with the aquifer class and vulnerability is Pl/H to Pl/E (poor aquifer with high to extreme vulnerability).

The overburden deposits of peat have generally low permeability and therefore act as a confining layer, reducing or preventing the free movement of surface water to the underlying bedrock. The topography of the site has a gentle slope to the north east. Groundwater at the site is expected to flow in the general direction of the topography.

3.9 Cultural Heritage

A preliminary assessment of the potential impact on archaeology was undertaken. This consisted of a review of the national database of the Record of Monuments and Places. Figure 15 shows that there is one recorded monuments in the database within 1km of all locations. As the project progresses an archaeological consultant will undertake a detailed assessment of the likely impacts of the proposed development on the archaeological, architectural and cultural heritage of the proposed site.

3.10 Assessment of Roads

All potential substation site locations are accessed either by third class road, track, or both - see Figure 16. All routes are connected to the N59 national primary road. The northern location is the closest to the N59 (1.5km) however most of the route is accessed via a track of approximately 1km. From the N59, approximately 0.5km of the third class road L-53453-3 (Doon Road) leads onto a track (1km) to the site. The middle location is approximately 2.6km from the N59. The N59 leads onto the third class road L-53471-0 for 2.2km and then continues via a track of 0.5km to the site. The southern location is accessed via 2.8km of third class road L-5348-0 (Knockranny Road) from the N59. All road lengths have been added to Table 3-7 for summary:

Road	Northern Site	Middle Site	Southern Site
Track Road	1.056	0.51	-
3rd Class Road	0.465	2.156	2.819
Total	**1.5**	**2.6**	**2.8**

Table 3-7: Road lengths from N59 in km (OSI 50,000 Mapping)

3.11 Flood Risk Areas

In November 2009 the Dept of Environment, Heritage and Local Government issued a guideline document to Planning Authorities in relation to Flood Risk Management. The Guidelines classify developments into three vulnerability classes based on the effects of flooding (i) Highly vulnerable development, (ii) Less vulnerable development and (iii) Water Compatible development. Essential infrastructure such as electricity sub-stations are classed as highly vulnerable development.

The Guidelines classify Land areas within three flood zones based on the probability of flooding. Zone A is at highest risk and has a 1 in 100 year (1%) chance of flooding from rivers in any one year. Zone B is at moderate risk and has up to 1 in 1,000 year (>0.1%) chance of flooding from rivers in any one year. Zone C is low risk and has less than 1 in 1,000 year (<0.1%) chance of flooding from rivers in any one year. In the identification of flood zones, no account should be taken of any flood relief walls or embankments.

Essential infrastructure such as electricity sub-stations are classed as highly vulnerable development and the Flood Guidelines state only lands in Flood Zone C are appropriate for such a development.

Ireland's national flood hazard mapping database www.floodmaps.ie which is managed by the OPW was used to gather information on flooding within the study area. According to the database, there are no historic incidents of flooding recorded within or near any of the potential substation sites. See Figure 17 for image from www.floodmaps.ie.

A draft National Preliminary Flood Risk Assessment (PFRA) had been developed by the OPW (www.cfram.ie). Figure 18 shows the study area with indicative flood event shown. It is noted that these maps are based on broad scale simple analysis and may not be accurate for a specific location.

From Figure 18, the northern and middle locations are not close to a fluvial event, however the southern location is located approximately 100m away for the stated fluvial event.

A full Flood Risk Management Plan should be prepared when the selected site is chosen. Site elevation data should also be obtained. The plan should include the following criteria:

- Fluvial Risk: Inundation from flow from neighbouring watercourses
- Pluvial Risk: Flooding due to direct rainfall
- History of Flooding
- Available Predictive Flood Risk Mapping
- Impact of presence of the Substation on the existing flood risk regime at its proposed site.

4 Summary and Constraints

A summary of the ranking of sites based on the visual impact, ecological and water quality considerations is provided in Table 4-1.

Table 4-1: Summary of ranking from the visual impact, ecological and water quality aspects

Visual Impact (Lowest potential impact to Highest impact)	Ecology (Lowest potential impact to highest potential impact)	Water (Lowest potential impact to highest potential impact)
Option 2	Option 3	Option 3
Option 1A	Option 2A	Middle Location
Option 1	Option 1A	Option 1A
Option 2A	Option 1	Option 2A
Option 3	Option 2	Option 1
Northern Location	Northern Location	Option 2
Middle Location	Middle Location	Northern Location

Both the northern and middle locations should be disregarded based on the visual impact assessment aspect as they would be highly visible in the landscape for some distance. Mitigation measures for visual impact, such as planting for screening purposes, are not feasible at they are not characteristic of the landscape at these locations. Screen planting would introduce additional impact to the existing landscape. The ecological value of these two areas is also very high and construction at these locations would constitute significant impact. There is also a high risk to water quality at the northern location but this could be mitigated against by good design and well designed mitigation measures.

Construction of the substation at the southern location Option 3 would not have significant impact on the ecology of the area as it a worked agricultural field of low ecological value. The potential impact on water quality would be low also and any risk could be mitigated again by good design and mitigation measures. However, the site is elevated and sloping and visibility would be higher than other options at this location. It would have the highest visibility of all the southern locations assessed with little scope for screening of the site.

Option 2 at the southern location is the preferred option from the visual impact aspect. However, it is the least suitable at this location from the ecological and risk to water quality aspect. Overall, this site is ecologically rated as having a Local Importance (at least lower value, possibly close to higher value) with the possibility of the site being used by the Marsh Fritillary. If the Marsh Fritillary were confirmed during spring/simmer surveys this would increase the conservation value of the site

significantly (as marsh fritillary is listed on Annex I of the EU Habitats Directive). Large quantities of peat (11,000m^3) would need to excavated at this site and deposited locally. The risk to water quality at the site is also high given the proximity of the Knockbane River and stream flowing at the southern boundary.

Siting the substation at the Option 1 site would require relocating the existing small stream flowing through the middle of this site. The exact fisheries value of this stream cannot be determined until electrofishing under licence is carried out post April 2012 and there is a risk that Inland Fisheries Ireland may not be in agreement to move this stream. Relocating the stream would also give rise to silt generation which could impact on the Ross Lake and Woods cSAC. There is also a flushed area on the site which adds to its ecological value and this could be lost during construction.

The ecological value of both the option 1A and option 2A are low and potential ecological impact are similarly low.

Generally, Option 1A site has no significant ecological interests. The planting of conifers has destroyed the former bog or heath habitat that would presumably have occurred there. The existing drainage channel and the small remnant of wet grassland/wet heath have only minor local value (rate Local Importance, lower value).The drainage channel provides hydraulic connectivity from the site to the stream flowing into the Knockbane river. The risk to water quality could be mitigated by good design and construction practice. The visual impact ranking is also low and any impact at this location could be further mitigated by screening with appropriate planting.

Option 2A site is centred on a commercial conifer plantation. The former ecological interest at this site has essentially been destroyed due to the planting of conifers. There is some connectivity to the adjacent Knockbane River but risk to water quality could be mitigated by good design and good construction practice. The site is less favourable the visual impact aspect than Option 1A. It would have a higher impact from the visual aspect than Option 1A but again some mitigation could be achieved by appropriate planting.

4.1 Key Constraints

The key constraints identified within the study area relate to peat excavation and removal, access to sites, transmission line redesign required to loop in the substation, landscape and visual impact, ecological conservation and water quality. Whilst some of these constraints could be addressed by appropriate mitigation measures, peat, ecology and water quality are likely to remain as significant constraints irrespective of any mitigation measures.

The majority of sites identified, and many other possible sites along the length of the 110 kV overhead line within the study area, are located in peat areas of varying peat depth. The excavation and removal of peat provides significant civil engineering and silt control challenges. Peat when excavated should not be stored at an excessive depth, generally no greater than approximately 1 metre. For the safe storage of peat a containment bund has to be built to contain the bund. It is

also not recommended to store excavated peat on insitu peat due to the possibility of failure occurring within the insitu peat and also for practical reasons. This is because the transport and placing of peat across the peat surface by construction plant is problematic due to the very low bearing strength of the underlying peat. Once a suitable containment area for peat is identified it is vital that it is in close proximity to the site of excavation to avoid the transport of large quantities of a practically liquid material with large trucks on public roads.

The northern and southern location sites are hydrologically connected via small streams and rivers to the Ross Lake and Woods cSAC. The status of this lake is moderate and likely to be downgraded to poor/low based in the most recent fisheries assessments. Any additional impacts on this cSAC would have significant consequences for its ecology.

At the southern location Option 2 site is constrained by the bounding Knockbane River and boundary stream and by the depth of peat at this location. Use of Option 1 site would require relocation of the small stream running through it but this would require additional fisheries assessment and consultation with Inland Fisheries Ireland.

5 Conclusion

EirGrid requires a new 110/38kV substation along the permitted 110 kV overhead line, west of Moycullen, Co. Galway.

A suitable site is required within a Study Area which encompasses parts of the townlands of Doon, Knockaunranny and Knockranny. This report provides an appraisal of three locations referred to as the northern, middle and southern locations and also provides an appraisal of five possible site options at the southern location.

The outcome of assessments and surveys analysed throughout this report have individually ranked site options, based primarily on the potential for visual, ecology and water quality impacts. Other environmental issues, in addition to the issues identified above, will need further detailed appraisals as the project progresses and a preferred site for the substation is identified. These issues include; road and traffic access, peat/rock excavation and removal, cultural heritage and noise.

Based on the preliminary assessment of visual impact, ecology and water quality and taking into account the likely excavation and peat storage requirements for each site the recommended site location is the southern location.

Within the southern location, the site options are ranked as follows:

- Site Option 1A has the lowest potential for visual impacts but is higher than site 3 in terms of potential impacts on ecology and water quality.
- Site Option 3 has the highest potential for visual impacts but it has the lowest potential for impacts on ecology and water quality.
- Site Option 1 is similar to 1A in terms of potential visual impacts but has a higher potential for impacts on ecology and water quality on account of the stream present on the site. If diversion of the stream were permitted, this site would become less constrained than at present.
- Site Option 2 is similar to 1 and 1A in terms of potential visual impacts but is the highest ranked in terms of potential impacts on ecology and water quality. Option 2 is likely to present many challenges on account of the peat volumes.
- Site Option 2A is similar to 2 in terms of potential visual impacts but is has a lower potential for impacts on ecology and water quality.

The design and construction of the substation will incorporate all required mitigation measures.

FIGURES

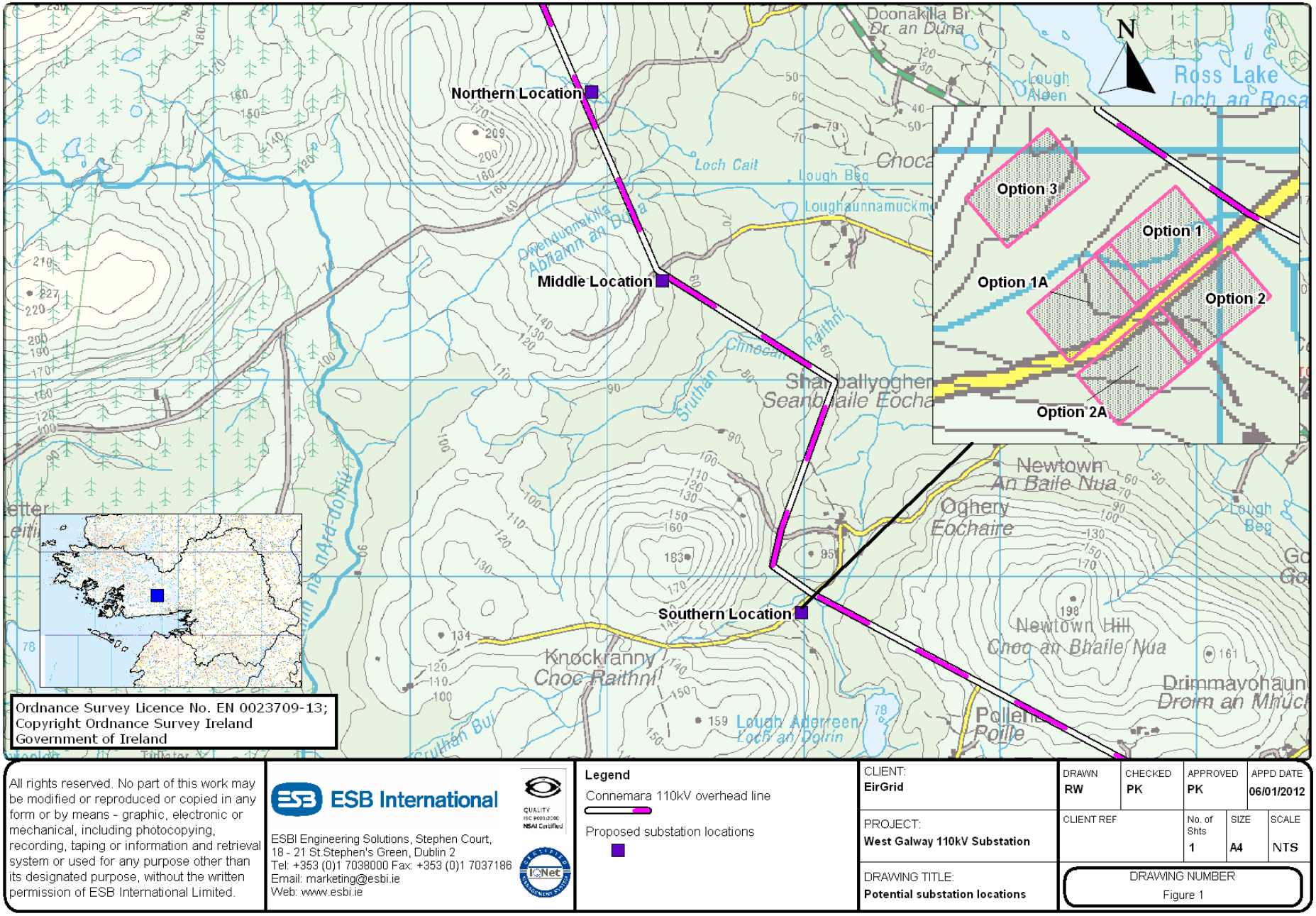


Figure 1: Potential substation locations

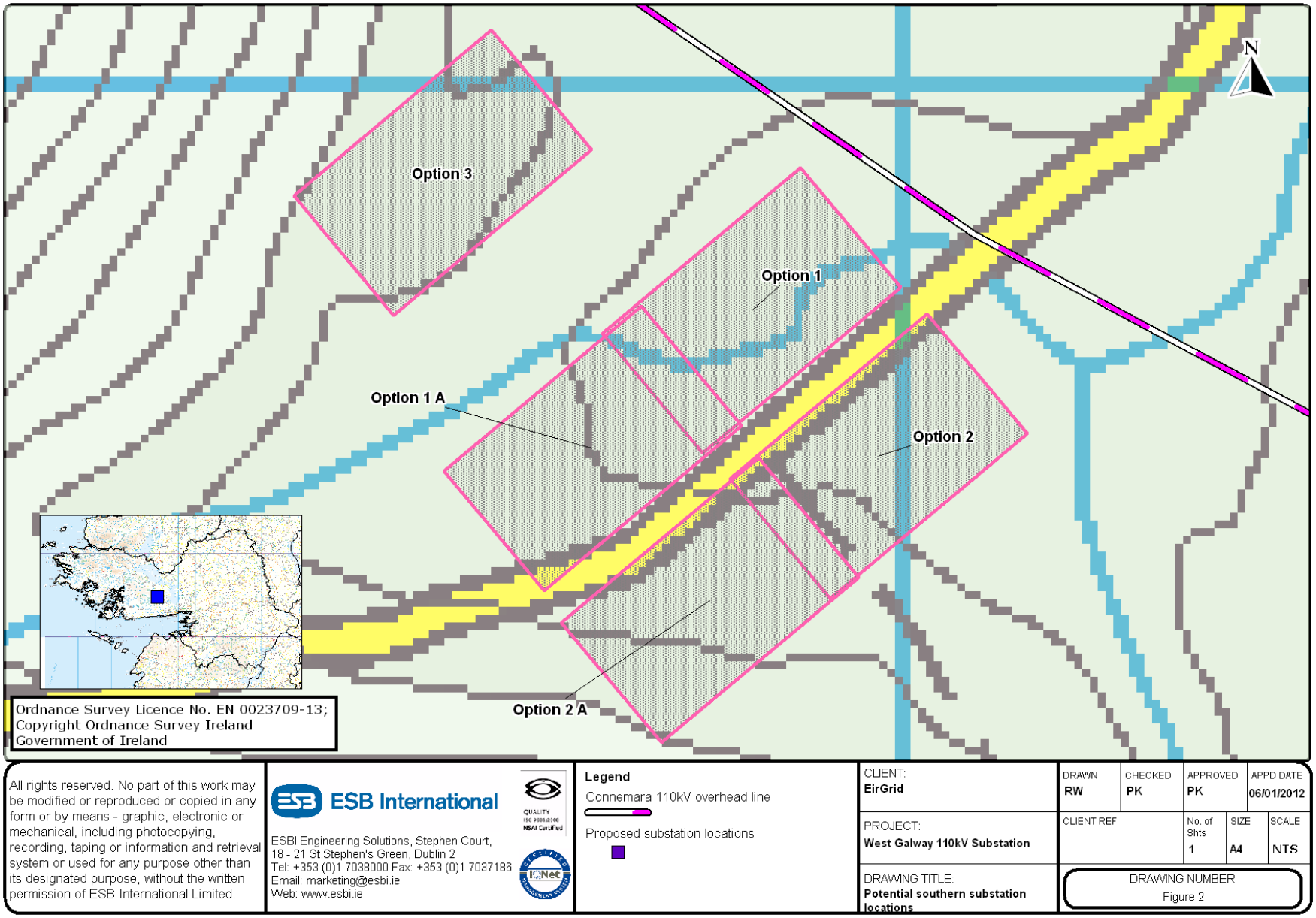


Figure 2: Southern Location – five potential substation sites

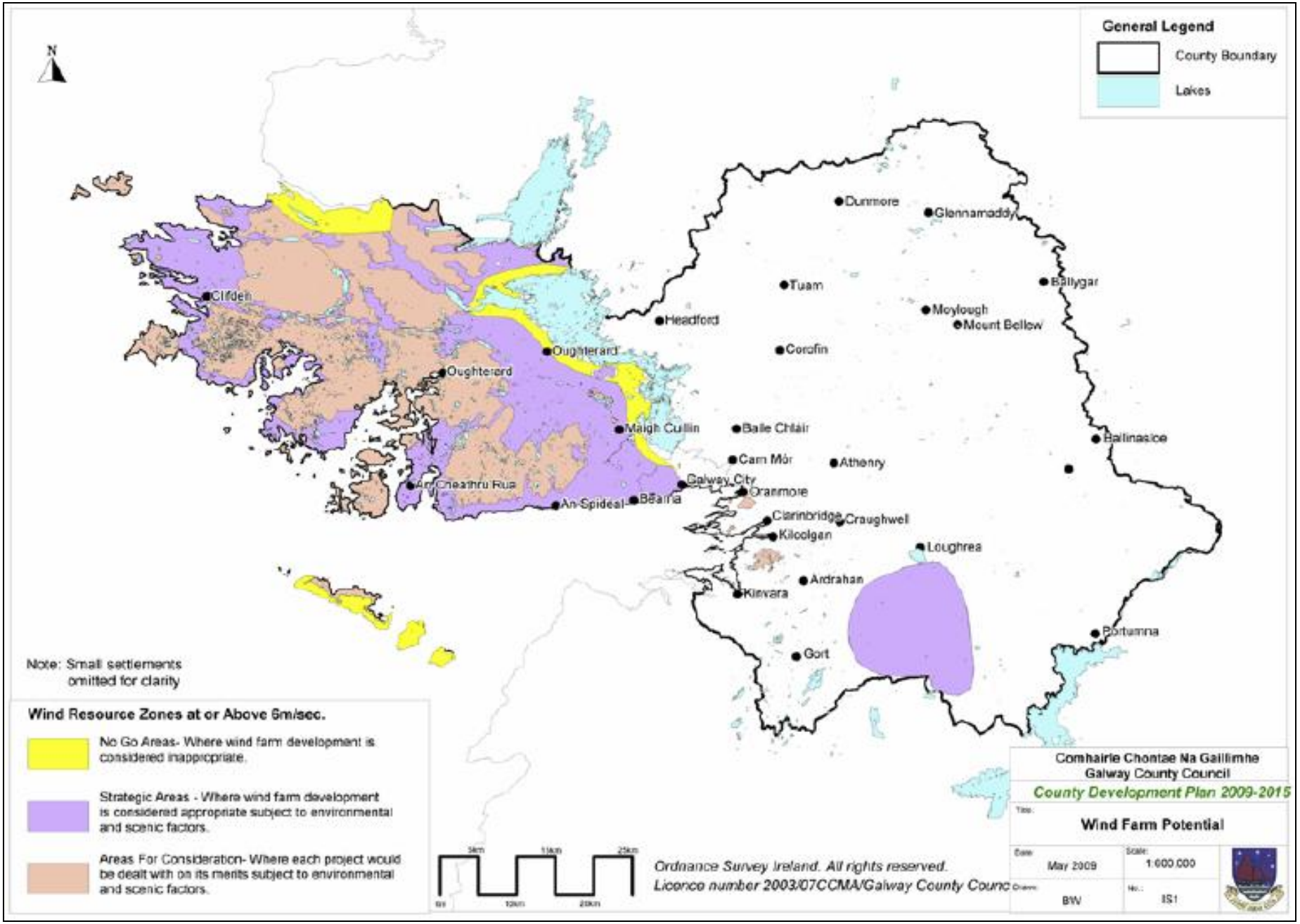


Figure 3: Wind Farm Potential (Galway County Council)

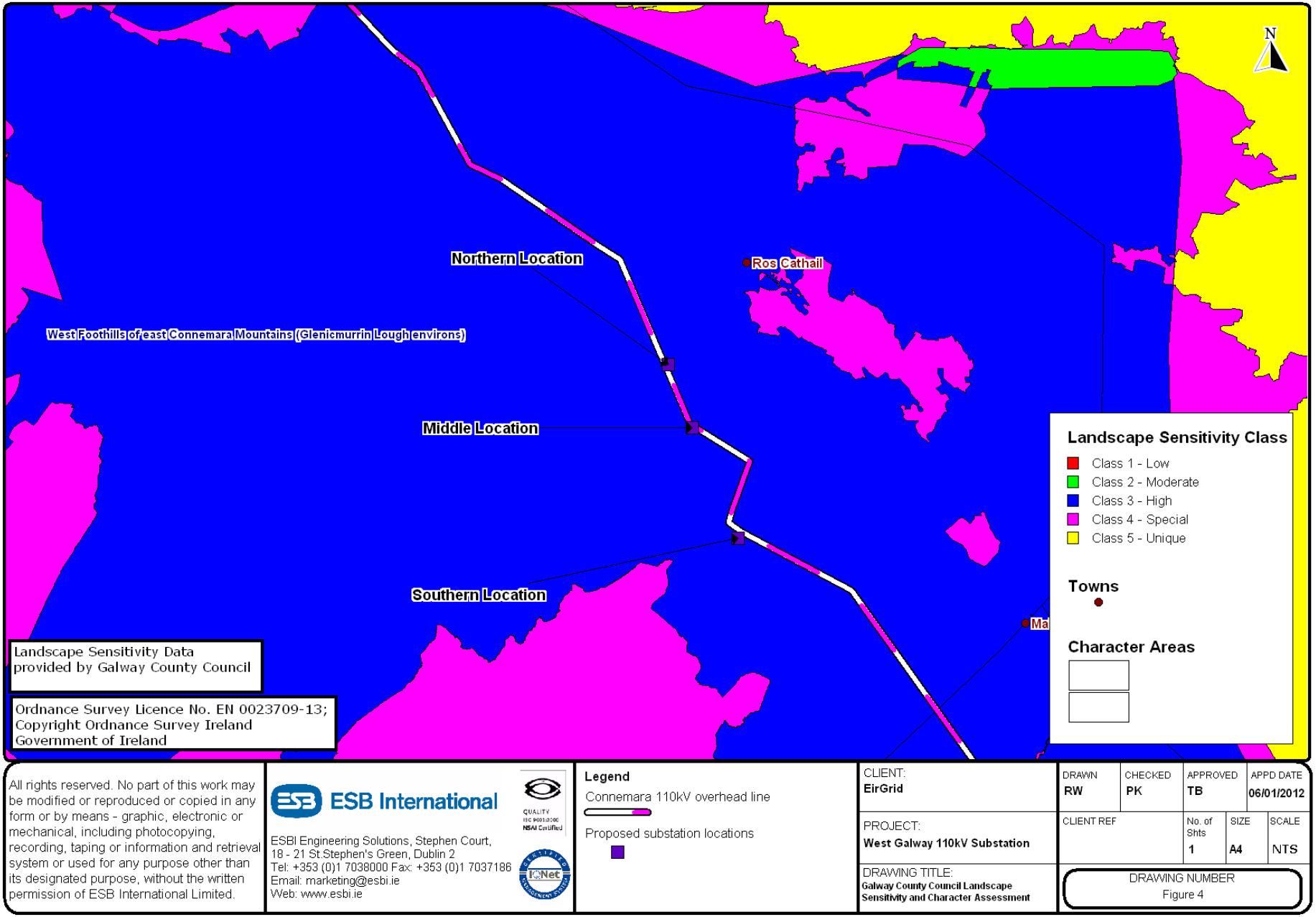


Figure 4: Landscape Sensitivity Assessment

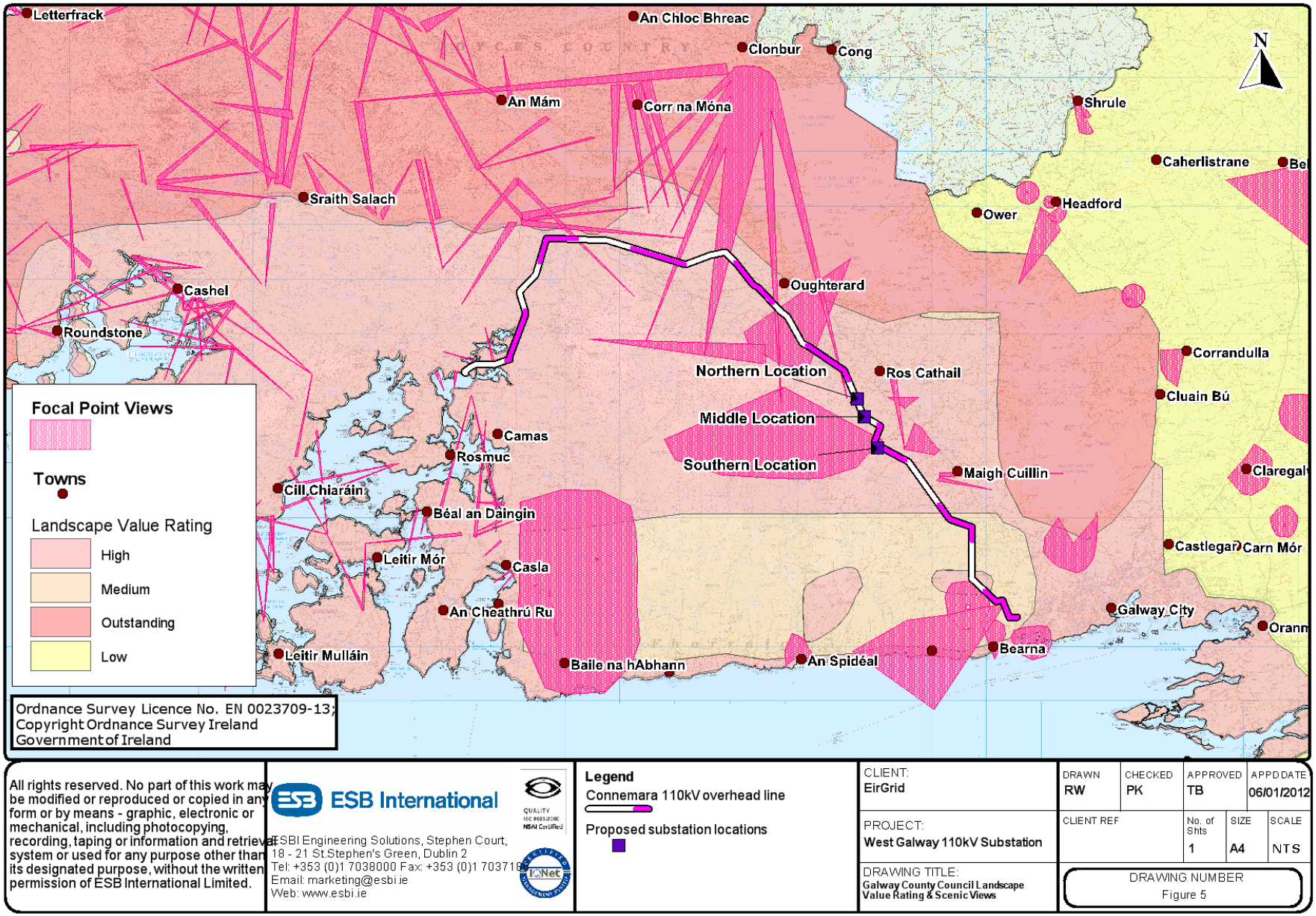


Figure 5: Landscape Value Rating & Scenic Views/Points

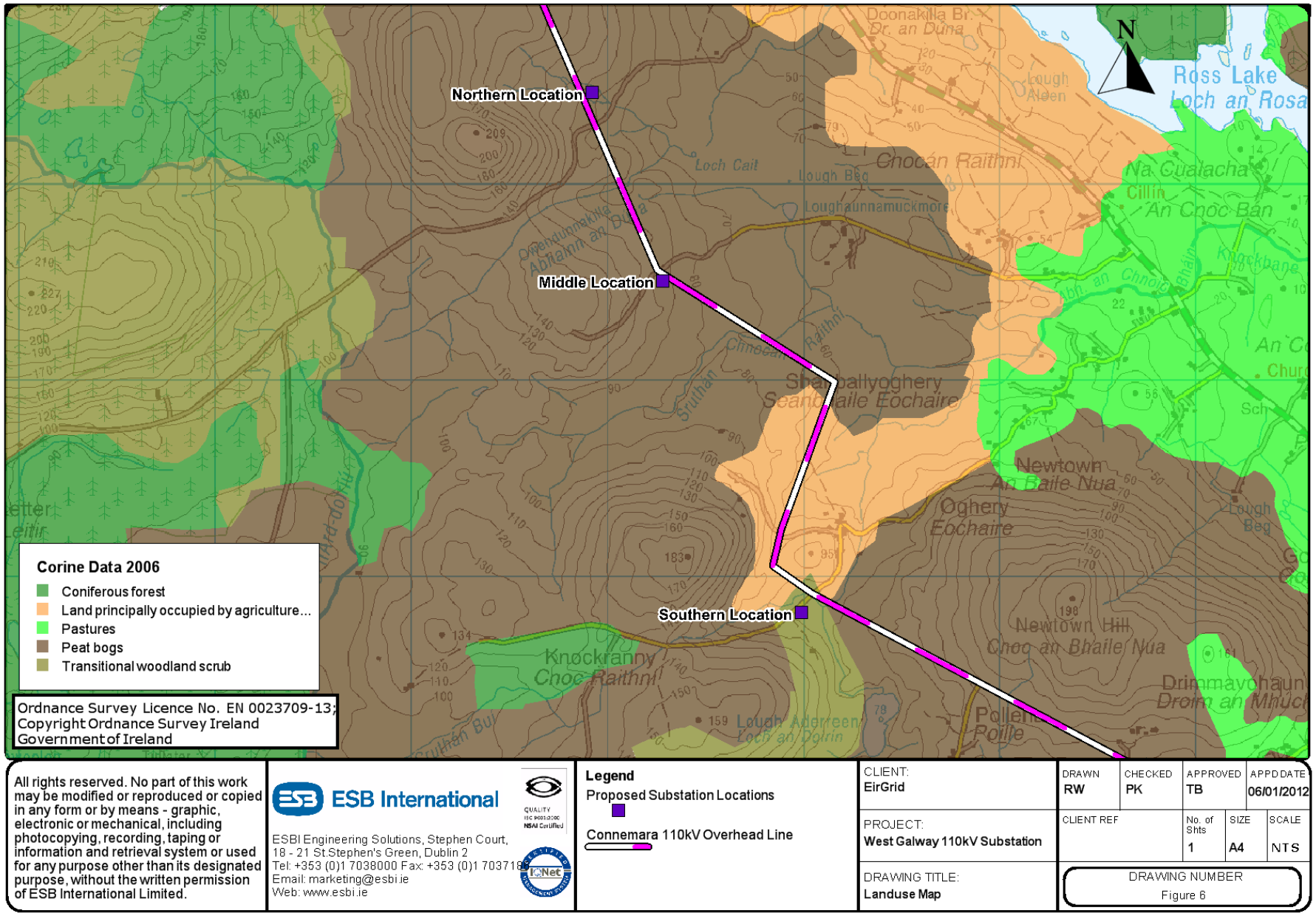


Figure 6: Land Use in the Study Area

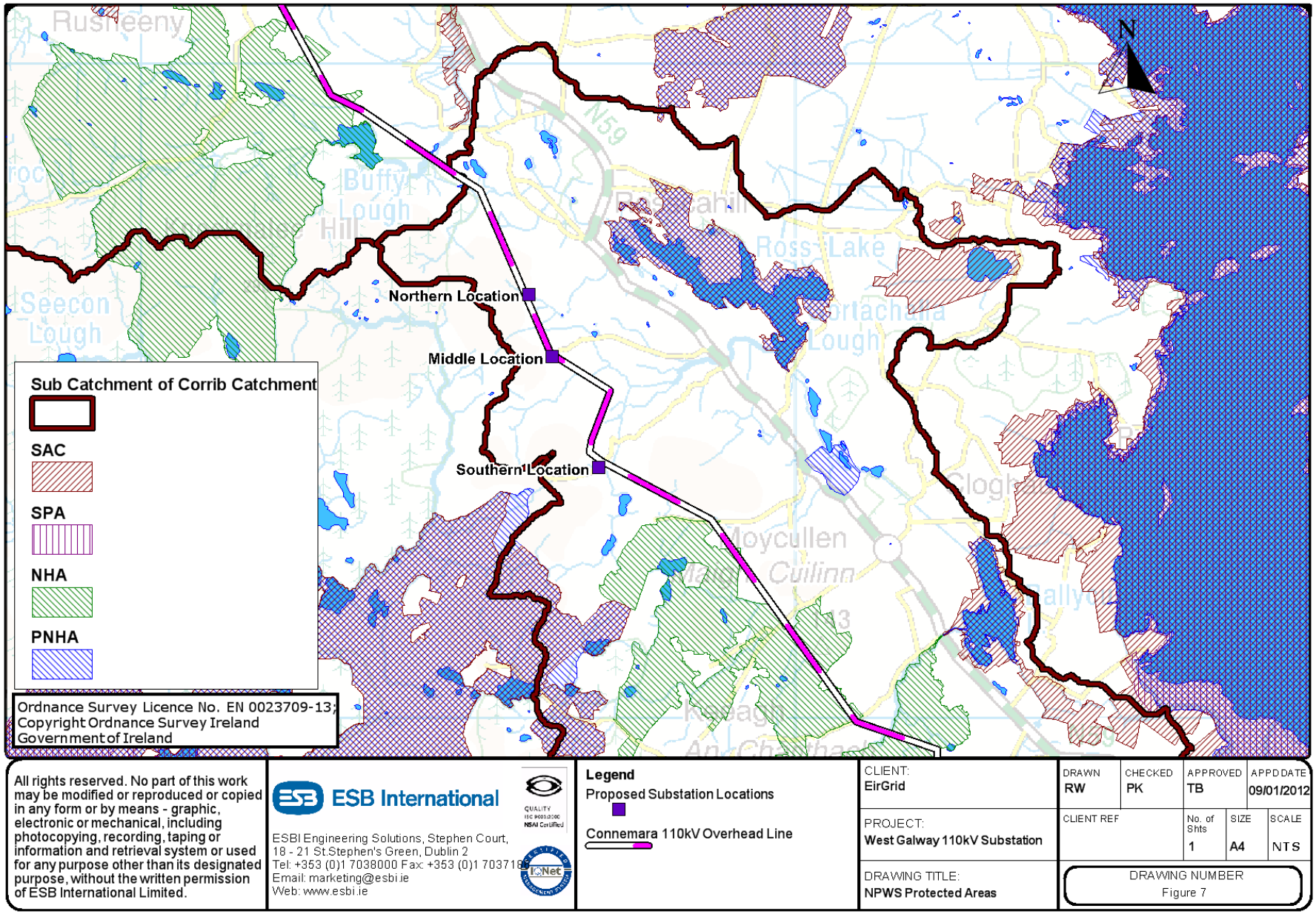


Figure 7: Protected Areas

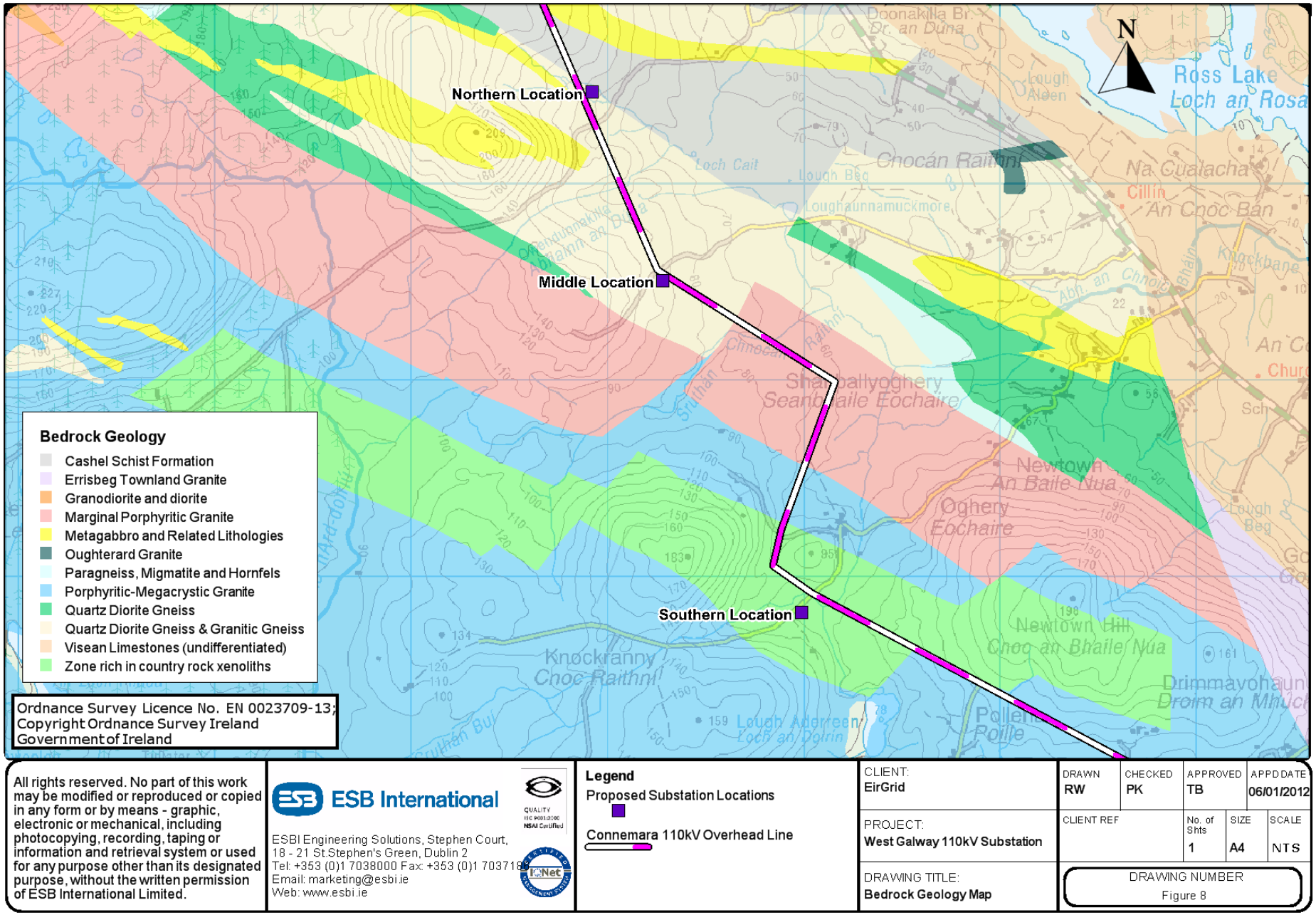


Figure 8: Bedrock Geology (Source: GSI Website)

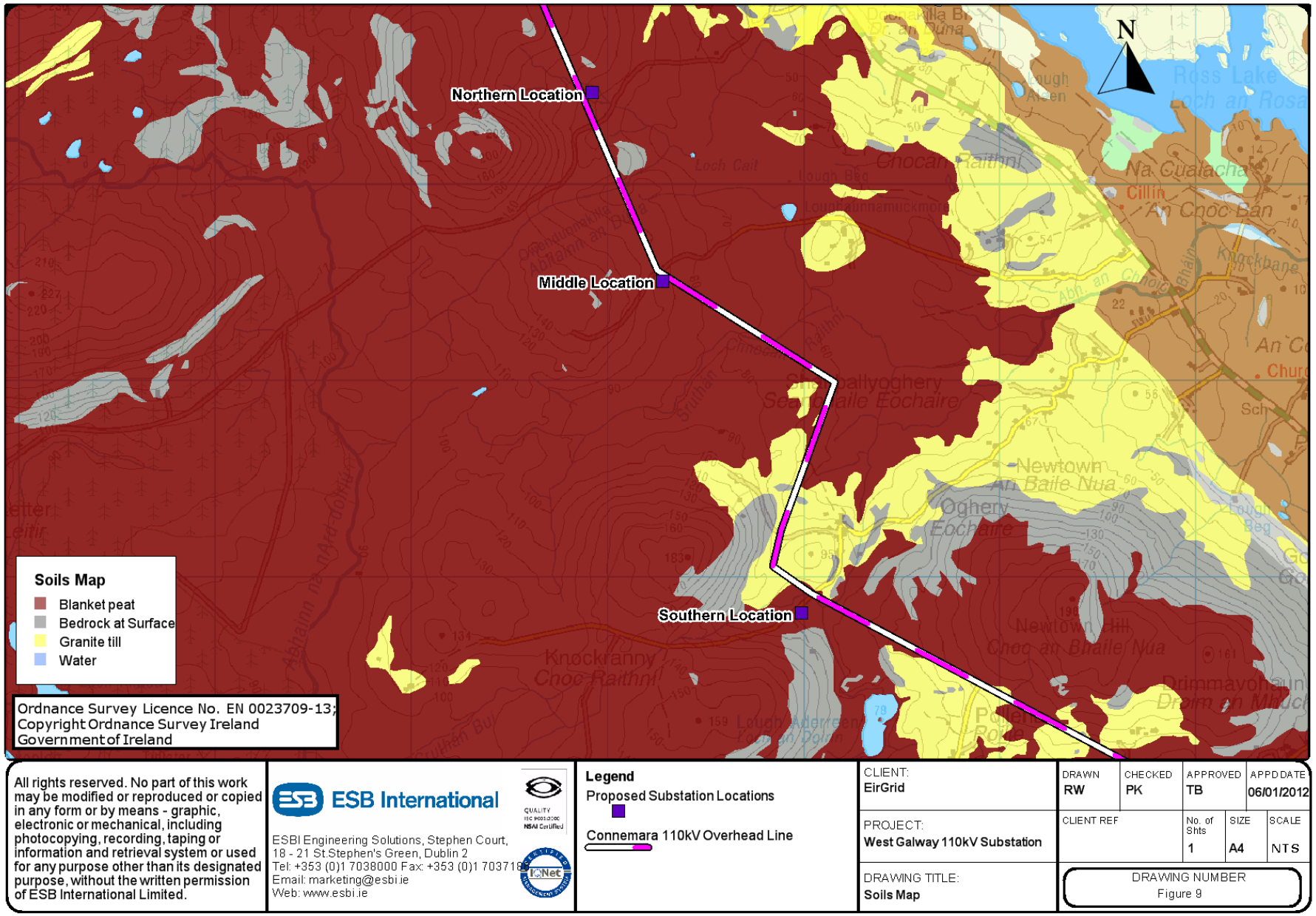


Figure 9: Soils

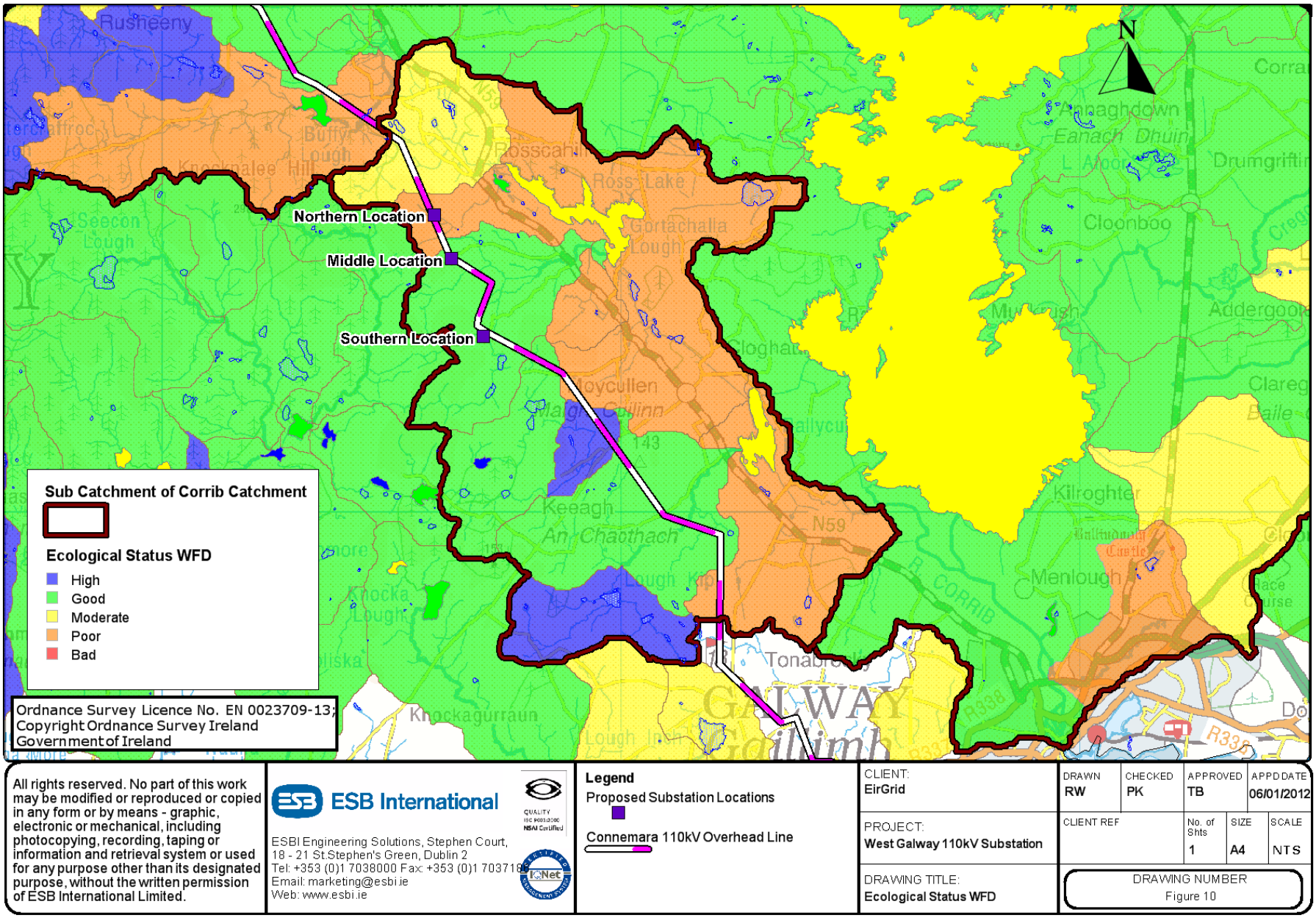


Figure 10: Water Framework Directive - Ecological Status for Surface Waters

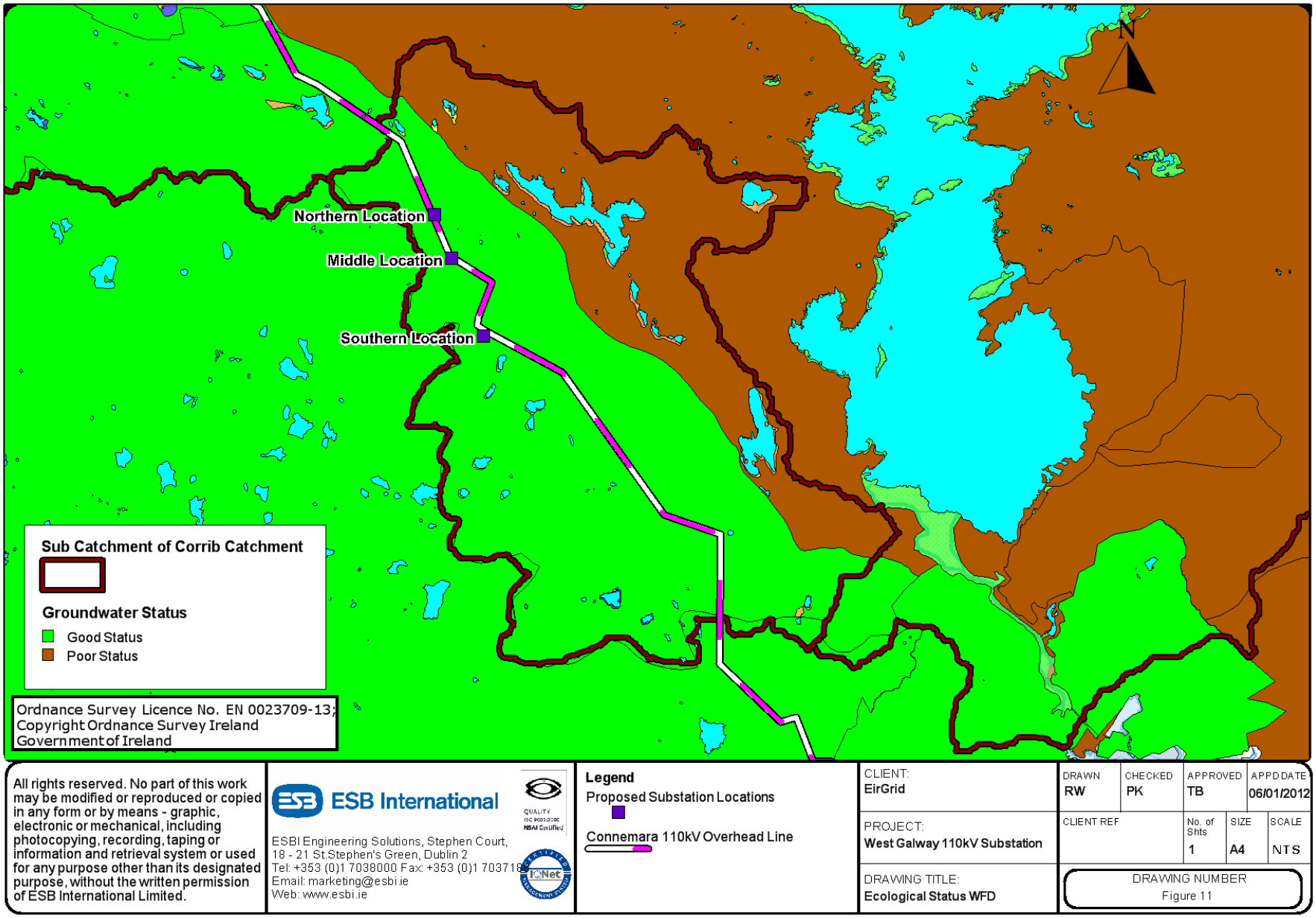


Figure 11: Water Framework Directive: Groundwater Status

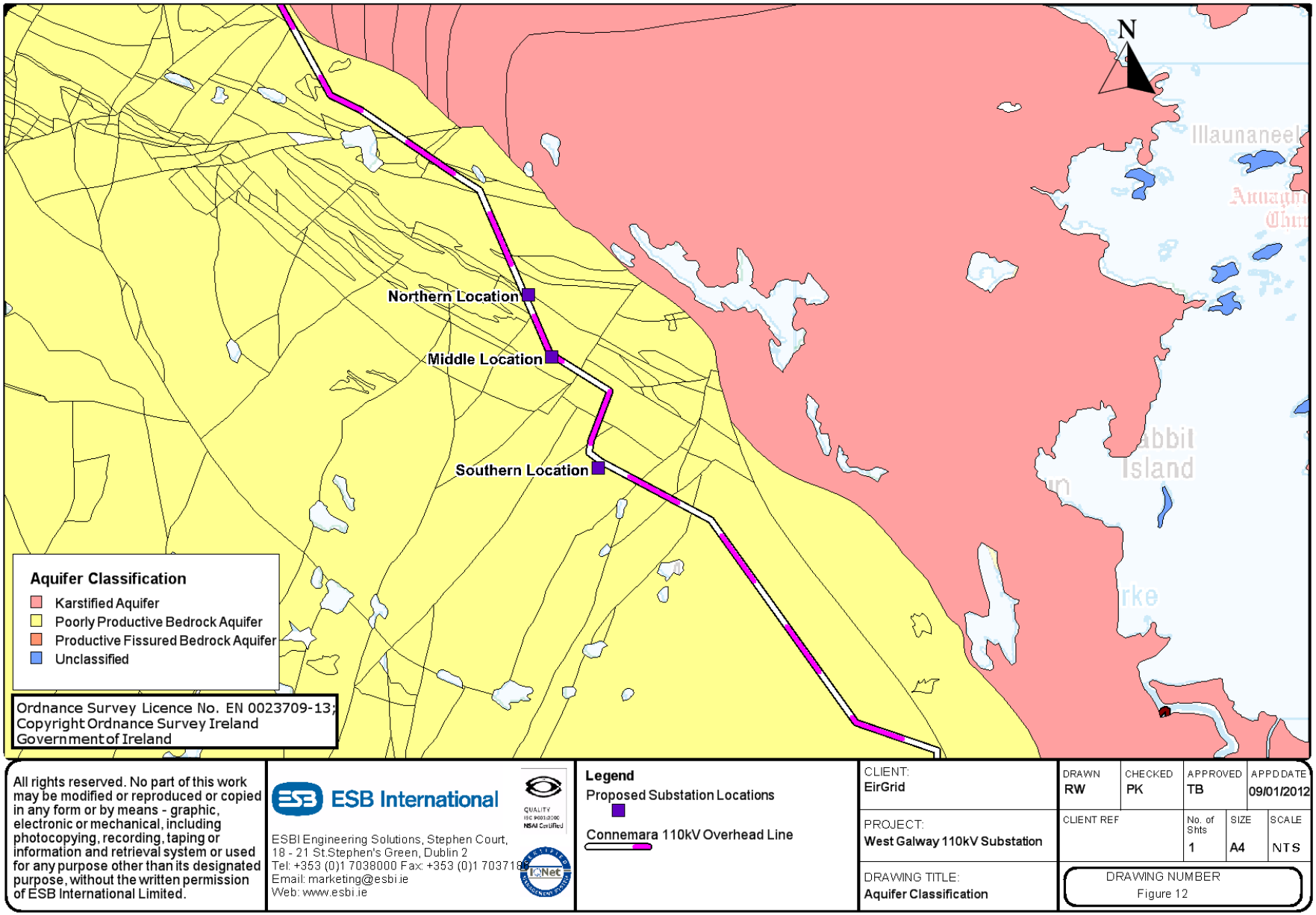
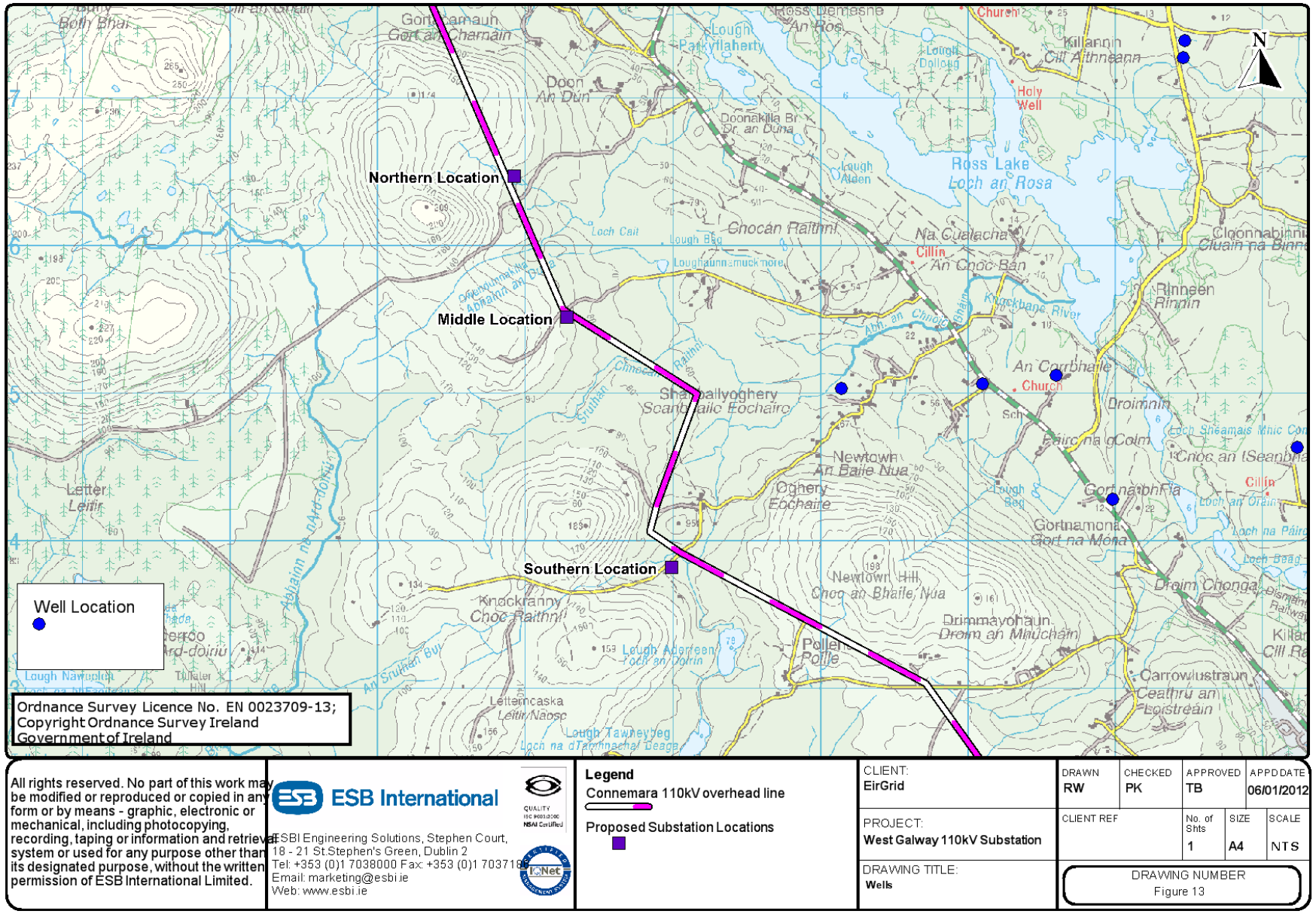


Figure 12: Aquifer Classification



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Legend
Connemara 110kV overhead line
Proposed Substation Locations

CLIENT: EirGrid	DRAWN RW	CHECKED PK	APPROVED TB	APP DATE 06/01/2012	
PROJECT: West Galway 110kV Substation	CLIENT REF		No. of Shts 1	SIZE A4	SCALE NTS
DRAWING TITLE: Wells	DRAWING NUMBER Figure 13				

Figure 13: Groundwater Well Locations

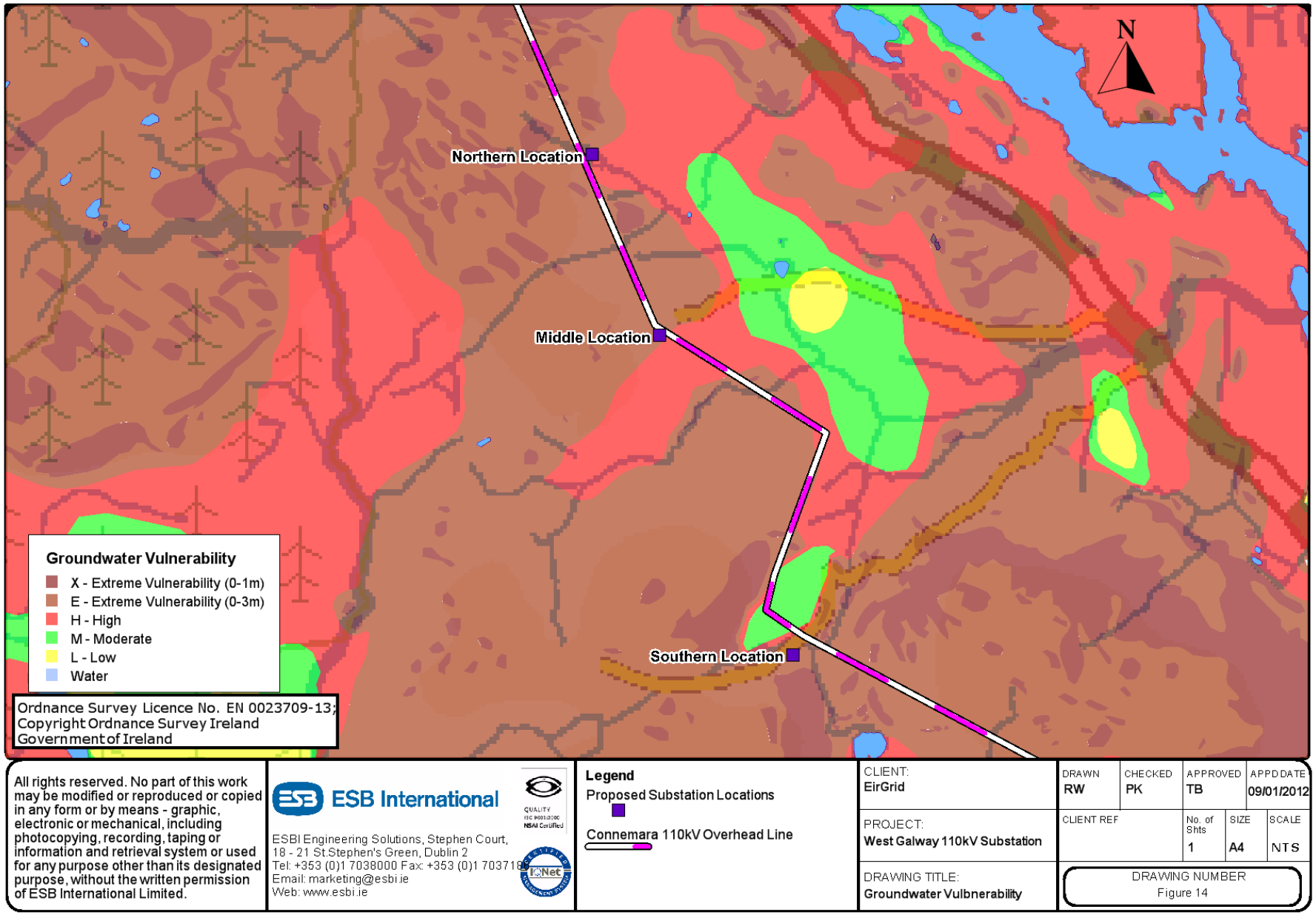

Figure 14: Groundwater Vulnerability

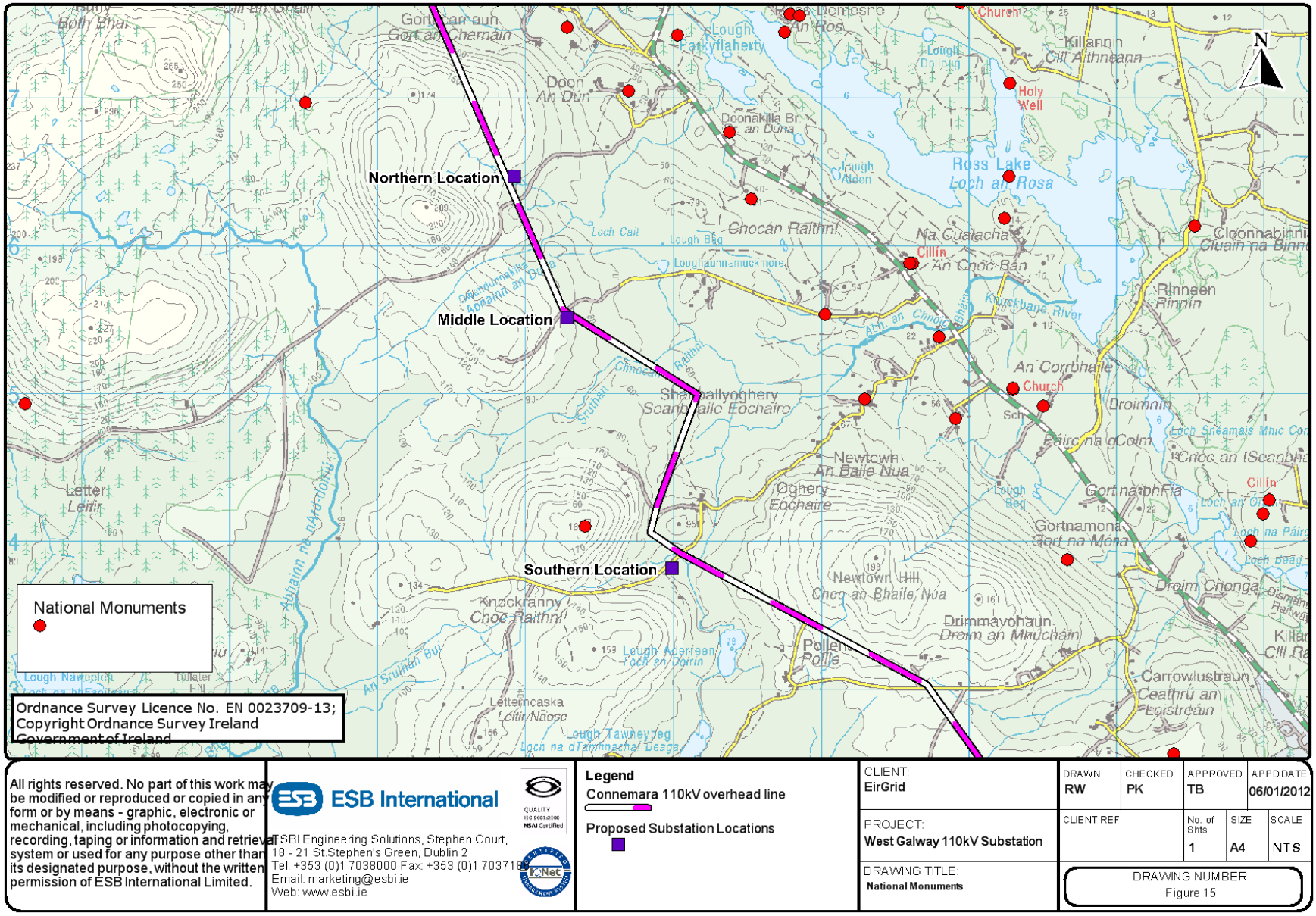

Figure 15: Site and Monuments

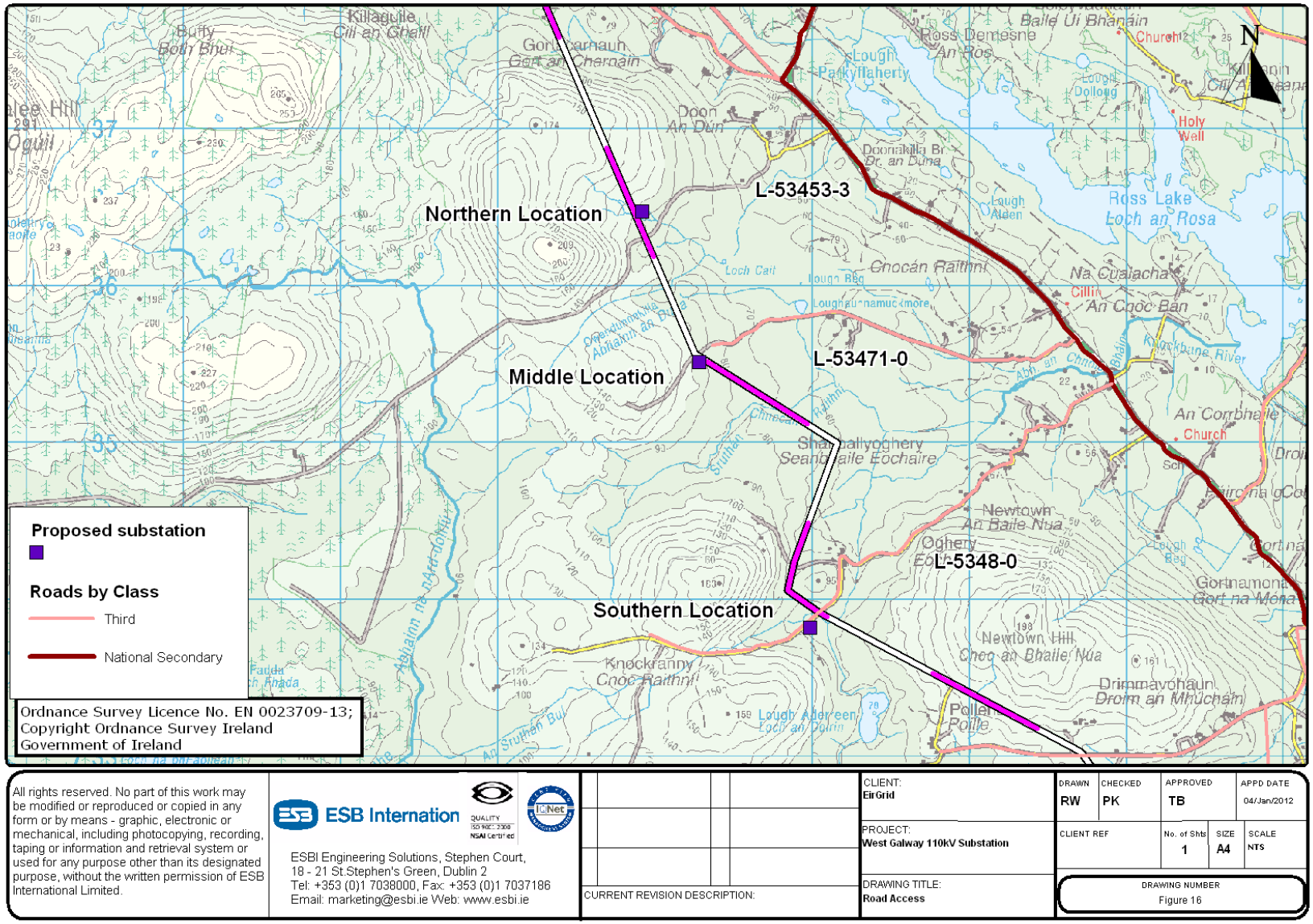

Figure 16: Access Roads

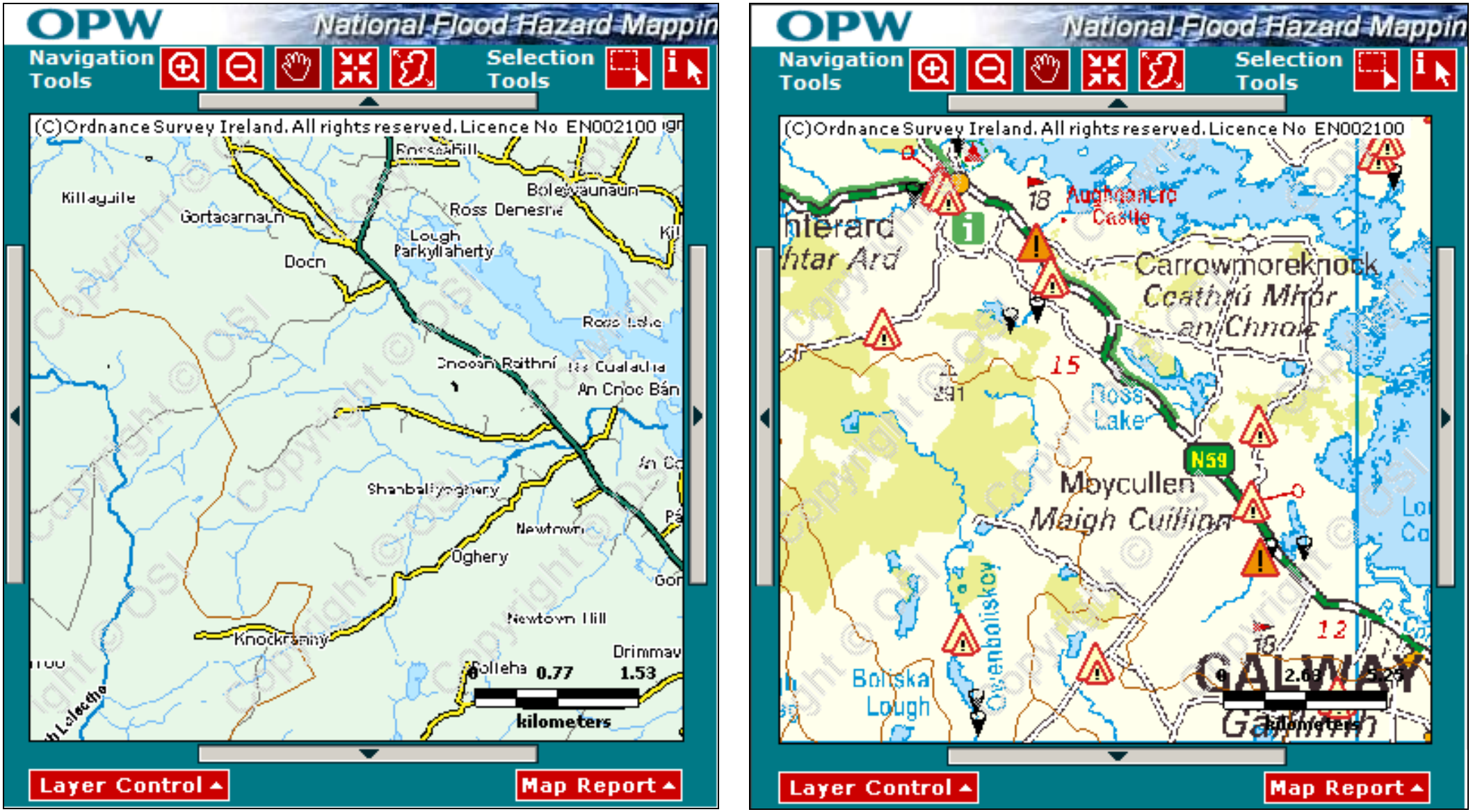

Figure 17: OPW www.floodmaps.ie images

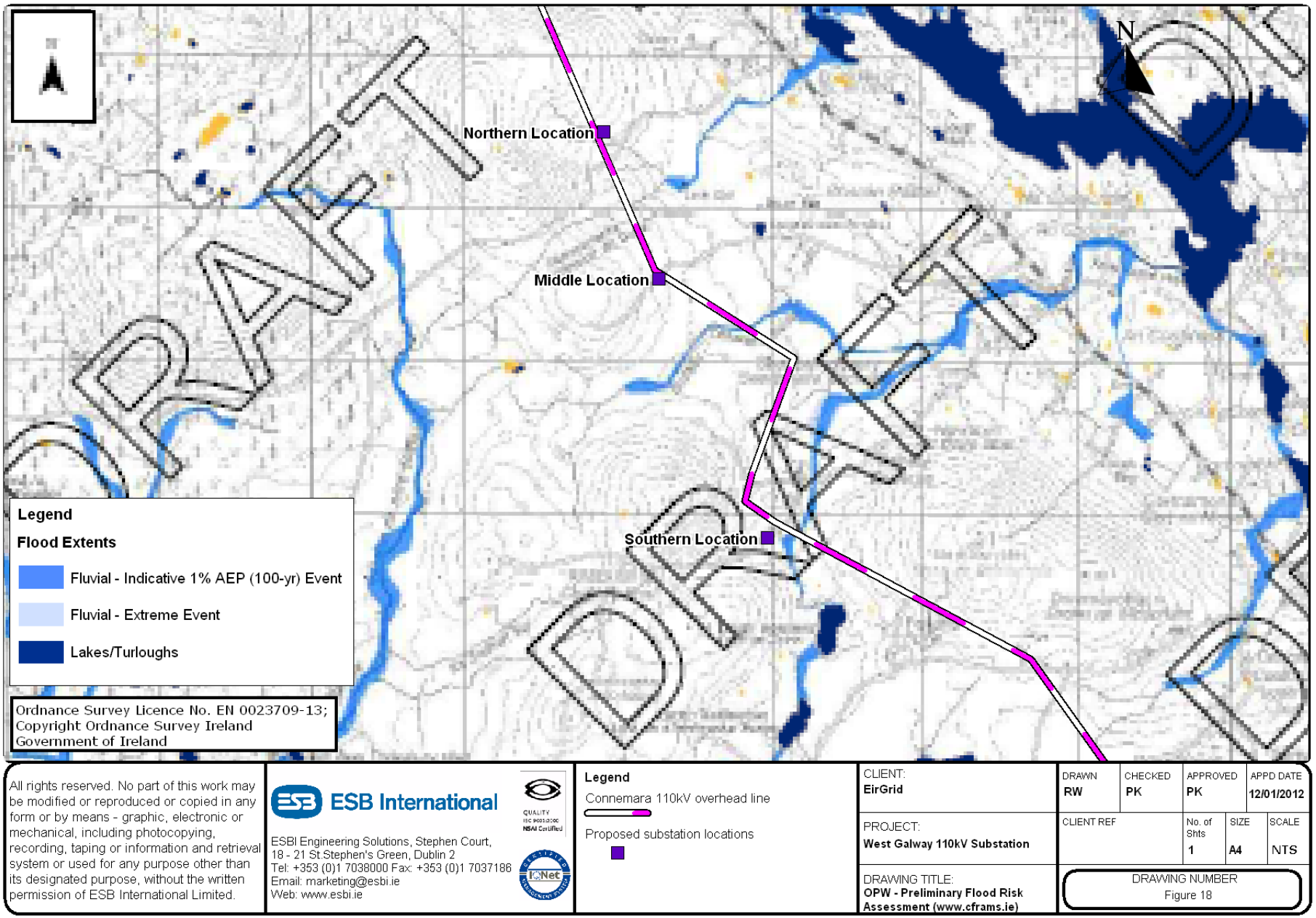

Figure 18: OPW www.cframs.ie images of study area

APPENDIX 1 VISUAL

Visual Assessment Report

URS

Proposed Substation near Moycullen, County Galway
Identification of preferred substation location

February 2012

Prepared for

ESBI

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Appendix A - Figure 1 and Photosheets

Figure 1 – Viewpoint locations

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Photosheet 2 – Plate 3-4

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Photosheet 4 – Plate 9-10

Photosheet 5 – Plate 11-12

Photosheet 6 – Plate 13-14

Photosheet 7 – Plate 15-17

1.0 Identification of preferred substation location

1.1 Introduction

EirGrid is planning to a new substation adjacent to the permitted 110 kV overhead line in an area northwest of Moycullen, County Galway. This report assesses the potential for landscape and visual impacts at a number of possible substation locations within the study area.

Three potential substation locations were assessed - the Northern and Middle and Southern locations. Desktop studies suggested that the Southern location would be less visible in the wider landscape than either the Northern or Middles locations and therefore five site options were considered at this location.

The Southern site comprises the following five potential substation site options:

- Site 1
- Site 1A
- Site 2
- Site 2A
- Site 3

1.2 Approach and Methodology

In order to provide information on the on-site visibility of the three general substation locations and the five detailed site options within the Southern Location, a survey was carried out on 5th January 2012. This task involved an outline investigation of potential landscape and visual effects arising as a result of the proposed development. The following main aspects have been surveyed on site:

- Setting of site within the wider landscape context
- Elevation of proposed site
- Availability of existing panoramic views from the site
- Visibility of the site from surrounding areas
- Degree of existing screening provided by vegetation and topography
- Proximity to settlements
- Capacity of the landscape to accommodate the proposed development
- Distance to permitted 110 kV overhead transmission line
- Other site specific characteristics

A number of photographs indicating the nature of visibility from within and towards the site locations have been taken and are shown on Photosheets 1-7 and Figure 1 – Viewpoint Location map, enclosed in the Appendix. It is understood that it has not been decided whether an AIS or GIS substation will be constructed at this stage. Therefore, an AIS scenario has been taken into account assuming a total structure height of 20m. It should be noted that the landscape (as shown on Photosheets 1-7) would be altered when the permitted 110 kV overhead transmission line is constructed. This has been considered in the landscape and visual appraisal herein.

The following preliminary landscape and visual assessment will outline the main characteristics of all three locations and relevant site options and classify each in terms of potential landscape and visual effects in order to identify a preferred substation location.

1.3 Review of substation locations

1.3.1 Northern Location *(refer to Photosheet 1 – Plate 1)*

This area is located approximately 1km southwest of the townland of Doon, approximately 6km northeast of Moycullen, on the slopes of one of the small hills east of Knocknalee Hill in the immediate vicinity of the permitted Salthill-Screeb 110 kV overhead transmission line.

Photosheet 1 contains photographs of the site and of views towards the site. Each photoplate contains notes on the nature of potential visibility.

1.3.2 Middle Location (refer to Photosheet 1 – Plate 2)

The Middle Location is also situated on one of the small hills east of Knocknalee Hill, northwest of the townland of Shanballyoghery, approximately 6km northwest of Moycullen, in close proximity to the permitted Salthill-Screeb 110 kV overhead transmission line. Due to flooding of the local access road, the site was inaccessible on the day of the site survey, but the surveyor was able to observe the site from a distance of 600m.

Photosheet 2 contains photographs of the site and of views towards the site. Each photoplate contains notes on the nature of potential visibility.

1.3.3 Southern Location (refer to Photosheet 2 – Plates 3 & 4)

The Southern Location is situated in the eastern part of the townland of Knockranny, approximately 4.8km northwest of Moycullen, in close proximity to the permitted Salthill-Screeb 110 kV overhead transmission line.

Photosheet 3 contains photographs of the site and of views towards the site. Each photoplate contains notes on the nature of potential visibility.

1.3.4 Preferred substation location

The Southern Location is preferred due its topographical location and to the screening provided by surrounding topography and vegetation. It is considered that this location has the capacity to absorb the proposed development better than the Northern and Middle Locations. The Southern Location would also be the least visible location in long distance views from lower lying areas to the northeast, east and southeast of the substation locations *(refer to Photosheet 3 – Plates 5-8)*.

The introduction of mitigation measures to partially screen the proposed development at the Northern and Middle location would itself create significant adverse visual effects and would most likely result in High Landscape effects due to the absence of any existing high vegetation in the locality. Required mitigation elements would be totally uncharacteristic when set within the attributes of the receiving environments of the Northern and Middle Locations.

1.4 Review of substation site options

1.4.1 Assessment of substation site options within Southern Location

Five site options have been identified within the Southern Location. The following assesses each site individually based on the methodology described in section 1.2:

Site 1 *(refer to Photosheet 4 - Plates 9 & 10 and Photosheet 7 - Plates 15 & 16)*

Location characteristics:

- Located within a mostly flat part of the Southern Location
- Majority of site is covered by drained and undrained grassland with small pockets of scrub and low woodland
- A small stream diagonally crosses the site
- Views to the site would be possible from within 200m of the site but not from areas at a greater distance
- It is unlikely that the proposed substation would not break the skyline in long distance views from the east
- There is an existing small woodland planting within close proximity of the site option boundary
- Existing surrounding vegetation would help to integrate proposed substation buildings
- Further mitigation planting would reduce visual impact

Site 1A *(refer to Photosheet 4 - Plate 10 and Photosheet 7 - Plate 15)*

Location characteristics:

- North-eastern section of the site located within a mostly flat area crossed by a small stream in the northern corner, the south-western section is located on gently rising ground
- Views to the site would be possible from within 200m of the site but not from areas at a greater distance
- It is unlikely that the proposed substation would break the skyline in long distance views from the east
- North-eastern part is covered by drained and undrained grassland with small pockets of scrub and low woodland while the south-western section extends into a coniferous plantation
- Existing surrounding vegetation would help to integrate proposed substation buildings
- Further mitigation planting would reduce visual impact

Site 2 *(refer to Photosheet 5 - Plates 11 & 12 and Photosheet 6 – Plates 13 & 14)*

Location characteristics:

- Located within a mostly flat area but the site gently rises towards its south-western boundary
- Views to the site would be possible from within 200m of the site but not from areas at a greater distance
- It is unlikely that the proposed substation would break the skyline in long distance views from the east
- Majority of site is covered by drained and undrained grassland including a pocket of low woodland. The south-western part is located within a coniferous plantation
- Existing bands of scrub and low trees along the north-western and north-eastern boundary would help to integrate proposed substation buildings
- Further mitigation planting would reduce visual impact

Site 2A *(refer to Photosheet 6 - Plates 13 & 14)*

Location characteristics:

- Located on gently rising ground in the south-western part of the Southern Location
- Views to the site would be possible from within 200m of the site but not from areas at a greater distance, although the potential for visibility of the proposed structures increases, due to the slightly higher elevation of the site
- It is unlikely that the proposed substation would break the skyline in long distance views from the east
- Majority of site is covered scrub and coniferous forestry
- Existing vegetation could provide screening along the south-eastern, south-western and north-western boundaries
- Further mitigation planting would reduce visual impact

Site 3 *(refer to Photosheet 4 - Plate 9 and Photosheet 7 - Plates 15, 16 & 17)*

Location characteristics:

- Located on the slopes of a small hill on higher ground than the other four site options
- Majority of site is covered by drained and undrained grassland and surrounded by bands of low scrub and woodland
- Views to the site would be possible from within 1km of the site, due to its location and elevation
- Distant views of proposed structures would be more likely due to the elevation of the site
- It is unlikely that the proposed substation would break the skyline in long distance views from the east
- Existing surrounding vegetation would be less effective in terms of screening due to its elevated location
- Further mitigation planting would reduce visual impact
- Distant views of proposed structures would be more likely due to the elevation of the site

1.5 Preferred Substation Site Options within Southern Location

The preliminary assessment of the preferred substation site option within the Southern Location is based on the methodology as described in section 1.2, the analysis contained in section 1.4 and observations made during the site survey of

the 5th January 2012, which result in the following ranking of preferred site options in terms of landscape and visual impact:

Ranking	Substation	Reasons for ranking
1	Site 2	Minimum visibility of substation against the skyline due to the low site elevation Minimum visibility of tall structures from distant views Maximum opportunities for enhancement of existing boundary planting in close proximity Local stream would remain unaltered Close location to permitted overhead transmission line
2	Site 1A	Increased visibility from within the vicinity due to its location and the absence of existing screening vegetation to its north-eastern boundary Minimum diversion of stream passing through the north-eastern corner Increased distance to permitted 110 kV overhead line Minimises visibility of substation against the skyline
3	Site 1	Maximum diversion of a section of the stream passing diagonally through the site Minimises visibility of substation against the skyline Good opportunities for enhancement of existing boundary planting in close proximity Close location to permitted overhead transmission line
4	Site 2A	Increased visibility in close proximity due to its location on rising ground Maximum distance from permitted 110 kV overhead transmission line within the Southern Location Existing coniferous plantation could be used and enhanced along all but the north-eastern boundary

5	Site 3	Maximum visibility of substation within the Southern Location and maximum possible visibility against the sky due to elevated location when seen from within the Southern Location Maximum visibility of tall structures from distant areas Minimum distance to permitted 110 kV overhead transmission line Minimum opportunity to use existing surrounding vegetation for screening the proposed structures

1.6 Conclusions and Recommendations

At this stage the following conclusions and recommendations can be made:

Site 2 and Site 1A are the preferred locations in terms of minimising landscape and visual effects.

Careful siting of the substation to take advantage of the screening effects of existing vegetation, local topography and the establishment of additional screening vegetation can further reduce visual impact. While Site 3 would require the minimum length of connection between the permitted 110 kV line and the proposed substation, the elevated location and lack of existing screen planting would result in higher landscape and visual effects when viewed from the vicinity and from a greater distance.

In order to confirm these recommendations it would be possible to produce accurate photosketches (e.g. showing the height or approximate extent of the proposal) from identified viewpoints.

Appendix

Figure 1 - Viewpoint locations

Photosheet 1 – Plate 1-2

Photosheet 2 – Plate 3-4

Photosheet 3 – Plate 5-8

Photosheet 4 – Plate 9-10

Photosheet 5 – Plate 11-12

Photosheet 6 – Plate 13-14

Photosheet 7 – Plate 15-17

Plate 1 (Panoramic): View northeast from an access track in the Northern Location.

Location characteristics:
This location is an exposed landscape on a hill slope with no vegetation of any significant height. The elevated position results in panoramic open views from the site of north-eastern, eastern and south-eastern lower lying areas. The absense of vegetation in this location would result in high visibily within 1km of the site, but the topography limits close range views from the west, north and south. The site survey of the wider area indicated that intervening vegetation would screen most of the potential views. Where views would be possible, the proposal would be seen against the hill range in the background, reducing the magnitude of visual effects.

Plate 2 (Panoramic): View southwest from an access track towards the Middle Location, which is approximately 600m away from this location.

Location characteristics (Due to flooding of the local access road, the site was inaccessible on the day of the site survey, but the surveyer was able to observe the site from a distance of 600m):
Similar to the Northern Location, the Middle Location is situated in an exposed landscape on a hill slope with no vegetation of any significant height. The elevated position would also result also in panoramic open views from the site of north-eastern, eastern and south-eastern lower lying areas. The absence of significant vertical vegetation in this location would result in high visibily within 2km of the site, but the topography limits close range views from the west. The site survey of the wider area indicated that intervening vegetation would screen most of the potential views from lower lying areas.
Where views would be possible, the proposal would be seen against the hill range in the background, reducing the magnitude of visual effects.

Photosheet 1: Northern & Middle Location

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Plate 3 (Panoramic): View southwest from access road across the Southern Location.

Plate 4 (Panoramic): View northeast from access road across the northern part of the Southern Locations.

Location characteristics:
This location is situated within a an area enclosed by higher ground with screening provided by surrounding hills and hummocks. The Southern Location is partially located within a natural depression containing a small stream and rises steadily towards the south-western, north-western and north-eastern boundaries. Further screening of the location is provided by bands and pockets of low woodland, scrub and coniferous plantations. The topography and vegetation limits localised visibility to approximately 700m. The site survey of the wider area indicated that intervening vegetation would screen most of potential views. Where views would be possible, the upper parts of the proposal would be seen against the hill range in the background, reducing significantly the magnitude of visual effects.

Photosheet 2: Southern Location

Plate 5: View south, southwest from the N59 in the vicinity of Rosscahill towards the Northern (approx. 2km distance), Middle (approx. 2.5km distance) and Southern Locations (approx. 4km distance).

Plate 6: View southwest from local road northeast of the townland of Shanballyoghery towards the Middle Location (approx. 1.6km distance).

Plate 7: View southwest from local road west of the townland of Ower towards the Northern (approx. 4.8km distance), Middle (apprx. 4.8km distance) and Southern Locations (approx. 5.4km distance).

Plate 8: View southwest from local road northeast of the townland of Pollagh towards the Northern (approx. 6km distance), Middle (apprx. 6km distance) and Southern Locations (approx. 7km distance).

The above panoramic photographs show views from distant lower lying areas northeast and east of the substation locations. Intervening vegetation and small hummocks screen the majority of views towards all substation locations. Due to its elevation, the proposal would be seen against the hills in the background and not against the sky in all three locations. Considering the scale of the field of vision, the proposal would only be a minor component in the wider view and could be missed by the casual observer. Potential visibility would be highly dependant on weather and light conditions. The Southern Location would be the least visible due to its secluded topographical location.

Photosheet 3: Distant panoramic views of Northern, Middle and Southern Location

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Plate 9 (Panoramic): View northwest from access road across Site 1 and of Site 3

Plate 10 (Panoramic): View southwest from access road across Site 1A

Photosheet 4: Southern Location - Site options

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Plate 11: View south from access road across north-eastern part of Option 2

Plate 12: View northeast from access road across south-western part of Option 2

Photosheet 5: Southern Location - Options

Plate 13 (Panoramic): View south from access road across Site 2A

Plate 14 (Panoramic): View southeast from access road across Site 2A

Photosheet 6: Southern Location - Site options

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Plate 15 (Panoramic): View north from access road across Site 1, Site 1A and of Site 3 (Option 1A and of Option 3)

Plate 16 Panoramic): View west from access road of Site 1 and Site 3

Plate 17 (Panoramic): View northwest of Site 3

Photosheet 7: Southern Location - Site options

PROPOSED SUBSTATION NEAR MOYCULLEN
COUNTY GALWAY
February 2012

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APPENDIX 2 ECOLOGY

Ecological Assessment

WEST GALWAY SUBSTATION

ECOLOGICAL ASSESSMENT

3/01/12

PREPARED FOR ESB INTERNATIONAL

BY

BIOSPHERE ENVIRONMENTAL SERVICES

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CONTENTS

1.0 Introduction

EirGrid is planning to a new substation adjacent to the permitted 110 kV overhead line in an area northwest of Moycullen, County Galway. This report assesses the potential for ecological impacts at a number of possible substation locations within the study area. BioSphere Environmental Services was commissioned by ESBI to carry out an ecological assessment of possible sites identified by ESBI. The study was to focus on terrestrial habitats and was to consider possible ecological impacts by development of each site. A site visit was made on 1st January 2012 and the findings are contained in the present report.

2.0 Methods

All locations to be assessed were marked on a Discovery map. Additionally the locations of the various options at the 'southern' location were identified on a supplied aerial photograph. A walk-over survey was carried out at all the sites as considered necessary.

Principal habitats were recorded and classified according to Fossitt (2000). Linkages with habitats listed in Annex I of the EU Habitats Directive were made where relevant. General observations were made on fauna species associated with the site.

Whilst the survey was conducted outside of the recommended season for botanical survey, principal habitats could readily be identified based on perennial plant species present and physical characters of the habitats. However, for a full botanical assessment of the sites, visits would be required within the period April to September.

In the following, a general ecological description is given for each site, along with a preliminary assessment of the conservation value of the site (the value of some sites could be upgraded following further survey in the appropriate seasons). Some comments are then given on impacts by development of the site (it is assumed that large scale construction works would be carried out over much of the site area).

The evaluation of ecological interests is made following guidance in the NRA Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009). Whilst the NRA guidelines were devised specifically for road schemes, they can be applied to general environmental impact assessment. The ecological valuation is based on the rating of sites at different geographical scales, as follows:

- International Importance
- National Importance
- County Importance
- Local Importance (higher value)
- Local Importance (lower value)

In addition, sites may be rated as having no significant ecological interests (i.e. below the level of local importance, lower value).

3.0 Southern Location Substation

3.1 Introduction

The study area is located in the eastern part of Connemara. It is within 3 kilometres of the N59 and is accessed by a third class road which ends a little further to the west. The local landscape is characterised by a series of low hills which would originally have been covered with blanket bog and heath. Whilst peatland habitats (bog and heath) are still widespread in the area, much of these have been cut and grazed to varying degrees. Agricultural land, mostly improved or semi-improved grassland, occurs in scattered pockets though becomes the dominant landuse towards the N59. A further main landuse in the area is forestry, with very extensive plantations further to the west. Small stands of native woodland and scrub, which includes oak and hazel, are a feature of the area. The wider landscape is studded with small lakes, while there are numerous rivers and streams which flow eastwards towards Ross Lake and Lough Corrib.

Three closely spaced options are identified, with additional versions for Options 1 & 2 (i.e. a total of 5 sites considered).

3.2 Option 1 site

This site is fairly evenly divided from east to west by a tributary stream of the Knockbane River (see Plate 1). The stream was observed to be generally less than 1 metre in width, with a gravel bottom. At the time of survey water clarity was good.

The southern sector of the site (between the public road and the stream) is semi-improved or improved grassland (GA1). This has a wet character in places.

The sector north of the stream can be divided into three main habitats. The western part is further improved grassland, while the eastern sector is wet grassland (GS4) dominated heavily by rushes (mostly *Juncus effusus*) (see Plate 2).

Between the wet grassland and improved grassland, there is a small area of remnant peatland habitat that is dominated by poor fen or flush vegetation (considered as 'poor fen and flush' PF2). This extends from the woodland strip just to the north of the site (co-ordinates 16929 33947 to 16891 33916) across the site to the stream where it enters as two small channels (at co-ordinates 16972 33910 & 16940 33894). (note that this area is readily visible on the 2000 and 2005 aerial images on the OSI map viewer). The area is extremely wet and supports a range of sedges and rushes (see Plate 3) and would undoubtedly be species rich during summer. The source of the wetness is not known but is likely to be a spring or seepage line.

The north and north-west boundary of the site is close to a field boundary that is composed of a strip of scrub dominated by blackthorn, hawthorn, hazel and willows.

Evaluation

The only part of this site that is of ecological interest is the poor fen/flush. This would have formerly been a component of the blanket bog landscape but is now surrounded by improved or semi-improved land. Nevertheless, it is of ecological interest though a survey in summer would be required to establish its full value. Tentatively, this feature is rated as Local Importance (higher value) on the basis of it being a semi-natural habitat with expected high biodiversity in a local context.

The stream is not assessed in the present study but it can be assumed to be of some local value and would provide a corridor for the movement of otters across the landscape.

3.3 Option 1A site

This site is fairly evenly divided between grassland and a conifer forest. The grassland is divided by a drainage channel (FW4) which flows north-east to the main stream (see Plate 4). This channel originates within the adjoining forest.

The grassland is semi-improved (GA1) but becomes wet (GS4) as one moves west towards the forest edge. The northwest sector of the grassland is more heath in character (i.e. has not been improved as the rest) and is classified as wet grassland GS4/wet heath HH3.

The conifer forest (WD4) is separated from the grassland by a deep ditch. It is a mix of sitka spruce and lodgepole pine and is at least 10 years planted.

Evaluation

Generally this site has no significant ecological interests. It is noted that the grassland fields to the south of the stream and associated drainage channel have long been improved (shown as fields on old OS large scale maps).

The planting of conifers has destroyed the former bog or heath habitat that would presumably have occurred there.

The drainage channel and the small remnant of wet grassland/wet heath have minor local value (rated Local Importance, lower value).

3.4 Option 2 site

This site was formerly dominated by upland blanket bog (PB2) and/or wet heath (HH3) (similar vegetation but wet heath on shallow peats). However, the presence of cut peat banks (now well vegetated) to the east and south-east of the site suggests that most of it had been cut in the past and can probably now be best classified as cutover bog (PB4). Some uncut blanket bog still occurs on the higher ground in the southwest of the site (adjoining the forestry plantation) and some may extend into the NE sector of the site. A rocky knoll with scrub (WS1) occurs in the central area of the site.

There has been no peat cutting on site in recent times and the entire site is well vegetated (apart from some poaching and trails by cattle in vicinity of entrance gate). Generally the vegetation on site is dominated by species characteristic of blanket bog and wet heath (see Plate 5), with ling heather (*Calluna vulgaris*), cross-leaved heath (*Erica tetralix*), deer grass (*Trichophorum cespitosum*), common bog-cotton *(Eriophorum angustifolium),* carnation sedge (*Carex panacea),* purple moor-grass (*Molinia caerulea),* bog asphodel (*Narthecium ossifragum*) and bog myrtle *(Myrica gale)* present. Devil's-bit scabious (*Succissa pratensis*) appears common throughout much of the site. Rushes are dominant in the north-west of the site (a strip c.30 m wide parallel to road), with soft rush (*Juncus effusus*) the main species. This strip, while on peat, is more characteristic of wet grassland (GS4) (see Plate 6).

The site is generally wet and supports a good bryophyte flora. Bog mosses (*Sphagnum* spp.) occur in localised patches. Lichens (*Cladonia spp.)* are occasional.

The rocky knoll is dominated by scrub (WS1), with gorse (*Ulex europaeus*), blackthorn (*Prunus spinosa),* hawthorn (*Crataegus monogyna*), holly (*Ilex aquifolium*), willow (*Salix* spp.) and some rowan (*Sorbus aucuparia*) (see Plate 7).

The extreme south-western strip extends into a conifer forest (WD4) which is separated from the bog habitat by a stone wall (BL1). Some willow scrub occurs along the margin of the forest.

A drainage channel (FW4) occurs along the north-west margin of the site (parallel to road) and flows northwards into the nearby stream.

Several snipe were flushed from the site. The site would almost certainly support the common frog and has some potential for the marsh fritillary butterfly (due to the frequency of its food plant, devil's-bit scabious).

Evaluation

Whilst this site is classified largely as cutover bog, the cutting is not recent and it is dominated by vegetation typical of blanket bog and wet heath. The small uncut remnants of upland blanket bog and/or wet heath could loosely be associated with the Annex I habitats blanket bog and wet heath. The presence of a small patch of native scrub adds diversity to the site.

Overall, this site is rated as having Local Importance (higher value) on the basis of containing semi-natural habitats with high biodiversity in a local context.

As the food plant of the marsh fritillary butterfly is widespread within the site, there is some chance that this rare butterfly could occur on site (as it is known from Connemara – see *www.**butterfly**ireland.com/MarshFritillary**Map**.htm*). If found, this would increase the conservation value of the site significantly (as marsh fritillary is listed on Annex II of the EU Habitats Directive).

3.5 Option 2A site

The option 2A site is centred on a commercial conifer plantation (WD4). This is sitka spruce planted at least 10 years. The trees were planted on former blanket bog.

This Option 2A overlaps slightly with Option 2 to include a sliver of blanket bog (PB2) to the other side of a stone wall.

At the south-western end, the site extends slightly into a further area of blanket bog. However, the bog here is poorly developed as it is on steep ground with much exposed rock and there are trails from cattle usage.

Evaluation

The former ecological interest at this site has essentially been destroyed due to the planting of conifers. The sliver of bog at the north-eastern margin (within the option 2 site) has local ecological interest while that at the south-western margin is of poor quality.

Overall, apart from the sliver of bog at the north-eastern margin, this site is not of ecological interest.

3.6 Option 3 site

The option 3 site is located on higher ground to the north-west of Option 2 site. This is essentially a large field of improved grassland (GA1) that is intensively managed (i.e. fertilised and reseeded) (see Plate 8). It is surrounded almost entirely by a strip of narrow woodland, with blackthorn, hawthorn, hazel and oak.

Evaluation

Improved grassland is not of any conservation value.

The marginal woodland which surrounds the field is of Local Importance (at least lower value).

3.7 Ranking of options

Below is a ranking of the five options described above. This lists the sites from the highest to lowest ecological value based on available information.

- Option 2
- Option 1 (ranking based largely on poor fen/flush which requires further assessment)
- Option 1a
- Option 2a
- Option 3

3.8 Potential impacts on terrestrial ecology

Below follows a summary of likely or potential/possible impacts by development for each option site. Full assessment of impacts would require full details of proposed works and surveys during spring/summer.

Option 2

- Substantial loss of habitats of local conservation value (i.e. well vegetated cutover bog, some remnant uncut blanket bog/wet heath, native scrub)
- Loss of habitat for possible fauna species of interest, especially the common frog (almost certain to occur) and marsh fritillary (some possibility of occurring)
- Potential for pollution of nearby stream during construction works (stream flows into the Ross Lake and Woods SAC)

Option 2A

- Possible loss of minor areas of blanket bog to either side of plantation (though these could probably be excluded from construction area)
- Potential for pollution of nearby streams during construction works (which flow into the Ross Lake and Woods SAC) especially as works would require extensive excavations due to slope.

Option 1

- Loss of flush habitat which is of local conservation value
- Significant disturbance to stream by re-diversion
- Potential for pollution of stream during construction works (stream flows into Ross Lake and Woods SAC)

Option 1A

- Loss of habitats of minor local conservation value (i.e. drainage channel, small area of wet grassland/wet heath)
- Potential for pollution of nearby stream during construction works (stream flows into Ross Lake and Woods SAC)

Option 3

- Loss of habitats is not an issue here though some scrub/woodland may need to be removed for an access road.
- While the site is not in immediate proximity to the local stream, drainage is ultimately to this watercourse and precautions would be required to prevent run-off

etc. during the construction phase (as stream flows into the Ross Lake and Woods SAC)

4.0 Northern Location

The general area for this proposed location is on blanket bog/wet heath just north of a mountain stream and a west of a gravel road. The bog is relatively intact and is classified as upland blanket bog (PB2) and/or wet heath (HH3). The bog is dominated by such species as ling heather, deergrass, purple moorgrass, bog cotton (both *Eriophorum angustifolium* and *E. vaginatum*) and carnation sedge. Bog mosses and other bryophytes are well distributed.

The small stream flows to Lough Parkyflaherty, which is within the Ross Lake and Woods cSAC.

Evaluation

The habitats at this site location are dominated by blanket bog and wet heath. Both appear relatively intact and have linkages with the EU Habitats Directive Annex I habitats Blanket bog and Wet Heath.

This site is part of a larger peatland expanse that is likely to be at least of Local Importance, higher value or possibly of County Importance.

4.1 Potential impacts on terrestrial ecology

Development of a site in this area would likely require the removal of a substantial area of peat bog that supports blanket bog and/or wet heath vegetation (both listed on Annex I of EU Habitats Directive). Depending on the exact location and the quality of habitats at that location etc., this impact would certainly be of some significance.

A potential significant impact is the proximity of the site to a local stream which flows to Lough Parkyflaherty, which is within the Ross Lake and Woods cSAC. Strict measures would be required to ensure that water quality of the stream is maintained during both the construction and operation phases.

5.0 Middle Location

The general area for this proposed location is on blanket bog/wet heath just south of a gravel road. The bog is relatively intact (though cutting has occurred in wider area) and is classified as upland blanket bog (PB2) and/or wet heath (HH3). The bog is dominated by such species as ling heather, deergrass, purple moorgrass, bog cotton (both *Eriophorum angustifolium* and *E. vaginatum*) and carnation sedge. Bog mosses and other bryophytes are well distributed.

Evaluation

The habitats at this site location are dominated by blanket bog and wet heath. Both appear relatively intact and have linkages with the EU Habitats Directive Annex I habitats Blanket bog and Wet Heath.

This site is part of a larger peatland expanse that is likely to be at least of Local Importance, higher value or possibly of County Importance.

5.1 Potential impacts on terrestrial ecology

Development of a site in this area would likely require the removal of a substantial area of peat bog that supports blanket bog and/or wet heath vegetation (both listed on Annex I of EU Habitats Directive). Depending on the exact location and the quality of habitats at that location etc., this impact would certainly be of some significance.

While the site is not located in the immediate vicinity of any watercourse, measures would be required to ensure that water quality of local watercourses is maintained during both the construction and operation phases.

6.0 Conclusions

The north and middle substation locations have substantial ecological interests by way of the presence of relatively intact blanket bog and wet heath habitats (both listed on Annex I of the EU Habitats Directive). Development at these locations could have substantial adverse impacts on these important habitats. Further, the northern location is close to an upland stream which flows into the Ross Lake and Woods cSAC – strict measures would be required to maintain water quality in this stream.

Five separate options are considered for the southern substation location. Option 2 is dominated by bog habitats and has substantial local ecological interests. There is also some possibility that the rare marsh fritillary butterfly (Annex II listed) could occur here as its foodplant is widespread on the site. Option 1 is of little interest other than the presence of a wet area of poor fen/flush to the north of the stream. This is of local ecological interest though it would require a summer survey to assess its full value. The option 2A and option 1A locations are of relatively low ecological interest and development at either of these sites is unlikely to result in any significant adverse ecological impacts (though attention to the maintenance of water quality in the local stream is required). Option 3 is the site of least ecological interest and no constraints on development here would be anticipated (though again attention is required regarding issue of run-off to local stream).

7.0 References

Fossitt, J. (2000) A Guide to Habitats in Ireland. The Heritage Council.

National Roads Authority [2004] *Guidelines for Assessment of Ecological Impacts of National Road Schemes.* NRA, Dublin.

Department of Arts, Heritage & the Gaeltacht (2011) Lists and Maps of Protected Sites in Co Galway - www.npws.ie

APPENDIX 1

PHOTOGRAPHS

Plate 1. South Substation location, Option 1 – view of tributary channel of the Knockbane River, looking eastwards over site.

Plate 2. South Substation location, Option 1 - view looking SW over site. Wet grassland and improved grassland are the principal habitats.

Plate 3. South Substation location, Option 1 – view of flush vegetation.

Plate 4. South Substation location, Option 1A – view of drainage channel, looking westwards towards conifer forest.

Plate 5. South Substation location, Option 2 – general view of bog/heath vegetation looking NW across site.

Plate 6. South Substation location, Option 2 – the section of the site alongside the road is dominated by rushes and is classified as wet grassland on peat.

Plate 7. South Substation location, Option 2 – view of area of scrub on rocky knoll within site.

Plate 8. South Substation location, Option 3 – view of improved grassland which dominates the site.

Plate 9. North Substation location – view of blanket bog which dominates the area. A small stream occurs in this area (left hand side of photo).

Plate 10. Middle Substation location – view of blanket bog which dominates the area.

Plate 1

Plate 2

Plate 3

Plate 4

Plate 5

Plate 6

Plate 7

Plate 8

Plate 9

Plate 10