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Northern Ireland Electricity

Tandragee - Louth

275kV Feasibility Study

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Northern Ireland Electricity
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EXECUTIVE SUMMARY

A joint steering committee comprising of both Northern Ireland Electricity (NIE) and ESB National Grid (ESB) requested that a feasibility study of potential 275kV Interconnections be carried out in February 2003. The inaugral report assessed the feasibility of a potential new 275kV line between Drumkee 275kV station and Arva 110 kV station.

However, following further joint NIE/ESBNG planning studies it was decided to investigate other further potential routes prior to making a definitive decision:-

(a) An additional Tandragee - Louth 275kV circuit with system security measures in Tandragee and Louth Stations.

(b) A new 275kV circuit from Drumkee 275kV Station to a new 275/220kV station looped into the Flagford – Louth 220kV line in the vicinity of Kingscourt.

This report focuses on (a) above from Tandragee 275kV station to the border between Northern Ireland and the Republic of Ireland. There is also a companion report produced by ESB studying the remainder of the route.

The scope of the project which was agreed at the project outset led to the production of desktop studies which detailed all physical and environmental constraints that helped to develop suitable route corridors. Typical constraints included Ecological sites & Special Designated Protected areas, Archaeological & Heritage Sites, Scenic & Tourist Roads, along with all developments & Infrastructure.

Upon completion of constraints maps, natural route corridors began to emerge. Potential route corridors were limited on the Northern side of the border mainly due to ongoing ribbon and rural development. The potential

route corridors were developed during the desktop survey. Limited site survey was carried out

On site investigation was limited and consisted of basic ‘drive through’ surveys. The potential route corridors were selected based on achieving a balance between Environmental, Technical and Economic criteria. Road crossings were inspected to assess if adequate clearances exist at present. Many road crossings could accommodate a route corridor of at least 100 - 200m, however routing possibilities in many areas will be very limited. Some areas are considered to be under particular threat from development.

This report considers the routes investigated to be extremely difficult to develop due to landscape concerns through an extensive area of AONB. There would also be one crossings of the existing Tandragee - Louth 275kV double circuit line.

It is noted that there could be system security concerns due to the following risks:-

(a) A major event at either Tandragee or Louth could render all three 275kV interconnection circuits inoperable, possibly for a considerable length of time.

(b) A conductor failure at any of the crossings of the Tandragee - Louth 275kV circuits could also render all three 275kV interconnection circuits inoperable.

It is recommended that the security issues are studied separately.

CONTENTS

1.0 INTRODUCTION

Following discussions involving NIE, ESBNG and ESBI the following Scope of Work was agreed.

The copy of work is defined to include:-

- Constraints map
- Desktop study
- Limited field study
- Cost estimate for above scope of works, including NIE and ESBI cost estimates both separate and combined to give total project cost. Cost estimates in euro and to be in a similar format to those provided for the recent Arva-Drumkee feasibility study.
- Outline programmes for 1st phase to planning.
- Report to be in a similar format to that provided for the recent Arva-Drumkee feasibility study.

Report Objective

- The objective of the report is to assess the feasibility of obtaining a 275 kV overhead line route between: - Tandragee and Louth.
- Overhead line routes will be selected based on achieving a fine balance between Environmental, Engineering and Economic criteria.

ESBI are engaged to study the optimum southern route to the Border and NIE to examine the Northern study area to the Border. Suitable border crossing locations are to be mutually agreed when both parties meet to monitor progress.

2.0 STUDY AREA

2.1 Introduction

The first task associated with this project was defining the study area.

The study area is defined in the east by the existing Tandragee – Louth 275kV line running from North to South.

An option would be the creation of an additional Tandragee - Louth 275kV circuit.

2.2 Makeup of study area

The study area is bounded by the existing Tandragee to Louth 275kV line. It encompasses approximately 300,000 hectares within Armagh.

The typical landscape throughout this study will feature a drumlin landscape of varying density.

The land is of varying agricultural quality with pasture being the main use. There are areas of peat, mixed quality land and marsh scattered throughout the extent of the study area but for the most part will be easily overcome.

Hedgerows are well established, although prevalence towards cutting the hedges throughout Armagh to allow for easier viewing into fields and R.E.P.S (Rural Environmental Protection Scheme) etc. is evident.

The study area includes, existing infrastructure including major roads in Northern Ireland numerous regional arterial routes and secondary roads. It

also includes overhead transmission lines such as the Tandragee - Louth 275kV as well as numerous lower voltage lines. Major rivers such as the Cusher River flow through the study area.

2.3 Conclusion

It was concluded that the study area of 300,000 hectares would be sufficient in size to accommodate the potential overhead line route options from the Tandragee area to the border.

3.0 CONSTRAINTS MAP

3.1 Introduction

With the limits of the study area defined, constraints need to be added so as to avoid routing the proposed line through problematic and difficult terrain. The capturing of constraints on to a single map is a very difficult task given the magnitude of this project. Some constraints were obvious while others were more difficult to quantify. The associated sections of this chapter give a more detailed account of the constraints.

Colored 1:50,000 Ordnance Survey maps were used for the production of the constraints map.

The constraints included;

- Landscape character.
- Land zoning, towns and rural dwellings
- Electrical Infrastructure
- General Infrastructure
- Ecological Sites and Special Designated protected areas
- Archaeological & Heritage sites
- Geology / Geotechnical
- Quarries, Mines and Airstrips
- Scenic and Tourist roads

3.2 Landscape character

The Landscape character is perhaps the single most important area when routing a transmission line. All natural parks and areas of high scenic value were marked on the constraints map. Open expanses of water and marshland were avoided. The overhead line should not go too close to the shores of a river or significant natural lake. Towers should be positioned a minimum of 15 meters away from navigable waterways. Moderately open valleys with woods were selected where possible, especially where the apparent height of structures might be reduced.

The line routes should follow natural lines created by topographic change, geology, and vegetation that will help to minimise the visual impact. Where possible, the overhead line route was located on the middle slopes rather than siting them along the dominant axis and at the base of small valleys. It is preferable, where possible, to avoid breaking the skyline.

Where possible, towers should be placed near to the most vertical elements in the landscape, such as tree group or hill slopes. Where the landscape has a complex character, a great number of towers can be visually absorbed.

Landscape Character Areas were interpreted by utilizing the contour lines. The landscape character of the study area is mainly that of a drumlin nature. The ideal line of this corridor would follow as much as possible the valleys between these drumlins. Areas that posed problems, e.g. flat areas around rivers, would indicate flood plains and silt deposits. The proposed line would be steered away from these areas, as they would entail complex foundations and possible objections at planning stage. Dense contours would indicate steep hills and awkward future siting of mast positions.

In Northern Ireland, there are numerous small loughs, and areas of marshy ground; these were avoided on both line routes. These tend to be limited to the east and west of the search area although the River Cusher runs down the center of the search area.

Forest parks or areas of public Amenity were marked on the map as areas to be avoided. This includes Slieve Gullion Forest Park, and Gosford Forest Park Co. Armagh. The ring of Gullion and the surrounding area is designated as an AONB.

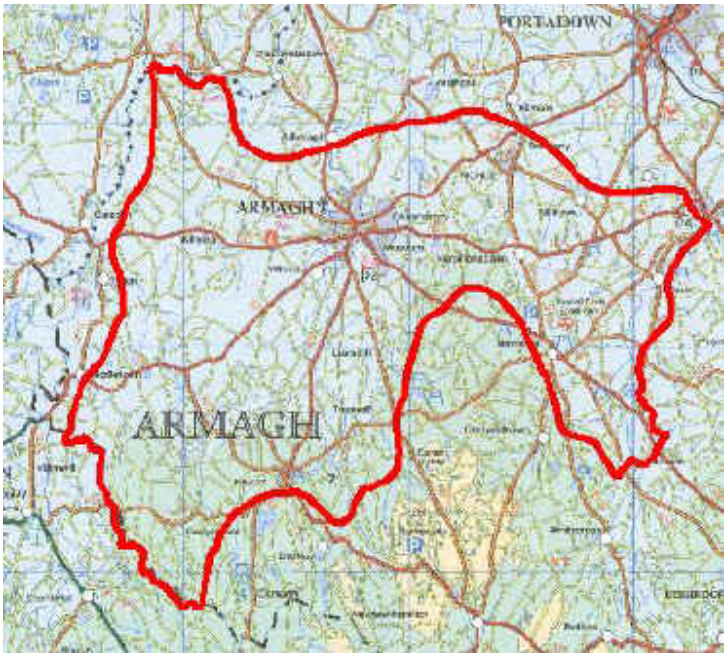
3.2.1 Landscape Character Areas in Northern Ireland

The study area falls into nine of the landscape character areas (LCA) of Northern Ireland, these are:-

LCA 66 - Armagh Drumlins
LCA 67 - Armagh / Banbridge Hills
LCA 68 - Carrigatuke Hills
LCA 69 - Newry Basin
LCA 70 - Crossmaglen Drumlins and Loughs
LCA 71 - Ring of Gullion

Details of the areas are set out below along with key characteristics, a landscape description, landscape conditions and sensitivity to change along with landscape management and principles for accommodating new development. This provides a framework for assessing the proposed development within the landscape types.

3.2.1 LCA 66; Armagh Drumlins



3.2.1.1 Key Characteristics

- Extensive area of rolling drumlins overlooked by the Carrigatuke Hills to the south and crossed by numerous, small winding river valleys.
- Improved pasture separated by bushy hedgerows and tree belts.
- Numerous scattered dwellings and farms connected by network of winding, hedge-lined roads.
- Wooded historic estate and park landscapes.
- Woodlands are almost all long established broadleaved or mixed and most is associated with present or former estates.
- Open views across landscape from higher points; intimate enclosed landscapes between hills.

- Significant archaeological sites.

3.2.1.2 Landscape Description

Land use is dominated by improved pastures, which are separated by overgrown hedgerows and tree belts. Mature hedgerow and ash trees are common.

There are a number of wooded historic estates, which are associated with stone walls and stands of mature trees, which includes Cornacrew, Gosford Park, Tandragee Castle and Clare Glen in the east. Most of these demesne woodlands were present at the time of the first 6" OS mapping in the 1830s and are at least ‘long-established’ woodlands and parts may be ‘ancient’. There has been sufficient time for species to colonize that might not be found in more recent woodlands, adding to the biodiversity of the woodlands and the LCA. Unfortunately, heavy grazing has reduced the species diversity of some of these woodlands. Similarly, at Elm Park the estate woodland with mature ash, beech, birch and occasional conifers, and an understorey of cherry laurel, hawthorn, and young ash and beech, passes into grazed areas of birch scrub with some holly, but the area is very open with a grassy ground flora. In addition to the planted woods, this inclusion into the estates of woods with a semi-natural origin is quite common, for example along stream courses or on former bog or fen., old estate woodland has mature conifers mixed with beech, horse chestnut, ash, and sycamore with an understorey mainly of hazel, holly and cherry laurel. However, in the southeast of the estate where beech occurs on the ridge, willow, blackthorn and alder dominate alongside the river.

Tassagh Wood has the appearance of semi-natural woodland, but the presence of beech as well as occasional larch and Scots pine in the canopy, which also includes sycamore, oak and ash, indicates that it has either a planted history or has been ‘landscaped’. The herb layer is often dominated

by wood rush. However, the woodland is quite diverse with some areas where oak, ash and sycamore predominate and there is a more varied herb layer with bluebell, lesser celandine and wood anemone.

Clare Glen is somewhat similar in that there are sections that have clearly been planted or ‘landscaped’ and has rhododendron and cherry laurel in the understorey. Elsewhere there are oak-hazel, ash-hazel and mixed broadleaved sections that have a rich herb layer and a diversity of mosses. The valley floor also has alder woodland with an herb layer that includes meadowsweet, creeping buttercup, king-cup and some reed canary grass.

Whereas beech is often the dominant species in the demesne woodlands and frequently has saplings, along with young growth of ash and sycamore, oak is also dominant in some locations together with abundant Scots pine, as at Hockley Lodge. Here another problem of estate woods is exemplified; many of the trees are over-mature and beginning to die and there is little sign of regeneration.

Gosford Park is the exception amongst the demesnes because much of the park and woodland has been replanted since it came into the Forest Service. It is now a complex of many small compartments in which Norway spruce and larches dominate although the trees are inter-planted with oak, sycamore and beech; there are also small compartments that are either solely conifers or broadleaves. It has interest for biodiversity in its arboretum and in the rare breeds of farm animals.

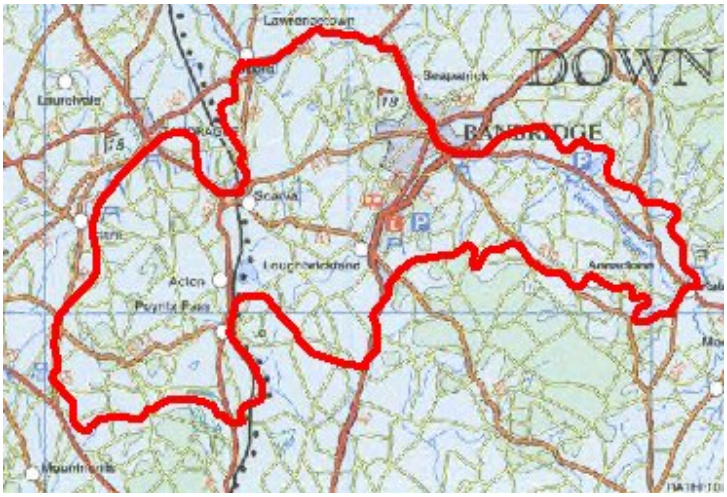
There are numerous scattered dwellings and farms, connected by a network of winding, hedged roads. Large farm barns and ruined stone cottages are common features. The city of Armagh, with its tall spires, is a focus for local roads and views. The area also includes smaller settlements such as Keady and Richhill. New development is prominent on ridgelines around the outskirts of Armagh. Archaeological features such as Navan Fort, on the outskirts of

Armagh, are of national significance. There are open views across the landscape from higher points, whist the landscapes between the hills are intimate and enclosed.

3.2.1.3 Landscape Condition & Sensitivity to Change

The most sensitive areas of this landscape are the settings of the numerous important archaeological sites. Local skylines and drumlin summits are also relatively sensitive, particularly when they are the sites of ancient raths. River and stream valleys, loughs and mosses are sensitive to changes in water quality and water table, the latter being easily affected by development

3.2.2 LCA 67 - Armagh / Banbridge Hills



3.2.2.1 Key Characteristics

- Rolling hills and ridges, with variations in scale; broad shallow slopes to the west and rocky outcrops to the south east, on the margins of Knockiveagh.
- Varied patchwork of fields, woodlands, hedgerow trees and patches of regenerating scrub, with a diverse texture and pattern.
- Woodlands largely in demesnes and former mill properties along the Bann.

- Valleys have flat pastures with drainage ditches, areas of damp woodland and patches of bog.
- Large farmsteads and their stone outbuildings are prominent landscape elements.
- Relatively open landscape, with long views from local ridges.
- Traditional stone gateposts.

3.2.2.2 Landscape Description

The LCA comprises a varied farmland landscape, with a diverse pattern of fields, woodlands and patches of scrub. There are areas of both arable and pasture land but pasture predominates overall. Arable land is generally concentrated on the broad, upper slopes of ridges. To the south, the fields become larger and more open in character as the landform flattens out at the base of the slopes. Here, there is extensive sheep grazing and stud farming. The broader valleys have flatter pastures subdivided by drainage ditches, with patches of moss and regenerating birch-alder woodland.

Woodlands account for 2% of the land cover of the LCA, with almost all in broadleaved or mixed woodland. Much is in large estates including Scarva House, Gilford Castle and various houses and former mill grounds between Gilford and Banbridge and upstream of Banbridge. Beech and oak are common constituents of these woodlands, with sycamore and ash; alder is frequent alongside the rivers. In almost all of these estate woodlands, occasional conifers were inter-planted – often Scots pine and larch – and also specimen trees nearer the house. Some estate woodland may have been planted in existing woodland and scrub; patches of hazel, rowan and ash can be found within the woods and these tend to have a more diverse ground flora. Elsewhere, estate woodlands are grazed and the ground flora is poor.

Even outside of the present estates, woodlands in valleys have been ‘landscaped’ by the addition of beech and occasional conifers. A particular example is Clare Glen, which displays a variety of semi-natural woodland

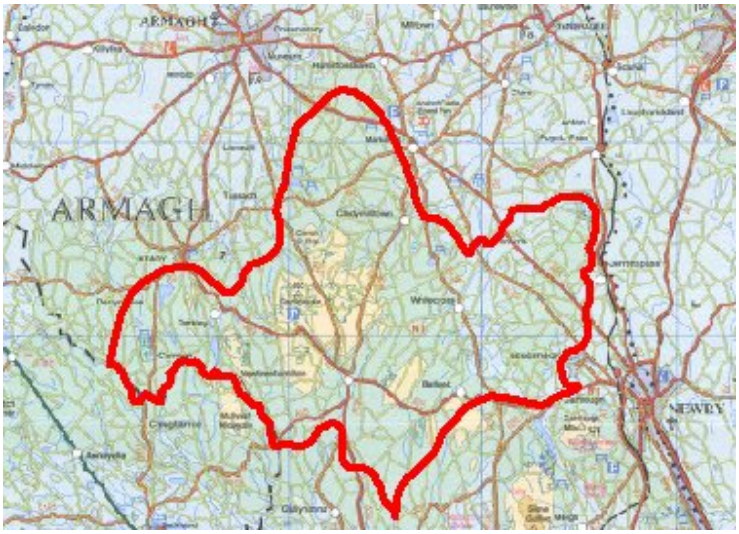
types. Mixed woodland dominates with ash, sessile oak and wych elm (many dead) all widespread, with a number of alien species notably beech and sycamore. Shrub layer species include hazel, hawthorn, blackthorn, holly and various willows, but alien species are widespread, particularly rhododendron and laurel. Wetter areas support alder. The ground flora has extensive tracts of bluebell, lesser celandine, meadowsweet and wood speedwell. Although substantially affected by alien species, the area does hold good examples of typical native woodland communities, including oak-hazel and ash-hazel woodlands.

Substantial farmsteads and outbuildings are often prominent on the upper slopes. Many buildings are associated with shelter stands of mixed broadleaf trees but elsewhere there are typically few hedgerow trees. Many of the buildings are of stone. There are many groups of residential dwellings scattered along rural roads in this area, as well as larger farmhouses and estates. The main settlement is Banbridge, which is situated on the A1.

3.2.2.3 Landscape Condition & Sensitivity to Change

In general, the landscape is in good condition, particularly on the upper slopes but there are patches of gorse and brambles in the poorly drained areas towards the valley floor. Hedgerow loss is evident as a result of agricultural intensification and field enlargement. The ridges are the most sensitive areas of the landscape and changes such as new built development; new cropping patterns and the amalgamation of fields would be prominent. Scattered residential development along rural roads is prominent where roads follow local ridgelines. It is detrimental to landscape character in some areas close to Banbridge and the A1.

3.2.3 LCA 68 - Carrigatuke Hills



3.2.3.1 Key Characteristics

- Large scale, smooth rolling hills and deep wooded valleys.
- Extensive conifer plantations and residual peaty moorland create a series of geometric blocks on the highest and wildest hills of the south-centre and west.
- Some planted, landscaped, deep wooded valleys.
- Many mature trees, tree-belts, and small woodlands on lower hills.
- Numerous winding roads link large houses, farms and buildings amongst rolling hills.
- Long panoramic views over the surrounding lowlands.

3.2.3.2 Landscape Description

Large conifer plantations create a series of straight edged blocks on the highest hills, where they stand out clearly against open moorland. On the lower rolling hills there are many small woodlands, mature trees and tree belts resulting in a landscape of well-treed character.

Woodlands account for about 5% of the land cover of the LCA, the vast majority of which is coniferous forest located in the uplands of the south-centre and west. These forests have been planted predominantly on peat but extend onto peaty and gleyed soils. Sitka spruce is the dominant species with Norway spruce, lodgepole pine and Japanese larch also common.

Three forests have been centered on former estates, Drumbanagher, Carnagh and Ballymoyer Forests. Whereas conifers are dominant in these, at Drumbanagher there are intermixed areas of conifers with oak and sycamore, and in the southern tip of the forest a section of beech and oak. At Carnagh Forest there is a small area of estate woodland located around the hotel consisting of beech, ash and oak. The ground flora is limited because of colonisation by rhododendron and salmonberry, relics from the estate sporting interests. In addition, adjacent to the lakes there is an extensive natural mature birch woodland with willow scrub on the outermost edges. A few beech and oak trees are also present. Beneath the birch canopy the ground flora is purple moor grass dominated.

Ballymoyer Forest is part of a former demesne; this wooded glen was one of the first properties to be donated to the National Trust. Today, Norway spruce and European larch dominate. Conifers are mixed with beech in the southern leg of forest, and sycamore and oak are located in pockets in the section of forest alongside the main road. Maytone House and Glen Anne provide another example of a wooded glen, planted in the nineteenth century, principally in mixed conifers and broadleaves. Wooded areas in other estates in the LCA have either been removed or have become very degraded, but

there are several large gardens and small parks in the LCA, some with a diversity of tree species.

Much of the semi-natural woodland is sparse, degraded and in small patches on rocky hillsides, for example Ballintate Wood has oak and ash in an area of blackthorn and gorse scrub, but it is heavily grazed. The only other widespread woodland type is wet woodland, generally carr woodland of willow, sometimes with alder, that is colonising fen. This is found not only on the more extensive fens, but also on many of the small fen patches in hollows within and between rocky ridges, especially in the south of the LCA.
Small conifer plantations, less than 1ha and generally of Sitka spruce and larch, are common throughout the LCA. Shelterbelts around active and abandoned farms are also very common; sycamore, ash and Sitka spruce are the most frequent species.

Bushy hedgerows bound fields, giving a locally enclosed landscape and creating a strong field pattern, which enhances the distinctive landform of rounded hills.

Blanket bog is confined to uplands in the south-centre and west of the LCA; east of Tullyogallaghan the landscape changes as the rocky country associated with the northern edge of the ring-dyke is reached. There the rocky slopes have peaty soils with heather, gorse and bracken rather than peat vegetation; lowland peat is found in smaller patches in valleys between the hills.

Much of the blanket peatland has been forested and that unplanted has largely been cutover. Former cutover bogs have also been used as refuse tips. To the east of Newtownhamilton there is some intact bog at Cold Brae Bog and at Carrickacullion, set in extensive cutover blanket bog. These have plant species typical of intact bog, including heather, deer and cotton sedges and the bog mosses.

Numerous winding roads, houses and farms, which are often at the end of long tracks, link large houses, farms and buildings amongst rolling hills. There are no small settlements and Newtownhamilton is the local market town. Archaeological features are associated with some of the hilltops, such Mullyash Mountain. There are extensive and breathtaking views from the hilltops particularly Carrigatuke, over the surrounding lowlands.

3.2.3.3 Landscape Condition & Sensitivity to Change

The landscape condition is good with a strong hedgerow structure, which remains consistent throughout the landscape. The tops of hills and upper slopes are particularly sensitive owing to their visibility. The wetlands and areas of blanket bog on the upland plateau are important.

3.2.4 LCA 69 - Newry Basin

3.2.4.1 Key Characteristics

- Large-scale drumlin landscape drained by tributaries of the Newry River.
- Rolling, improved pastures in good condition, becoming increasingly rough on the fringes of the Mourne foothills.
- Well-trimmed, low gorse hedges and tree belts separate fields, creating an intact and unified landscape.
- Scattered individual bungalows and large farms, with many new bungalows located on drumlin tops.
- Network of narrow hedged and hedge-banked roads within the drumlins.
- Occasional panoramic views of the Mourne Mountains.

3.2.4.2 Landscape Description

The Newry Basin is a large scale rolling drumlin landscape situated between the Ring of Gullion and the Mourne Mountains. The area is drained by tributaries of the Newry River, which flow in attractive river valleys. The drumlins are orientated north-northwest to south-southeast. To the southeast, broader ridges separated by narrow, flat-bottomed valleys with ribbon loughs and bogs such as Derryleckagh Lake and Greenan Lough displace the drumlins. To the south of Newry, the Newry River flows in a dramatic, steep sided narrow valley. The Newry Basin is a very diverse area, with a rich heritage of historic landscapes and archaeological sites. The rolling fields have a neat and artificially green appearance, although pastures become increasingly marginal with rocky knolls, bracken and gorse hedgerows towards the foothills of the Mourne Mountains. Elsewhere, well-trimmed low hedges and tree belts separate fields, creating an intact and unified landscape pattern. Small woodlands, such as Derryleckagh Wood, are often found on valley sides.

Woodlands cover just under 3% of the LCA with a large proportion in estates including Narrow Water, Dromantine House and Rostrevor House. Beech is often the dominant tree but oak, sycamore and ash are common. In some of

the wooded estates conifers may be intermixed, as at Dromantine, but even where the planting is essentially broadleaf, exotic conifers occur and include monkey-puzzle, giant redwood and coastal redwood. Denser woodlands can have a heavy cover of rhododendron and cherry laurel that reduces the plant diversity of understorey and ground layers. In other parts of the parklands, as at Narrow Water, heavy grazing has resulted in a lack of understorey or ground flora species. Several of the woodlands show little sign of regeneration with many mature and post-mature trees. In contrast, recent planting of larch, Austrian pine and birch at Warrenpoint Golf Course is out of keeping with the mature oaks that dominate the former parkland.

In this LCA exotic species of trees, particularly conifers, and small arboreta are common to large houses, as for example at Glenview, Dromantine House and notably at Rostrevor House. Along the lower Moygannon valley and the coast between Warrenpoint and Rostrevor, there are a number of large houses with impressive stands of trees that include both common broadleaves (particularly beech, lime, oak and sycamore), evergreen oaks from the Mediterranean and many conifer species. However, several of these larger houses and grounds are under threat from expansion and urban in-fill, particularly along the coast.

Upland mixed ashwood is found at Fathom where ash comprises over half of the canopy trees, with beech, sycamore and wych elm also present. The understorey is of hazel, hawthorn and some willow. Nearby is mixed woodland of beech, ash, Scots pine, Norway spruce, European larch, wych elm and oak.

Carrickbawn Wood is a considerable area of oak/birch/beech woodland adjacent to the coniferous plantations of Ballymoney Wood. It has a poor understorey, including rhododendron that has extended out from the adjacent Rostrevor House, and a considerable amount of recent piecemeal felling. Nevertheless, saplings of the canopy species are common. This woodland

has either a planted origin or has been ‘landscaped’ by the addition of beech and oak; this has almost certainly occurred in the lower Moygannon valley where hazel woodland on the steep stream-side slopes also contains beech and oaks. A relatively rare, for this LCA, patch of almost pure hazel coppice is alongside. One of the best examples of base-rich woodland in Co. Down is Derryleckagh Wood, occupying steep slopes on the west of Derryleckagh Bog. Hazel is dominant with occasional oaks; there is a rich ground flora and the parasitic toothwort has also been recorded. A rich moss and lichen community is found on rock faces. Greenan Wood occupies a similar site; it has some oak with birch and hazel. The understorey is comprised of bramble, honeysuckle and bracken and there is a good moss cover on rocks. However, the site is heavily grazed.

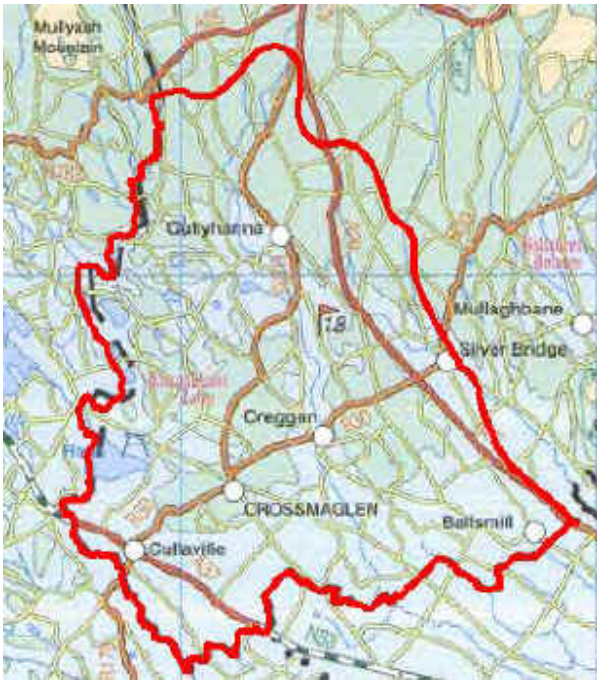
Wet woodland is scattered throughout the LCA and usually associated with small pockets of fen; willow and alder dominate. Some of these woodlands are under threat from infill of wetland for urban and industrial expansion, particularly in the south of the LCA.

There are occasional panoramic views of the Mourne Mountains from the tops of the drumlins. The landscape seems open and exposed on ridge-tops and enclosed and sheltered within the valleys. There are scattered individual bungalows and large farms throughout the area and the many new immaculate dwellings have a neat suburban feel. New bungalows and derelict stone cottages are often sited on drumlin tops, particularly towards Slieve Roosley. There is a network of small hedged and hedge banked winding roads connecting scattered dwellings. The town of Newry is at the head of the Newry River, which leads to Carlingford Lough, the port of Warrenpoint, and the small town of Rostrevor is located in sheltered bays along the coast. Narrow Water Castle is an important historic landmark at the entrance to the Newry River.

3.2.4.3 Landscape Condition & Sensitivity to Change

The landscape is generally in good condition, especially in the drumlin farmland landscape to the north. It becomes slightly more degraded on the fringes of Newry, with field boundaries falling into disrepair and scattered ribbon development. Pylons, major transport corridors and insensitive development associated with the town, serves to detract from the overall high quality of the landscape. The most sensitive landscapes are the attractive river valleys, loughs and marshes, such as the Derryleckagh Bog ASSI and the many archaeological sites (raths, mottes, standing stones), which are concentrated on the fringes of the area.

3.2.5 LCA 70 - Crossmaglen Drumlins and Loughs



3.2.5.1 Key Characteristics

- Rolling drumlins with broad areas of wetland and bog in inter-drumlin hollows; small rounded loughs are fringed by moss.

- Loughs and fens in broad inter-drumlin hollows and flat-floored valleys.
- Strong field patterns created by hedgerows give the landscape a neat, well-structured appearance.
- Woodlands very sparse and confined to small patches.
- Attractive winding rivers weave inconspicuous courses between drumlins; stone bridges are a feature.
- Roller-coaster roads wind across the drumlins, keeping to the higher land.
- Scattered settlement pattern with many derelict stone cottages.
- Ring of Gullion provides a striking backdrop to an isolated and deeply rural landscape.

3.2.5.2 Landscape Description

The landscape can be summarised as one of rolling drumlins with broad areas of wetland and bog in inter-drumlin hollows; small rounded loughs are fringed by moss.

Woodland is scarce in the LCA, accounting for less than 1% of the land cover, and occurs as small patches. There are no extensive coniferous forests, although there has been recent planting along the edge of the cut-over bog at Sheetrim House. There are also several small plantations (c. 0.5 ha); some are recent and often of Sitka spruce, but others are part of nineteenth century 'landscaping', associated with mounds and predominantly of Scots pine and larch. Occasional broadleaf plantations occur, as along the valley near Silverbridge where beech is dominant and accompanied by ash, oak, and elm together with hazel, birch and rowan. Such plantations may be associated with parklands although several of these have been lost and of those that remain, many are rundown; felling, pollarding and piece-meal coppicing are

evident. An exception is Creggan Poet's Glen, centered on the Rectory and walled garden that has recently undergone restoration.

Semi-natural woodland is mainly of two types, wet woodland and hazel woods. Wet woodland is common in areas of fen and is predominantly of willow and alder carr; examples include Cappagh Lough and St Peter's Lough. Hazel woodland occurs as isolated patches on hillsides or along valley sides; examples include those at the Dorsy Enclosure. They are often almost completely hazel, but there are occasional ash, sycamore, holly and rowan.

Fields are predominantly pasture and are of a regular shape and size. Dense hedgerows with numerous hedgerow trees, which create strong field patterns, enclose them. Some pastures are abandoned and scrubby. Rivers, including Creggan River, pass inconspicuously between drumlins and are crossed by attractive stone bridges. Roller-coaster roads wind across the drumlins making orientation difficult. They connect roadside houses, which are traditionally situated at the ends of access tracks. Scattered derelict stone cottages and wooden bungalows are prominent on drumlin summits and there is piecemeal new development. The principal settlement is Crossmaglen, at the junction of several rural roads. Archaeological features, such as the Drumhill standing stone,are important.

The Ring of Gullion creates a strong backdrop, with hilltop towers overlooking the drumlins. Isolation of the area by the uplands has given it a remote and deeply rural character.

3.2.5.3 Landscape Condition & Sensitivity to Change

The hedgerow pattern remains intact on the drumlins but there are some areas where the farmland has become degraded, with derelict and partly abandoned fields. There are also numerous abandoned stone cottages and the principal pressure for change is neglect. The landscape is overlooked by the western hills of the Ring of Gullion, so development could be visible,

although the rolling landform and well structured field pattern is relatively robust and may offer some potential for screening. The inter drumlin wetlands and loughs are the most sensitive areas and are of both ecological and scenic importance.

3.2.6 LCA 71 - Ring of Gullion

3.2.6.1 Key Characteristics

- Ring of volcanic hills with a knobbly, uneven skyline and many rocky outcrops.
- The central volcanic plug of Slieve Gullion forms a distinctive landmark within the enclosed, broad circular basin.

- Open moorland on hilltops with pasture on the lower land, bordered by gorse hedgerows and derelict stonewalls on the upper slopes. ‘Ladder farms’ form distinctive patterns on some hill slopes.
- Slieve Gullion is one of the largest heathlands in Northern Ireland.
- Extensive coniferous forestry plantations on the hillsides.
- Remote, enclosed landscape with a distinctive sense of place and rich association with myths and legends.
- Radio masts and hilltop towers on skylines, scattered development on lower slopes with many abandoned farmsteads and barns.

3.2.6.2 Landscape Description

The volcanic hills comprising the Ring of Gullion create a knobbly, uneven skyline with many rocky outcrops. Between the steep hills are river valleys and extensive areas of bog. Cam Lough is a linear lough within a valley to the north of Slieve Gullion. The vegetation is predominantly upland grass, heather and moorland on the hilltops, with pasture on the lower land, bordered by stone walls and gorse hedgerows. Field boundaries form striking patterns on some hill sides, particularly in areas where there are long ‘ladder farms’. Commercial forestry plantations occur in large blocks on the hillsides.

Woodlands account for approximately 6% of the land cover of the LCA; the majority of this is in three state forests that are predominantly coniferous. In all three – Camlough, Fathom and Slieve Gullion - Sitka spruce, Lodgepole pine and Japanese larch are the most common species, but all have some areas of broadleaves. Outside of the state forests, coniferous trees occur in small patches and whereas some are recent, many have their origins in nineteenth century landscaping – particularly of circular planting on artificial mounds and knolls; these are predominantly Scots pine and larch.
Broadleaved semi-natural woodland is, apart from the upper slopes of Slieve Gullion, scattered throughout the LCA. However, almost all the sites are small.

In the southern part of the area, these extend across the summits and

diminish the apparent scale of the landform. The lower slopes are dotted with a mixture of stone smallholdings and modern pebbledash bungalows. The majority of the new development is sited in an ad-hoc fashion, often at a distance from the roads. Forkill and Meigh are two of the main settlements within the area. The whole area has an enclosed, isolated character, with derelict stonewalls on the upper slopes and abandoned stone farmsteads and barns. It has long been an important 'gateway' landscape at the border between the Republic and Northern Ireland. The area is extremely rich in archaeological and historical features, including a variety of cairns, castles and cashels. Radio masts and towers dominate the skylines.

3.2.6.3 Landscape Condition & Sensitivity to Change

The Ring of Gullion has a special visual character resulting from its unique physical structure and the way in which the land has been farmed and settled through thousands of years of occupation. Ridge-tops, skylines and the higher open hill slopes are the most sensitive components of the landscape as they are so prominent but all development is highly visible in the long views into the central basin from the roads, which cross the distinctive enclosing uplands. The whole area is extremely sensitive to change. The condition of some lower slopes has been degraded by extensive piecemeal development, for example near Meigh. Walls are often in poor condition and scrub and rushes have infested some pastures. The positioning of masts/towers on hilltops has eroded their wild, open character.

3.3 Landzoning, Towns and Rural Dwellings

'Green belts' surround the provincial towns of Newry City. Because of their extent, routing to avoid these areas would prove unfeasible from an economic point of view, so routing towards the outskirts of these belts is preferable at this stage, see Appendix Map No.2 North-/South Interconnector – Physical Constraints.

The route corridor avoided the development limits of large towns or clustered areas of settlement. In compiling the constraints map and carrying out the onsite investigations, relevant County Development Plans were consulted as to the extents and uses of land zoning around towns in the different counties. Routing was preferable outside these zones thus avoiding or reducing considerably, future conflict due to development etc. Although for the most part the route corridor is on average 3 kilometers wide there are pinch points where the corridor extents will be reduced to approximately 1 kilometer wide due to existing development. North of the border the width of corridors is more prescriptive with less options open for routing.

Scattered rural dwellings were to be avoided, keeping the proposed corridors approximately 50-75 meters away from any existing dwellings. Generally along the major arterial routes the one off housing would generally be discouraged by The County Councils. Instead, developments along minor roads are less likely to be restricted by the County Councils. As a result the minor roads are more congested with one off housing developments, and building in the areas affecting the proposed route corridor will be inevitable.

3.4 Existing Transmission Lines and Substations

Existing Tandragee – Louth 275 kV is a major constraint for selection of an alternative line route. It passes through the areas identified within this study excluding the Ring of Gullion.

3.5 General Infrastructure

Other infrastructure to be highlighted included railways, motorways, major roads e.g. A1, etc., again these need at or near 90 degree crossings. Navigable Rivers, Canals, e.g. Newry Canal to be crossed at or near 90 degrees.

3.6 Ecological Sites and Special Designated Protected Areas.

Designated Areas for Flora and Fauna and Areas of Special Scientific Interest (ASSI)

North of the border, seventeen Areas of Special Scientific Interest (ASSIs) are present within the search area, the main concentration being to the southeastern corner. Sites have generally been designated for their habitat interest, which includes lakes, fens and species-rich grassland. Of these, the site at Slieve Gullion, a candidate Special Areas of Conservation (SACs), has also been put forward under the Habitats Directive.

Twenty-five Sites of Local Nature Conservation Importance (SLNCI) are dispersed throughout the entire Armagh and Newry area. These are provisional designations, which will be reviewed during the current Area Plan process.

The Ring of Gullion has been designated as an Area of Outstanding Natural Beauty.

Nationally important sites of nature conservation value are designated as ASSIs, formerly under the Nature Conservation and Amenity Lands (Northern Ireland) Order of 1985, and at present under the Environment (Northern Ireland) Order, 2002. Sites may be designated because of their flora, fauna, geological, physiographic or other features. Designation as an ASSI is a required precursor to designation as a site of international importance (Special Area of Conservation, Special Protection Area). Any change in activities affecting a site must be authorised by Environment and Heritage Service (Department of the Environment) and the Department may enter into a management agreement with a landowner to protect the conservation interest of a site. Proposed development both within and without sites of national importance (where the latter is likely to affect a site) is the subject of

special scrutiny under the planning process. The relevant Planning Policy Statement (PPS 2) issued by Planning Service indicates the potential damage to habitats or species, the opportunities for alternative siting or potential mitigating measures, the possibilities for replacement sites, opportunities to enhance nature conservation and the importance of the proposed development to Northern Ireland will all be considered. Planning Service declares that where a development will have a significant adverse effect, directly or indirectly, on a site, it will not be permitted unless the reasons for the development clearly outweigh the value of the site.

3.6.1 Site of Local Nature Conservation Importance (SLNCI)

Where a site is not of national importance due to its conservation value, but is important in a more local context, Planning Service may designate the area as a SLNCI. The Environment and Heritage Service (Department of the Environment) is in the process of submitting a series of such sites to Planning Service for inclusion in Local Area Plans. This process is proceeding on a council area by council area basis, and not all parts of Northern Ireland have as yet been surveyed for potential SLNCIs. PPS 2 indicates that careful consideration will be given to the nature conservation implications of any development proposal where that proposal may threaten any significant feature of nature conservation value.

3.6.2 Statutory Nature Reserve (SNR)

This is a statutory designation, which can cover either state or private land, which is of scientific interest. Reserves are designated under the Wildlife Act, 1976. There is an obligation to manage the land in accordance with the objectives for which it was designated. Most nature reserves are in state ownership and are managed by Dúchas, the Heritage Service. Any state agency, which is involved in activities that may affect a reserve, is required to consult with D.O.E.H.& L.G. and to take all practical steps to avoid or minimise any damage.

3.7 Archaeological & Heritage Sites

In Northern Ireland, many archaeological sites were identified in the area of search, which are either scheduled or in State care. Numerous other unprotected archaeological sites are scattered throughout the search area. Many of these are raths, although forts and enclosures are also common. Other archaeological sites include holy wells, tombs, graveyards and tree rings.

3.8 Geology / Geotechnical

A review of ground conditions likely to be encountered was undertaken by examination of the surface/drift geology shown on the Quaternary edition of the Geological Map of Northern Ireland. No site walkover was undertaken, no further records were sought from Geological Survey Northern Ireland (GSNI) and no further site investigation was undertaken at this preliminary stage.

Much of the corridor through which the proposed overhead lines may pass is mantled with Pleistocene drift deposits (boulder clay). Spreads of glacial sands and gravels are generally restricted to the north-western corner of the corridor, although it should be noted that similar material may also occur on the lee-side (down-glacier) sides of drumlins. Glacigenic sand and gravel is otherwise restricted to isolated, well-dispersed pockets. Glacial lake deposits are localised to the west of Portadown, where there is a substantial area of laminated clays and silts.

Postglacial deposits are alluvium along the courses of the frequent streams in the corridor, extensive areas of basin peat immediately to the south of Lough Neagh, and more restricted, dispersed areas of peat on higher ground, mainly to the south of Keady.

Bedrock outcrops are most extensive towards the southern end of the corridor, particularly in the area of Slieve Gullion. Elsewhere bedrock outcrops are generally localised, isolated and dispersed.

The solid geology of the corridor is complex. A broad band of faulted Silurian greywackes and shales crosses much of the southern half of the corridor, trending northeast to southwest. Dolerite and basalt dykes of Palaeogene age have been intruded into the earlier deposits. Earlier, Ordovician, greywackes and shales bound much of the northern margin of the Silurian. A southern limb of the Tertiary Lower Basalt Formation extends into the northeastern corner of the corridor, overlain in places by clays of the Oligocene Lough Neagh Group, which are also extensive immediately to the south and southwest of Lough Neagh. Bedrock complexity increases in the area around Dungannon, where Triassic sandstones and mudstones occur alongside Carboniferous limestones and localised sandstones. In this area there are also restricted areas of Permian sandstones and marls, and rare dolerite dykes. The Slieve Gullion intrusive complex to the west of Newry consists of Late Caledonian granodiorite, intruded by concentric dykes of Palaeogene age.

The ground conditions noted above are considered unlikely to give rise to unusual difficulties or excessive costs in the construction of tower or pole bases.

3.9 Quarries, Mines and Airstrips.

Most quarries were already marked up from the Ordnance Survey mapping and were highlighted for the constraints study to be avoided. During the very limited on site investigation one previously unmarked quarry was found. There was no evidence to date, from the councils or from onsite scrutiny that there were any mines or airstrips within the study area.

3.10 Scenic and Tourist Roads

Relevant County Development Plans were consulted and information noted. Urban/Residential zones were marked up to be avoided in the corridor selection. At this stage e.g. scenic viewing points were noted but not marked as the exact position and effect on desktop corridor could not be determined until field study was carried out. Field study would also allow for visiting the County Council Offices for further detailed investigation e.g. possible gas pipelines in the study area.

3.11 Conclusion

Using the above constraints plotted onto 1:50,000 map of the study area, corridors became apparent through which a provisional initial 275kV overhead line could be routed and studied, see Appendix Map No 2 North-/South Interconnector – Physical Constraints.

The Tandragee - Louth route corridor also followed a predominately straight north south line through the Ring of Gullion and the significant area of AONB.

4.0 ROUTE OPTION.

4.1 Introduction

The constraints map completed in the office was the foundation for on site assessing of suitable corridors. See Appendix Map No. 1 A3 Route Map and Map No. 2 North-/South Interconnector – Physical Constraints. Conclusions from the desktop study were briefly assessed on site in a general way.

4.1.1 Overhead Line Route Options.

The selection of preliminary route corridors was arrived at after desktop study of constraints and a drive through of as much of the study area as possible, within the limited time available. It was not possible to take into consideration the distance of dwellings to the proposed lines within the route corridors.

Electricity pylons and their associated overhead lines in all situations detract from the landscape in which they are located. Siting, particularly with regard to focused views, skylining, contrasting backcloth and proximity to primary viewing points can regulate the degree of impact on the landscape.

The route corridor options is

Tandragee Main Substation to the border South of Forkill via the Cusher River Valley.

This corridor provides a routing from Tandragee Main substation to Sturgan Mountain following the Cusher River from the vicinity of Clare Glen. In light of this and the severe detrimental effect on the visual amenity the proposal would have on the Ring of Gullion LCA, (identified below), this corridor is not considered a feasible option. It passes through 3 Landscape Character Areas (LCA). These include:

LCA 67 – Armagh / Banbridge Hills
LCA 69 – Newry Basin
LCA 71 – Ring of Gullion

LCA 67 Armagh / Banbridge

The Tandragee Main substation is located in this LCA on the western side of the Cusher River valley where the hills are low and of gentle gradient. The field pattern tends to be large and there is a concentration of overhead cables associated with the sub station. From the sub station the corridor goes east and crosses the Newry Canal. In this LCA the electricity lines and associate pylons could be accommodated within the corridor although there will be areas were very careful siting will be necessary in order to reduce the visual impact.

LCA 69 – Newry Basin

The corridor follows the eastern side of the Newry Canal passing Scarva and Points Pass to Jerrettspass. The valley containing the Canal also contains a number of other significant landscape elements including demesnes / parkland type landscapes. From Jerrettspass the corridor swings southwest towards Strugan Mountain. Here the ground rises to the northwest and to the south. The drumlin landscape is not of particularly high quality and the field pattern varies in size. The corridor avoids visible contact with Camlough Lough. With careful siting the valley should be able to accommodate the electricity lines and associated pylons.

LCA 71 – Ring of Gullion

West of Camlough the corridor swings southward along the narrow gap between Sturgan Mountain and Drumilly Mountain. It follows the lower slopes of Sturgan Mountain and Sugarloaf Hill and drops down in to the valley to the west of Slieve Gullion with Cashel and Croslieve lying to the west. From the corridor there are wide vistas of the Ring of Gullion. Those to the west are of

a different landscape character to those in the east. However both are of high visual quality. This area is a designated AONB (Ring of Gullion) and the views justify the designation. The landscape could not easily accommodate the proposed overhead cables and associated pylons without having a severe detrimental visual impact. Power lines through this corridor are therefore not considered a feasible option.

It is however important to note at this stage that these potential route corridors have only been supported by drive though surveys and not detailed on-site investigations.

It is accepted that the scale of the proposed 275kV structures would be highly visible in the local landscape; however, with careful route selection its impacts can be reduced. The countryside, through which the proposed route would pass, is generally of a high quality where landscape character and visual amenity are potentially sensitive to change from a development of this nature.

It is concluded that further investigation field visits and input from routing experts are required before any of the potential route corridors can be further refined.

4.2 Assumptions / Caveats of Route corridor

This section details the assumptions, comments and caveats associated with the aforementioned route corridors.

4.2.1 General Assumptions

- No survey took place of the proposed corridors nor were they walked. Only a very brief drive by survey of all road crossings to check as to the feasibility of the corridors along with ensuring adequate clearances from existing developments.

- It is assumed no additional quarries, mines, airstrips, gas lines, landfill sites will come on stream. Existing quarries will not extend beyond present geographical limits.
- Rights of way, historical trails etc. were not marked up on constraints maps. It is assumed walking routes (Walk ways) e.g. ‘Ulster Way’ walking route can be crossed without wayleave / planning problems.
- The Route has not been agreed with the Planning authorities, Public bodies or landowners at this stage.

4.2.2 Protection of route corridor.

- The corridor varies in width from 1 - 3 kilometers in some locations to pinch points of approx 200m elsewhere.
- It is assumed that the route corridor will not be further encroached by development including, Ribbon housing, Transmission lines, Roads etc.
- No additional areas are added to the NHA’s, SAC’s listings.
- No additional archaeological sites/monuments are added to listings.
- Urban commercial/residential zones are not expanded beyond present limits in towns
- Additional scenic viewing points, scenic drives etc are not added by County Councils Proximity to Secondary Amenity Areas will not incur planning restrictions e.g. minimum distance in sight lines etc.
- No planning restrictions on routing through Designated ‘Greenbelts’ in Northern Ireland.
- Dismantled railways are not refurbished and used commercially again on or near the proposed route corridor.
- No commercial/industrial developments will take place in or near route corridor e.g. wind-farms, manufacturing plants, etc.

4.2.3 Electrical Infrastructure

- Crossings of existing transmission lines at voltages of 275kV would not be desirable

- Conflicts with existing distribution network including 33kV, 11Kv and LV have not been investigated or quantified
- Conflicts with existing communication lines including B.T have not been investigated or quantified.
- No future transmission/networks lines are planned and built in the corridor area.

4.3 Conclusion

This feasibility study identifies possible overhead line route options. The total length of the route corridors are approximately:- 50 km from Tandragee to Louth.

These routes are interdependent on a number assumptions as listed above in section 4.4.

Also of concern is the extent and spread of ribbon development that may impact on the route corridor chosen for this project especially around urban areas. Also the rapid growth of houses in the countryside in the route corridor area will, in time, restrict the corridor chosen.

In Northern Ireland the potential main route corridors, from Tandragee to the border crossing and into Louth are fraught with many varied difficulties.

Typically L8 double circuit tower pylons are between 35-45m in height and in comparison to a single circuit pylon of between 20-30m in height it is apparent that the lower structure would be more suitable given that the terrain is mostly undulating drumlins of varying heights. The terrain should help break up short and medium visual impact. The negative side of this type of landscape is due to the loose scattering of drumlins that make it virtually impossible to reduce the number of angle towers and bends without compromising visual impact by moving onto higher ground.

5.0 COSTINGS

5.1 Introduction

This section provides the budgetary estimates of the project. The costs are split between station, overhead line and cable works. The costs are subject to a number of caveats as detailed below.

5.2 Caveats

The caveats associated with this project are detailed below:

5.2.1 Financial

- All costs are preliminary and gross based on Unscoped Estimates
- The costs assume February 2004 construction rates.

5.2.2 Technical

- The costs are unscoped, i.e. the scope of the project has not been defined.
- The costs only assumed a nominal amount of non-standard foundations for transmission line structures.
- The costs assume standard materials will be used for construction, i.e. no special camouflaged conductor, no cold formed steel on towers, no camouflage painting of towers.

5.2.3 Third Parties

- The costs assumed only nominal difficulty from wayleaves, with Easement purchasing at most road crossings.

- The costs assume no financial burden associated with organized objection groups.

5.2.4 Construction

- The costs assume zero delay during construction phase.
- The costs assume no new archaeological site impacting upon the development will be discovered during construction,
- Scaffolding requirements for major and minor road crossings are an unknown entity and will be costed separately with the award of the construction contract.
- Construction is using standard lattice steel towers.

5.3 Conclusion

Table 1 Budgetary Estimates

		Tandragee to border
		Single circuit 275kV Lattice tower
		€
Overhead Line	Northern Ireland	20,854,166
Station	Northern Ireland	794,499
Total (Lines & Stations)		21,648,665
Cable	Option 1: 0.75km	556,111
	Option 2: 4.0km	3,177,777

From Table 1 it can be seen that the approximate cost of construction for the single circuit option is 21.6 million euros from Tandragee to the border.

6.0 CONCLUSIONS

The options for further interconnection between ESB and NIE is considered in this report, along a route corridor from Tandragee to Louth.

This report concludes that after investigating the requirement of additional transmission interconnections between Northern Ireland and Republic of Ireland, potential route corridors are on the surface, currently available.

Connection to the Grid at Tandragee would be by overhead line although extensive accommodation works would be required at both substations to facilitate the connection.

Major difficulties are foreseen as this proposed route corridor would cut through an extensive part of the Ring of Gullion LCA, South Armagh and the Mournes AONB.

Telecommunication companies erecting masts in this area have already encountered stiff opposition from resident collations indeed most have been unsuccessful.

The proposed route would necessitate crossing under the existing Tandragee – Louth double circuit lines in one location north of the border, this would not be deemed acceptable practice due to the additional risk off multiple circuit outage in a maintenance or fault situation.

In the event of a major fault occurring at either substation or indeed the crossing points of the 3 circuits both transmission networks are exposed to significant risk.

7.0 RECOMMENDATIONS

The route detailed within this report from Tandragee to the border would not be the preferred route given alternative options are available. The most significant risk is the requirement to construct the line within the Ring of Gullion. AONB.

The security concerns identified within this report are not fully investigated within this report and it is recommended that these issues are studied separately.

APPENDIX 1

- **Map No. 1 North-/South Interconnector – Physical Constraints**

- **Map No. 2 North-/South Interconnector – Route Options**