N5 Ballaghaderreen to Scramoge Road Project **Environmental Impact Assessment Report**

DECEMBER 2017

Volume 4A | Route Corridor Selection Report & Appendices

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ROUTE CORRIDOR SELECTION REPORT

March 2010

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1 EXECUTIVE SUMMARY

1.1 Introduction

Roscommon National Roads Design Office was commissioned by Roscommon County Council, in consultation with the National Roads Authority, to advance the development of the N5 Strategic Corridor Study in accordance with the National Roads Project Management Guidelines.[1]The scheme is located on the N5 National Primary Route in Roscommon approx. between the towns of Ballaghaderreen and Strokestown (See ES1).

This Route Corridor Selection Report has been prepared generally in accordance with Phase 3 of the above guidelines. The objective of the report is to identify route corridor options, assess and evaluate these options and to determine an emerging preferred route corridor based on engineering, environmental, and economic criteria. The process is informed predominately by the Constraints Study Report, consultation with the general public, statutory and non-statutory organisations, site visits/ surveys/ investigations and inputs from various specialist sub-consultants in relation to engineering and environmental topics.

1.1.1 Report Format

This report summarises the process followed in the identification, assessment and evaluation of the route corridor options that led to the determination of the Emerging Preferred Route Corridor. It consists of two volumes:

- Volume 1 – this volume, contains an Executive Summary, the Route Corridor Selection Report and the technical, environmental and economic reports, and
- Volume 2 contains the Scheme Drawings.

1.2 Background and Context to the Proposed Scheme

1.2.1 Overview

The N5 National Primary route extends over a distance of approx. 34km from Westport, Co. Mayo in the west to Longford Town in the midlands where it connects with the N4 National Primary route. Approx. 60km of the N5 Route lies within County Roscommon of which, approx. 11km, between Scramoge and Termonbarry, has been upgraded over the past decade or so. The Ballaghaderreen Bypass, currently at CPO Stage, represents a further 14km approx. The remaining 35km approx. is the subject of this report.

1.2.2 National Planning Policy

The previous *National Development Plan (NDP 1999-2006)* outlined the strategy for National Roads Infrastructure. This included a motorway from Dublin to Kinnegad with further major improvements on the N4 along the North West Route and on the N5 on the Western Corridor. The NDP pitched the level of investment in the non-motorway national route system to achieve a minimum LOS D on 90% of the network.

The strategy envisaged for the national primary roads involved the adoption of an integrated planning approach with the identification of improvement needs and route selections for substantial sections of the routes rather than focusing solely on the delivery of town bypasses.

[1] National Roads Project Management Guidelines, 2000 – National Road Authority. Forms part of the NRA Design Manual for Roads and Bridges, Section 5.1.2.

In relation to National Roads, *Transport 21* seeks to improve the Strategic Road Links to the West and Northwest by upgrading the N4 and the N5 National Primary Routes

Under the Economic Infrastructure Priority of the *National Development Plan 2007-2013*, the key strategic objection of the Transport Programme, consistent with the policy goals set out in Transport 21, is the creation of a road network that will promote regional, national and international competitiveness.

The N5 National Primary Road connects the linked Hub Towns of Castlebar/ Ballina with the Midlands Gateway and, via other National Routes, with the eastern Gateways of Dundalk and Dublin. It is categorised as a "Route to Border/ North West and West" in the NDP.

The N5 National Primary Route is identified as a Strategic Radial Corridor within the *National Spatial Strategy 2002-2020* providing links between the western and northwestern gateways and hubs and those located in the east of the country

1.2.3 Regional Planning Policy

The *West Regional Planning Guidelines (2004)* outline the importance of the N5 as:

- a communications/ access route serving the linked hub of Castlebar/ Ballina; and
- a means of reducing the Peripherality of the West Region both nationally and internationally.

Upgrading the N5 is included in the Overall Regional Infrastructural Priorities necessary to achieve the planning and development objectives for the region.

The *Midland Regional Planning Guidelines* outline the importance of the N5 as a key linkage between the Midland Region and the West Region.

1.2.4 Local Planning Policy

The *Roscommon County Development Plan* (2002) has, as its Transport Aim, "*to develop a safer, more efficient and integrated transport system that will improve the road network and other forms of transport to serve the urban and rural population"*.

The County Development Plan identifies a number of objectives in order to achieve its aim. Those most relevant to the N5 National Primary Road include:

- To implement improvement to National Primary Roads as listed in Schedule 2 – this includes "Upgrade N5 road between Termonbarry and Mayo Boundary",
- To reserve and maintain free of development land corridors for the provision of town bypasses including Ballaghaderreen, Bellanagare, Frenchpark, Tulsk and Strokestown.

1.3 Route Corridor Options

1.3.1 Constraints Study

The study area was defined having regard to key constraints identified from a preliminary review of existing information sources and to the need to allow the development of feasible route corridors during the subsequent stages of the scheme.

The purpose of the scheme is to upgrade the N5 National Primary Route between Ballaghaderreen and Scramoge. Hence, the western and eastern boundaries of the constraints study area were defined with respect to the proposed Ballaghaderreen Bypass Scheme tie-in and the completed Scramoge Scheme tie-in locations respectively.

The northern and southern boundaries were defined by reference to known environmental and physical (built and natural) constraints, the requirement to allow for feasible options to be developed and employing the knowledge and experience of the design team.

The boundaries remained under review throughout the preparation of the Constraints Report to allow the accumulation of information to inform amendments where necessary.

The study area measures approx. 35km in a generally east-west direction and approx. 11.5km in a generally north-south direction. It covers an area of approx. 328 square Km (See Figure ES2).

1.3.2 Development of Corridor Options

The development of feasible route corridor options was informed by the Constraints Study Report and progressed through the design team, its sub-consultants, and continued liaison with public and private organisations, the general public and elected representatives. Seven route corridor options were developed based on optimising the balance between engineering, environmental and economic considerations (See Figure ES3). Each option is nominally 500m wide and will allow a considerable amount of flexibility to mitigate by avoidance during the next stage of route development – Preliminary Design. Each of the route corridor options commences in Ratra/ Teevnacreeva townlands and finishes in Scramoge/ Treanaceeve and thus connects the proposed N5 Ballaghaderreen Bypass Road Scheme with the recently completed N5 Scramoge Road Scheme.

Corridor 1 is approx. 33.7km long. It is located north of the existing N5 along its entire length. This option passes just north of Frenchpark where it crosses the R[2]361 (Williamstown to Boyle) Regional Road. It remains north of Bellanagare and Tulsk, crossing the N61 (Athlone to Boyle) road near Shankill Cross. This option continues north of the existing N5 and north of Clooncullaan Lough before crossing the R368 (Elphin to Strokestown) at Lugboy townland and veering south to bypass Strokestown to the north and east.

Corridor 1A is approx. 34.2km long. This option commences south of the existing N5 but, immediately west of Bellanagare, it crosses to the northern side of the N5 and follows the same route as Option 1. This option passes just south of Frenchpark where it crosses the R361 (Williamstown to Boyle) Regional Road. It crosses the N5 at Cashel Townland west of Bellanagare. It proceeds north of Bellanagare where it follows the same route as Option 1 from Corry West Townland eastwards.

Corridor 2 is approx. 34.6km long. This option weaves north and south of the existing N5. It follows substantially the same path as option 1A from the western tie-in to Tonaknick (north of Bellanagare). This option crosses the R369 (Bellanagare to Elphin) Road at Kilvoy Townland, the N61 at Castleland Townland and continues along the existing N5 between Ardkeenagh (Plunkett) Townland and Ardakillin Townland from where it veers south to bypass Strokestown.

Corridor 2A is approx. 35.0km long. This option is similar to Option 2 except that it veers further south between its western tie-in and the R361 crossing south of Frenchpark.

Corridor 2B is approx. 34.5km long. This option is similar to Option 2 except that between the crossing point of the N61 at Castleland Townland and the crossing point of the N5 at Ardakillin, the route is north of and parallel to the existing N5 as opposed to along it.

Corridor 3 is approx. 35.7km long. This option represents an online upgrade of the existing N5 route and is the “Do-Minimum” option. This option does not fulfil the scheme objectives but is considered for comparison purposes.

[2] Letters preceding Road Numbers have the following meanings – N denotes a National Route, R denotes a Regional Route and L denotes a Local Road.

Corridor 4 is approx. 38.0km long. It is located south of the existing N5 along its entire length. This option follows the approximate line of Option 1, 2 and 2B as far as the crossing of the R361 south of Frenchpark. From here it veers further south crossing the R367 (Ballintober to Tulsk) road at Mullygollan Townland and the N61 at Sheegeeragh Townland. The route then veers north-eastwards towards the existing N5 at Lissaphuca Townland and follows a similar route to Options 2, 2A and 2B to bypass Strokestown on the southern side.

1.3.3 Assessment and Evaluation

Each of the seven route corridor options was subjected to an assessment and evaluation process to determine the preferred route corridor based on engineering, environmental, and economic considerations.

1.4 Engineering

1.4.1 Existing Road Network

The existing road network within the study area comprises National, Regional and Local roads (See Figure ES4).

The National Routes are:

- N5 National Primary Road – Westport to Longford,
- N61 National Secondary Road – Athlone to Boyle.

The Regional Routes are:

- R361 Regional Road – Williamstown to Boyle,
- R369 Regional Road – Elphin to Bellanagare,
- R367 Regional Road – Ballymoe to Tulsk,
- R368 Regional Road – Fourmilehouse to Strokestown,

In addition, there is a relatively dense network of Local Roads serving local communities and providing access to the wider market through the National and Regional road networks.

1.4.2 Existing N5 National Primary Road

The N5 National Primary Route stretches from Westport in Mayo, through Roscommon, to the N4 National Primary Route at Longford Town; a distance of approx. 134km. Within County Roscommon, the N5 stretches from Carracastle to Termonbarry, approx. 60km. The section from Scramoge cross to Termonbarry, approx. 11km, has been upgraded and the Compulsory Purchase Order for the Ballaghaderreen Bypass, approx. 13.6km, has been confirmed by An Bord Pleanála. The remaining 35km is the subject of this report. It is characterised by:

- Significantly sub-standard cross-section – approx. 47% with paved width less than or equal to 7.3m and only 14% meeting the standard 2-lane carriageway width requirement of 12.3m paved width. In addition, verge widths are rarely achieved (see Figure ES5),
- Horizontal and vertical alignment are substandard and do not complement each other, e.g. long straights with hidden dips in the vertical alignment,
- Overtaking value, approx. 12%, that is significantly below the 30% requirement for National Primary Routes,

- There are 459 junctions including 85 public road junctions and an additional 518 field accesses leading to reduced traffic safety and decreased traffic capacity.

1.4.3 Traffic Study

A Traffic Modelling Report was prepared in accordance with the NRA Project Appraisal Guidelines by Transport Planning International. This included a comprehensive traffic survey that was carried out during January/ February 2007 and June 2008 and included an Origin-Destination Survey at Tulsk Cross Roads (N5-N61), Manual Classified in conjunction with the O-D Survey, Automatic Traffic Counts on 18 road links, Manual Classified Counts at 10 junction locations, Automatic Number Plate Recognition surveys at 10 locations and Vehicle Journey Time Surveys. This information formed the basis of the traffic model developed for the scheme using the SATURN suite of computer programs that was used to forecast Opening Year (2015), Design Year (2030) and Horizon Year (2040) traffic flows on each of the route corridor options.

Traffic flow along the exiting N5 (2007) varies between 4096 AADT and 5794 AADT with approx. 12% Heavy Commercial Vehicles (HCV). Traffic flow along the N5 at the design year is predicted to increase to between 5312 and 8785 vehicles (See Figure ES6). Traffic transfer for each of the route corridor options is approximately equal. It is anticipated that practically all through traffic will transfer and up to 80% of “all traffic” will transfer to each option.

1.4.4 Accidents and Geometric Design Standards

There were 10 fatal and 44 serious injury accidents along the existing N5 within the study area between 1994 and 2004. Analysis of this data revealed a pattern of accident clusters that appear to coincide with three primary factors – within urban centres, in the vicinity of junctions, and at locations where the road geometric features are poorest. It is anticipated that with the exception of Option 3, each of the remaining corridor options would lead to a significant improvement in all primary factors.

The geometric design of a road scheme is governed by the National Roads Authority Design Manual for Roads and Bridges (DMRB), March 2000 as amended and the UK DMRB as amended by NRA Addenda. With the exception of Route Corridor 3, each of the options provides the opportunity to develop road alignments that meet all road design standard requirements.

1.4.5 Structures

The junction strategy for the scheme will be developed during the Preliminary Design Stage and therefore the number of structures required to facilitate it is unknown at this stage. It is likely that, with the exception of option 3, each of the corridors would require a similar number of road structures/ bridges. A substantially online option such a Corridor 3 would result in restricted opportunity for the provision of grade-separation and associated structures.

Each of the route corridor options will necessitate the crossing of watercourses, the number of which has been estimated based on the characteristics of each corridor.

1.4.6 Soils and Geology

The underlying bedrock geology of the area primarily comprises Upper Carboniferous Limestone (predominately undifferentiated Visean).

The physiographic nature of the landscape is predominately flat to undulating lowland varying from mainly wet and organic soils throughout the majority of the study area to mainly dry soils near the southern boundary. Rolling lowland and Drumlin features predominate east of the N61. In addition there are significant basin bog areas north of Frenchpark and south of Bellanagare. Based on the soil type classifications prepared by the Geological Survey of Ireland and Teagasc,

the primary soil types are gleys and podzolics derived from limestone glacial tills with a limited amount from sandstone glacial tills at the eastern extremity (see Figure ES7).

The soils and geology assessment and evaluation of the route corridor options is based on three principal factors:

- The length of each route crossing known peat areas - moderated by the depth of peat,
- The length of each route crossing areas where the subsoil is unlikely to be suitable for reuse as engineering fill – primarily gley soils,
- The preliminary earthworks analysis for each route.

Having regard to the above, Option 3 emerges as the preferred option followed by Option 1A, and 2B with the least preferred being option 2.

1.4.7 Utilities

All of the route corridor options, with the exception of Corridor 3 – the online option, traverse a predominately rural environment, resulting in a relatively low density of services. Corridor 3 passes through the towns of Frenchpark, Bellanagare, Tulsk and Strokestown and would involve significant conflict with most services.

The main service providers include Eircom, ESB, ESB International, Roscommon County Council, Bord Gáis, and the Mobile Phone companies. The impact on Eircom, ESB, ESBI, mobile telephony and watermains is relatively equal with the exception of Option 3 where, due to the preponderance for service locations along the existing N5 and in urban areas, there would be a larger impact. The source for Ardkeenagh Group Water Scheme is located within Corridors 2 and 2A and, although it is possible to avoid the source within each corridor, it represents a constraint. Bellanagare reservoir is located on the edge of corridor 4 but could be avoided through the design process.

Having regard to utilities, the preferred option is corridor 1 and 1A, followed by 2B. Option 3 is the least preferred.

1.4.8 Road Safety Audit

The Stage F Part 1 Safety Audit of all route options was carried out on 16th February 2007. The subsequent Audit Report outlined a preference for route Option 1, 1A, 2B, 2, 2A, 4 and 3 respectively, however, the report went on to confirm that there were “very small” differences between each of the options and that those differences could be designed out in subsequent design stages.

The Stage F Part 2 Safety Audit has been completed and there are no outstanding issues.

1.4.9 Assessment and Evaluation – Engineering

The overall Engineering assessment and evaluation of the route corridor options was based on six overarching sub-criteria:

- Traffic;
- Accidents and Road Geometry;
- Structures;
- Utilities;

- Soils and Geology; and
- Road Safety Audit.

The resulting order of preference is Option 1A, 1, 2B, 2, 4, 2A, and 3.

1.5 Environment

1.5.1 Introduction

Each of the seven route corridor options was developed, assessed and evaluated based on an iterative design process involving the design team, including its specialist sub-consultants, and extensive consultations. The overall process is based on engineering, environmental and economic criteria. This section outlines the environmental criteria considered and should be read in conjunction with Chapter 6 and the environmental and technical reports included in Appendix 3.

1.5.2 Human Beings

The effects of Human Beings are described by reference to a number of environmental topics of which the principal ones include:

- Agriculture and Property;
- Air Quality;
- Landscape and Visual;
- Soils and Geology;
- Hydrology and Hydrogeology; and
- Noise and Vibration.

1.5.3 Agriculture and Non-Agricultural Property

The Agriculture and Non-Agricultural Property report was prepared by Roscommon NRDO and is included in Appendix 3A.

Six principal factors were considered as part of the assessment and evaluation of the route corridor options under this heading:

- The average farm size and the distribution of farm sizes throughout the study area;
- The number of farm units intersected by each of the corridors;
- The Farming Systems employed throughout the study area;
- The land-cover pattern traversed by each of the options;
- The number of Potential Properties Affected;
- The number of planning applications was used as a proxy for development trends.

Having regard to these factors, the emerging preferred route corridor is Option 1A followed by 1 and 2.

1.5.4 Ecology

The Ecology assessment was carried out by Dr. Mark Farragher and Dr. John Whelan and their report is included in full in Appendix 3D.

There are ten designated sites within the study area. Other important habitats include Raised Bogs, Blanket Bogs, Loughs, Turloughs and cut-over bogs.

None of the protected plant species have been recorded within the study area although each of the corridors provides suitable habitats for same.

There are potential bat roosts throughout each of the corridors and the five species have been recorded in the general area. Badger and otter activity were noted on site visits and is likely to be similar for all corridor options.

Corridor 1 impinges on Cloonshanville Bog (pNHA/ cSAC) producing a potential severe negative impact rating. Corridor 1A does not impact on any designated site. Corridors 2, 2A and 3 impinge on Corbally Lough (NHA) producing a potential severe negative impact. Corridor 2B does not impinge on any designated site. Corridor 4 encroaches on Bellanagare Bog (pNHA/ cSAC/ SPA) and passes through part of Brierfield Turlough producing a severe negative impact. With the exception of 1 and 1A, each of the options pass between Cloonfree Lough and Fin Lough which is an important aquatic environment (See Figure ES7).

Having regard to the above, Corridor 1A is the emerging preferred option in relation to Ecology, followed by 2B, 3, 1, 2A, 2 and 4.

1.5.5 Soils and Geology

This section of the Route Corridor Report seeks to assess and evaluate the route corridor options in relation to soils and geology. Considering the environmental aspects summarised in the previous section, the main criteria that have been used are:

- Percentage of each route corridor underlain by peat, moderated by the depth of peat;
- Percentage of each route corridor underlain by subsoil unlikely to be suitable for re-use as engineering fill, primarily gley soils;
- Earthworks analysis for each route corridor;
- Impact on designated sites – considering the geological characteristics of each site within the study area and proximity to the individual route corridors; and
- General impact implications road schemes have on the geological environment.

Overall the route corridor preference in relation to soils and geology is Option 3 followed by 1A, 2B, 2A, 2, 4 and 1.

1.5.6 Hydrogeology and Hydrology

The Hydrogeology and Hydrology report was prepared by Hydro Environmental and is included in Appendix 3F.

This section of the Route Corridor Report assessed and evaluated the route corridor options in relation to hydrogeology. The main criteria that have been used are:

- Risk to the groundwater – addressing the importance and characteristics (including the presence of karst features) of the underlying aquifer and groundwater usage in the form of groundwater protection schemes, group water schemes and private well sources;
- Impact on designated sites – considering the hydrogeological characteristics of each site within the study area and proximity to the individual route corridors; and
- General impact implications road schemes have on the hydrogeological environment.

The preferred option from a Hydrogeological perspective is Option 2B,1A, followed by, 3,2, 2A, 1 and 4.

This section of the Route Corridor Report has been prepared by expanding the desk study work carried out for the Constraints Study to look at all available data specifically relating to the selected route corridor options. It includes an assessment of aerial photography reviewing watercourses and floodplain areas. The desk study details are verified on the ground by a drive-by survey along each route corridor.

The principal criteria that have been used to assess and evaluate the route corridor options are:

- Significant watercourses crossed;
- Floodplains;
- Surface water features; and
- Designated sites of ecological importance.

The preferred option from a Hydrological perspective is Option 1A, followed by 3, 1, 2A, 4, 2 and 2B.

1.5.7 Air Quality

The Air Quality Report was prepared by RPS Consulting Engineers and is included in full in Appendix 3B.

The Air Quality Assessment focuses on Nitrogen Oxides (NO_x) and Particulate Matter (PM_{10}) because these are the principal traffic derived pollutants. A survey established the background pollutant levels. The locations of sensitive receptors was established through use of the GeoDirectory Database. The existing and future traffic levels were derived from the Traffic Report for the proposed Scheme. The Index of Change in Exposure was calculated. This indicated that there would be benefits from each of the options with the exception of Option 3. Option 1A provides the greatest benefits followed by 2A and 1.

The impact on Sensitive Ecosystems was tested and found to be well below the limit value at the design year.

1.5.8 Noise and Vibration

The Noise and Vibration report was prepared by Roscommon NRDO and is included in Appendix 3H.

Noise and vibration impacts depend primarily on the number of receptors potentially affected (based on proximity to the centre of the proposed route corridor) but this is moderated by the change in traffic flow pattern and the likely need for mitigation measures.

In relation to noise and vibration, Option 1 emerges as the preferred option followed by 2A, 2 and 4.

1.5.9 Landscape and Visual

The Landscape and Visual Report was prepared by MosArt Limited and is included in full in Appendix 3G.

Each of the route corridor options was assessed and evaluated having regard to visual impact and landscape impact.

In relation to Visual Impact, the number of receptors within distance bands of the centre of each corridor was considered.

In relation to Landscape Impact, two principal criteria were considered:

- Structures – based on the length of each option,
- Impact upon Specific Landscape Features.

The resulting preference is for Corridor 1A followed by 1, 4 and 2A.

1.5.10 Archaeology, Architecture and Cultural Heritage

The Archaeology, Architecture and Cultural Heritage report was prepared by Archaeological Development Services Limited and is included in full in Appendix 3C.

Building on from the preceding Phase 2 Constraints Study Report, the Phase 3 report acknowledges the significant level of archaeological monuments in the general area of North Roscommon through which the route option corridors run.

The Phase 3 reports acknowledges the significance of Rathcroghan, Carnfree and a number of other areas/archaeological sites termed within the report as Key Constraints. Identification of these Key Constraints and a greater understanding of the overall archaeological picture of the region has been obtained throughout Phase 2 and 3 by ongoing consultations with the Archaeology Department of the National University of Ireland, Galway and staff of the Discovery Programme, both of which institutions have research interests in the area and both of which have been able to provide significant knowledge on the archaeology of the region, which has in turn assisted in the development of route option corridors and the identification of the emerging preferred corridor.

The assessment and evaluation of the route corridor options involved both a qualitative and quantitative approach and included extensive consultations. A quantification of the number of recorded archaeological monuments and architectural heritage constraints within each corridor was carried out and measured against an assessment of the relative potential impact of each route option corridor on the Key Constraints (See Figure ES9). Weightings were assigned to the heritage constraints based on their relative distance from a supposed centreline (50m bands out from the centreline), allowing for a comparable assessment of any potential impact on them- though of course allowing for any necessary future change to the centreline.

Following this process, Corridor 1A emerged as the preferred option, followed by 1, 2B and 2A.

1.5.11 Socio-Economic

The Socio-Economic report was prepared by Optimize Consultants Limited and is included in full in Appendix 3I.

The assessment and evaluation was based on four principal criteria:

- Journey Characteristics,
- Community Severance,
- Amenity, and
- Economic Impacts.

The results of this process indicate that there is little difference between Options 1, 1A, 2 and 2A with Options 2B, 4 and 3 being less preferred.

1.5.12 Assessment and Evaluation – Environmental

The overall Environmental assessment and evaluation of the route corridor options was based on ten sub-criteria:

- Agriculture and non-Agriculture Property,
- Ecology,
- Soils and Geology,
- Hydrogeology,
- Hydrology,
- Air Quality,
- Noise and Vibration,
- Landscape and Visual,
- Archaeology, Architecture and Cultural Heritage, and
- Socio-Economic

The resulting order of preference is Corridor 1A, 1, 2A, 2B, 2, 3 and 4.

1.6 Economic

1.6.1 Cost Estimation

Roscommon National Roads Design Office prepared the Options Comparison Estimate (OCE) for each of the seven route corridor options generally in accordance with the NRA Cost Management Manual[3]. The estimate was based on level 2/3 information and was informed by the NRA Roadworks Unit Rate Database (Version 2 – Base Date May 2007) and other recently completed road schemes in the region. These Options Comparison Estimates were used in the Cost Benefit Analysis for each of the options.

1.6.2 Cost/ Benefit Analysis

Cost/ Benefit Analysis is carried out using the COBA computer program. It compares the User Costs on the existing network with the User Costs on the improved network and determines the User Benefits. These are derived from savings in travel time, operating costs, emissions costs and accident costs. The User Benefits are expressed in 2002 prices and are described as Present Value of Benefits (PVB).

The Options Comparison Estimate are then used to derive the Present Value of Costs (PVC)

The criteria for project appraisal are the Benefit to Cost Ratio (BCR) and the Net Present Value (NPV).

NPV = the difference between the Net Present Benefits (PVB) and the Net Present Costs (PVC).

BCR = PVB/PVC and is an indication of the return on investment from the scheme over its lifetime.

[3] Cost Management Manual (Consultation Version 1), National Roads Authority, October 2007

The Government considers projects to be economically viable if the BCR is 1 or above.

1.6.3 Assessment and Evaluation Economic

The results of the Economic Assessment and Evaluation as determined by Cost/ Benefit Analysis shows that Option 1A produces the highest benefit to cost ratio (1.431) and is therefore the preferred route corridor option. It is followed by 2A, 2B, 2, 1, and 4.

1.7 Consultation

1.7.1 Public Consultation – Constraints Stage

As part of the Constraints Study, consultations were held with elected public representative and with the public through an information day held on 6th July 2005. Details of this consultation is contained in the Constraints Study Report[4].

1.7.2 Public Consultation – Emerging Preferred Route Corridor

The Design Team have consulted with the elected public representatives on an ongoing basis and have considered all consultations/ representations during the development of the N5 Strategic Corridor Scheme. In particular, an information meeting was held on 21st May 2007 in the offices of Roscommon County Council.

Representations and consultations from members of the public were welcomed and considered throughout the scheme development process and in particular, the Emerging Preferred Route Corridor Public Consultation was held in the Community Hall in Bellanagare on 31st May 2007. Details of the seven Route Options under consideration as well as the Emerging Preferred Route Corridor were presented on various Ordnance Survey background mapping. Members of the Design Team were in attendance to provide information and assistance to all attendees. In addition, a brochure describing the main features of the emerging preferred route corridor, giving details of the process and giving contact details for further comment/ information was circulated on the day and available at the offices of Roscommon County Council.

Over 226 people attended on the Information Day and a further 60 visited the Design Team Offices to discuss the proposed scheme.

In addition, 135 completed questionnaires and letters/ submissions were received.

All information/ comment arising from the public consultation was considered by the Design Team.

1.7.3 Consultation with Statutory Bodies and Other Organisations

Consultation with public and private organisations has been ongoing throughout the development of the N5 Strategic Corridor Scheme. Consultations during the Constraints Stage is described in the Constraints Report. During the Route Corridor Selection Stage, 63 organisations were consulted at two separate stages; namely:

- Route Corridor Options (November 2006); and
- Emerging Preferred Route Corridor (June 2007).

The feedback from each of the consultations informed firstly the development of route corridor options and subsequently the development of the emerging preferred route corridor.

[4] N5 Strategic Corridor Constraints Study Report, Roscommon County Council, December 2006

1.8 Preferred Route Corridor

1.8.1 Introduction

Seven route corridor options were developed by the design team in conjunction with specialist technical and environmental sub consultants, through an iterative process, based on engineering, environmental and economic factors. Extensive consultation formed a significant input into this process (as detailed in Chapter 8). In summary, this included consultation process included:

- Over 60 statutory and non-statutory organisations;
- A Public consultation and submissions; and
- Ongoing consultation with elected public representatives (Local and National) and members of the local community.

The seven route corridor options, as described in Chapter 3 of this report, were assessed and evaluated based on engineering, environmental and economic criteria.

1.8.2 The Preferred Route Corridor

The amalgamation of these three criteria (Engineering, Environmental and Economic) leads to the identification of the optimum route corridor option as being Option 1A. This is the Preferred Route Corridor for the N5 Strategic Corridor Road Scheme.

1.8.3 Conclusions and Recommendations

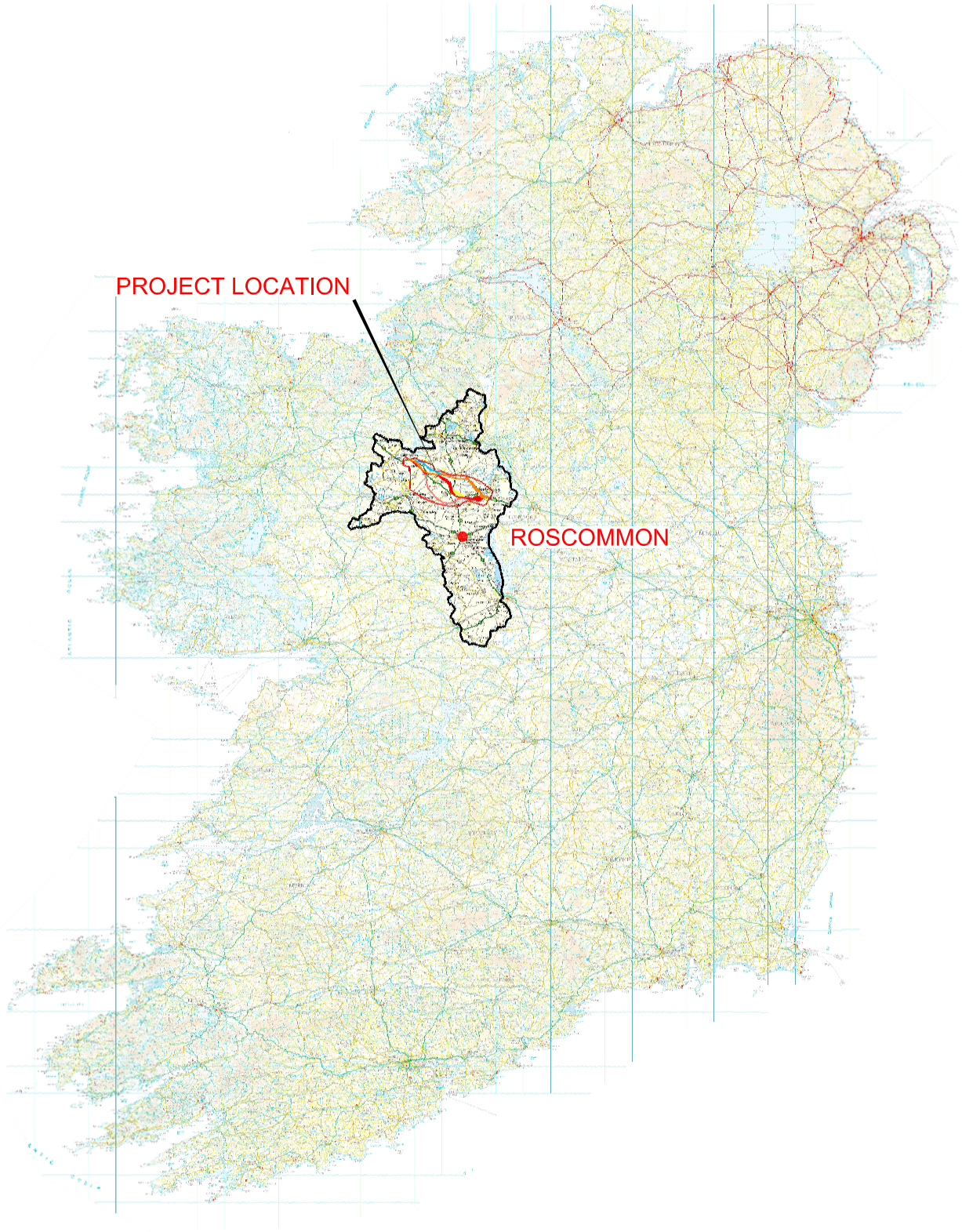
The Preferred Route Corridor for the N5 Strategic Corridor is Route Corridor Option 1A (See Figure ES10)**.**

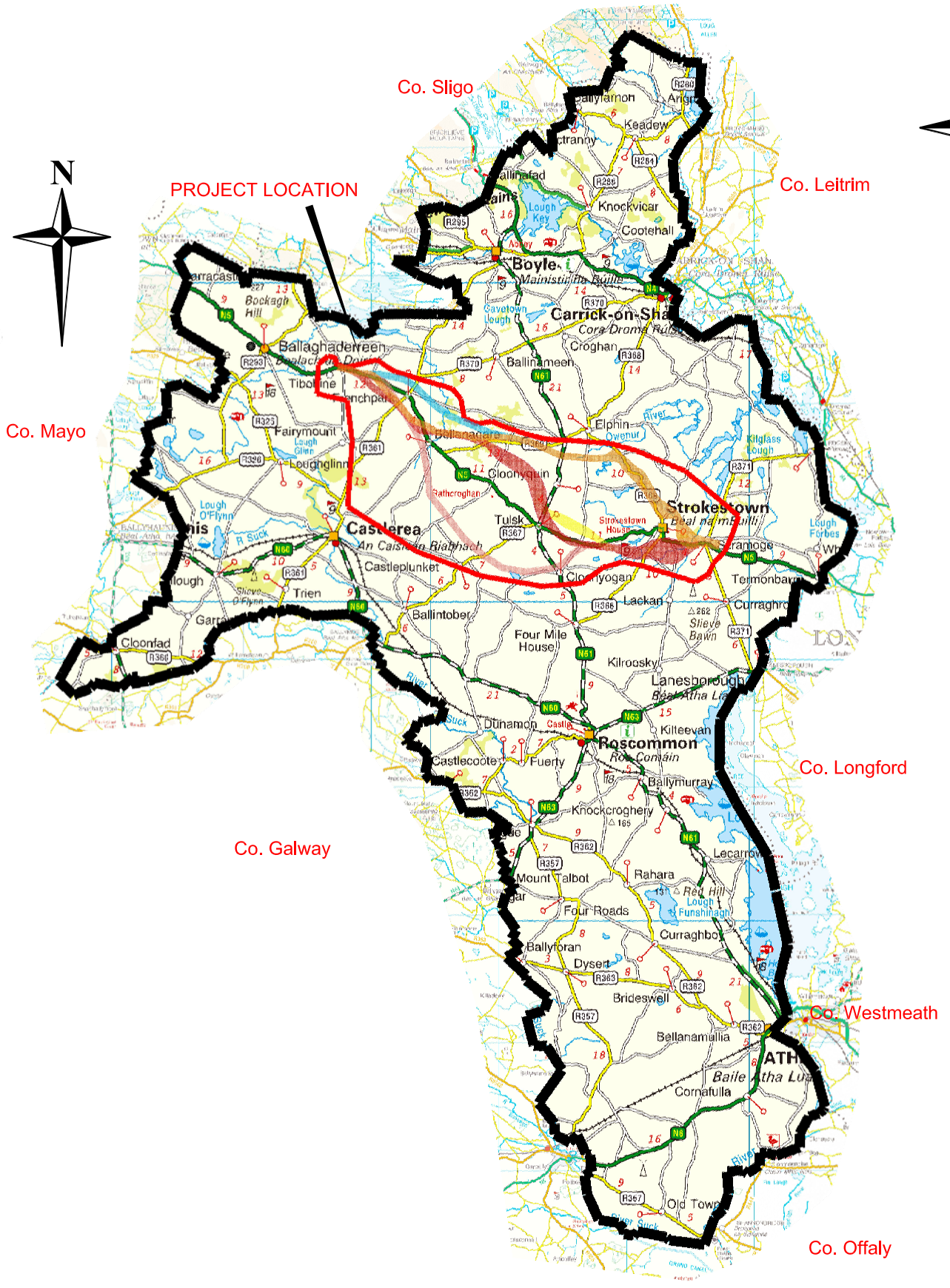
It is recommended that this route corridor be adopted by Roscommon County Council and included in the Roscommon County Development Plan and all associated sub-plans as appropriate.

In addition, it is recommended that this Route Corridor Option form the basis of and inform the development of the Preliminary Design Stage of the N5 Strategic Corridor Scheme.

1.9 Requirement for an Environmental Impact Statement

Roscommon County Council will decide on whether or not the proposed N5 Scramoge to Ballaghaderreen Road Scheme is or is not likely to have significant effects on the environment following completion of a Screening Report which will inform that decision and which will be completed during the next development stage of the scheme – Phase 4 – Preliminary Design.





NDP PLEAN FORBARTHA NÁISIÚNTA	NRA National Roads Authority An tÚdarás um Bóithre Náisiúnta	ROSCOMMON COUNTY COUNCIL Courthouse, Roscommon. Phone: 090–6637100 Majella Hunt Director of Services	NATIONAL ROADS DESIGN OFFICE ROSCOMMON Racecourse Rd. Roscommon. Phone: 090 6627004 Martin Curley, B.E., CEng., Senior Engineer.	

Rev	Description	Checked	Approved	Date
1	Post Peer Review			28/02/08

Project No. & Desc.: RN 04250 N5 Strategic Corridor Study - Route Corridor Selection

Drawing Title: Location Overview

File Folder: R:\RN04250\N5SC12 Route Selection Report\Drawings\Final Dwg-Draft 2\Final Dwg RSR\RN04250-12-345 Layout mapping.dwg

Drawn: Brian Earley

Drawing No.: Figure ES1

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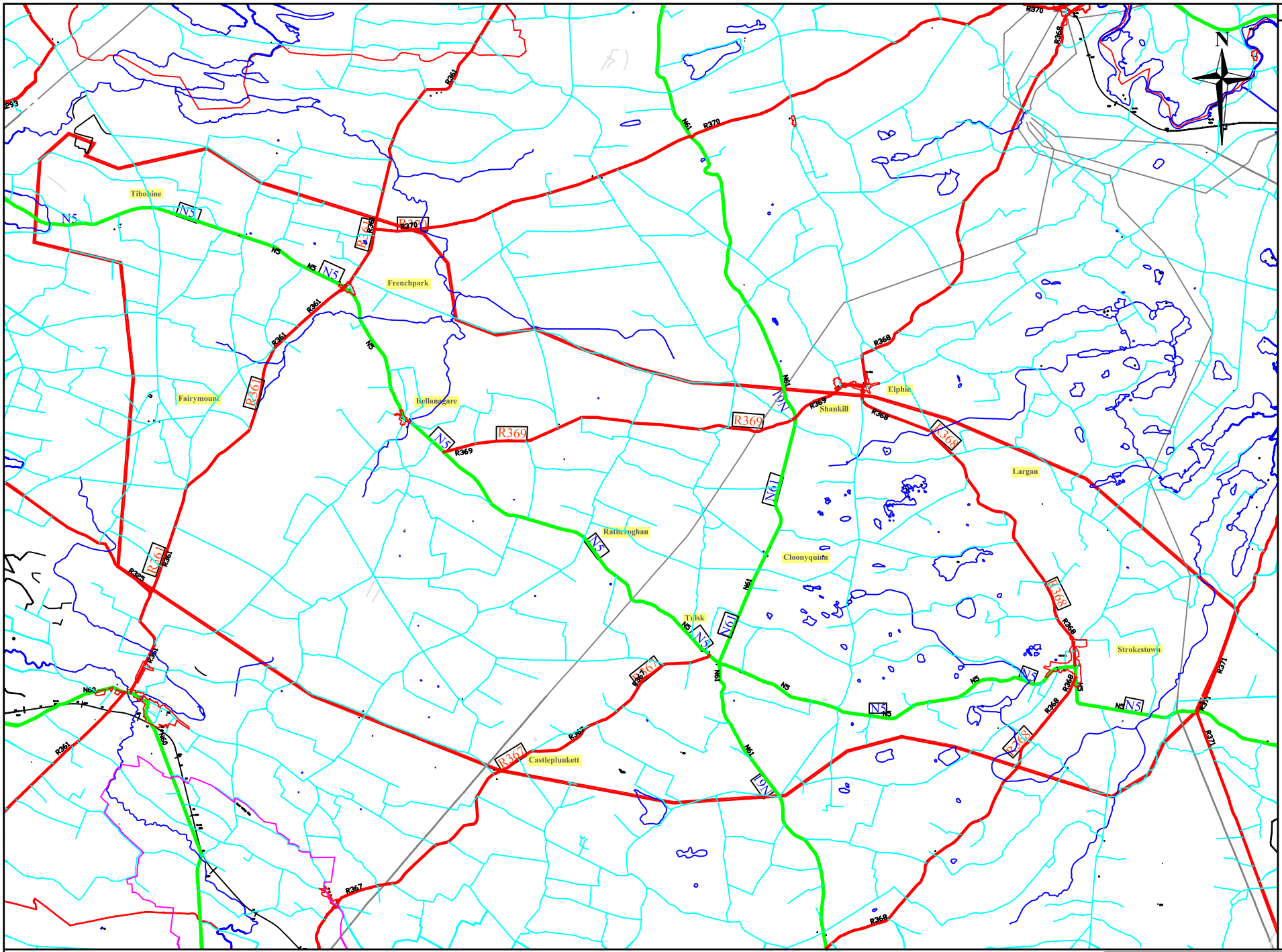
Scale H: 1:20,000

Layout: 1 of 1

Date: September 2007



Notes

Legend

Study Area Outline

NDP
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Rev	Description	Checked	Approved	Date
1	Post Peer Review			28/02/08

Project No. & Desc. RN04250 N5 Strategic Corridor - Route Corridor Selection

Drawing Title: Study Area

File Folder: R:\RN04250 N5SC\12 Route Selection Report\Drawings\Final Drwgs\Draft 2\Final Dwgs\RSR\RN04250-ES-001 (Draft).dwg

Drawing No.: Figure ES2

Layout: 1 of 1

Drawn: CG

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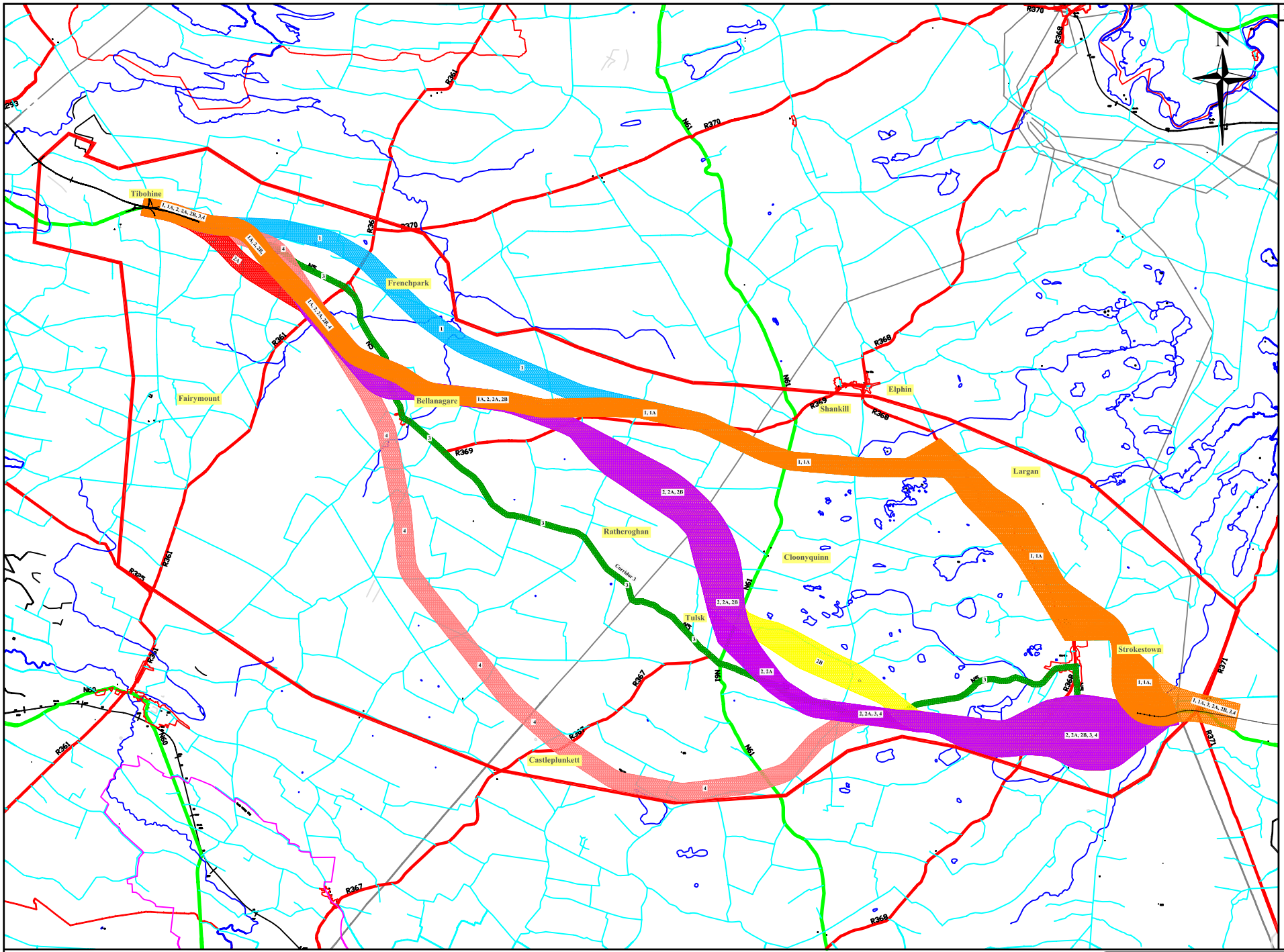
Date: September 2007



Notes

Legend

- Study Area Outline
- Corridor 1
- Corridor 1A
- Corridor 2
- Corridor 2A
- Corridor 2B
- Corridor 3
- Corridor 4

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Rev	Description	Checked	Approved	Date
1	Post Peer Review			28/02/08

Project No. & Desc. RN04250 N5 Strategic Corridor - Route Corridor Selection

Drawing Title: Feasible Corridors

File Folder: R:\RN04250 N5SC\12 Route Selection Report\Drawings\Final Drwgs\Draft 2\Final Dwgs\RN04250-ES3 (Feasible Corridors).dwg

Drawing No.: Figure ES3

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Drawn: CG

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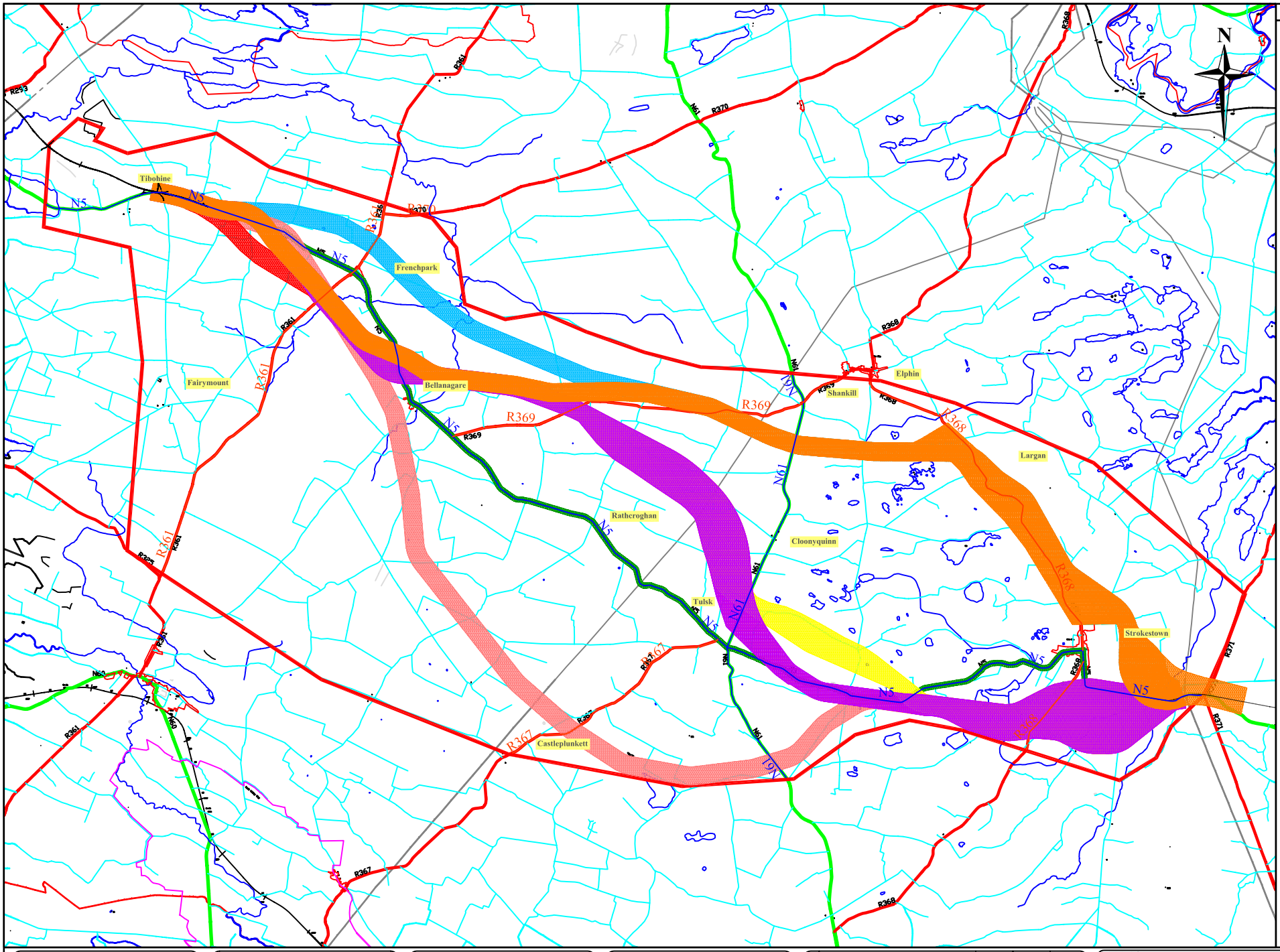
Date: September 2007



Notes

Legend

- Study Area Outline
- Corridor 1
- Corridor 1A
- Corridor 2
- Corridor 2A
- Corridor 2B
- Corridor 3
- Corridor 4
- Road Numbers LT-60834

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1	Post Peer Review			28/02/08

Project No. & Desc. RN04250 N5 Strategic Corridor - Route Corridor Selection

Drawing Title: Existing Road Network

File Folder: R:\RN04250 N5SC\12 Route Selection Report\Drawings\Final Drop\Draft 2\Final Drop\ES\RN04250-ES4 Existing Road Network.dwg

Drawing No.: Figure ES4

Layout: 1 of 1

Drawn: CG

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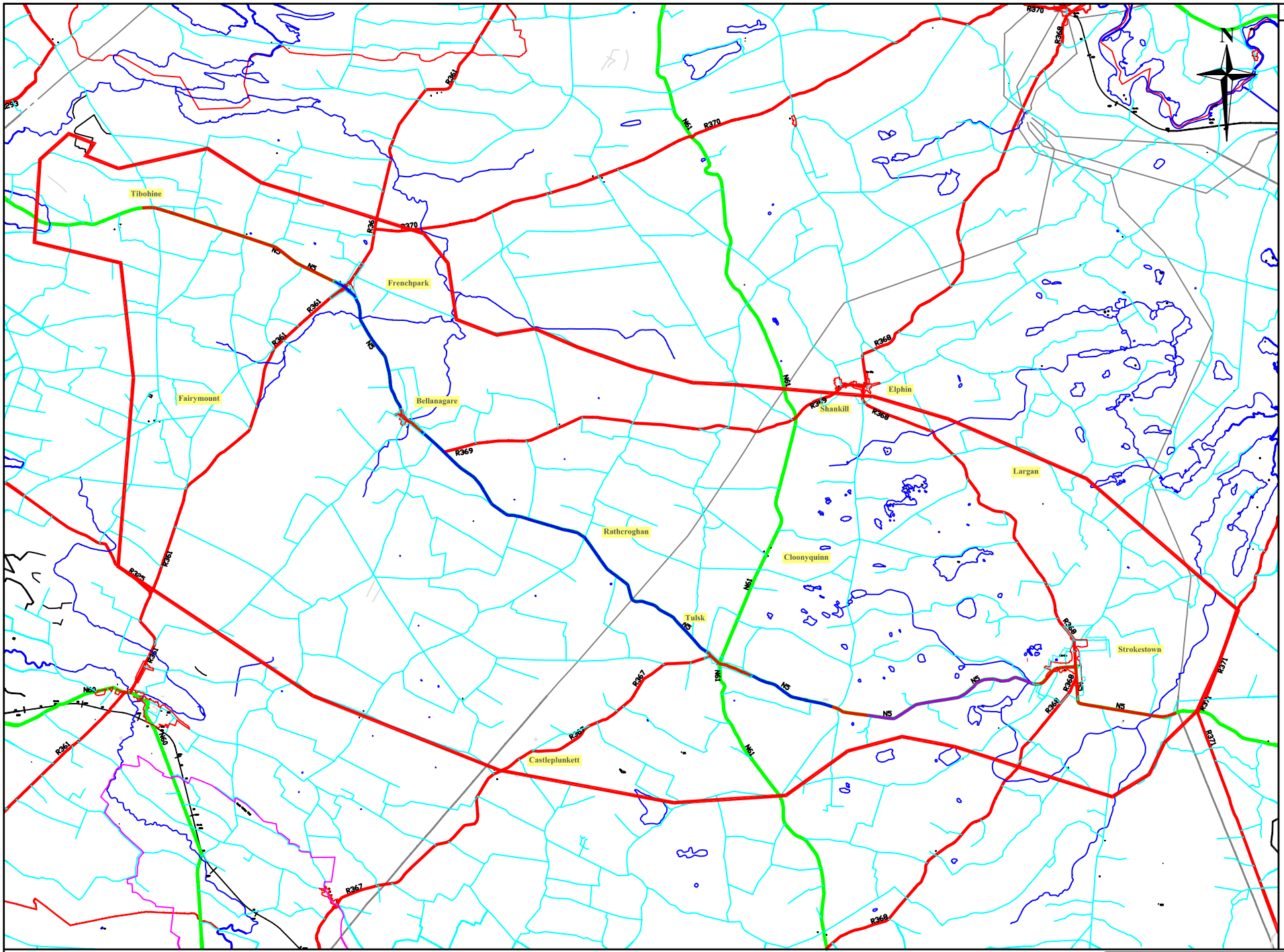
Date: September 2007



Notes

Legend

Study Area Outline

Pavement Widths

< 7.3m

≥7.3m < 12.3m (S2)

≥ 12.3m

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Rev	Description	Checked	Approved	Date
1	Post Peer Review			28/02/08

Project No. & Desc. RN04250 N5 Strategic Corridor - Route Corridor Selection

Drawing Title: N5 Pavement Widths

File Folder: R:\RN04250 N5SC\12 Route Selection Report\Drawings\Final Drwgs\Draft 2\Final Dwgs\RSR\RN04250-ES5 (Road Widths).dwg

Drawing No.: Figure ES5

Layout: 1 of 1

Drawn: CG

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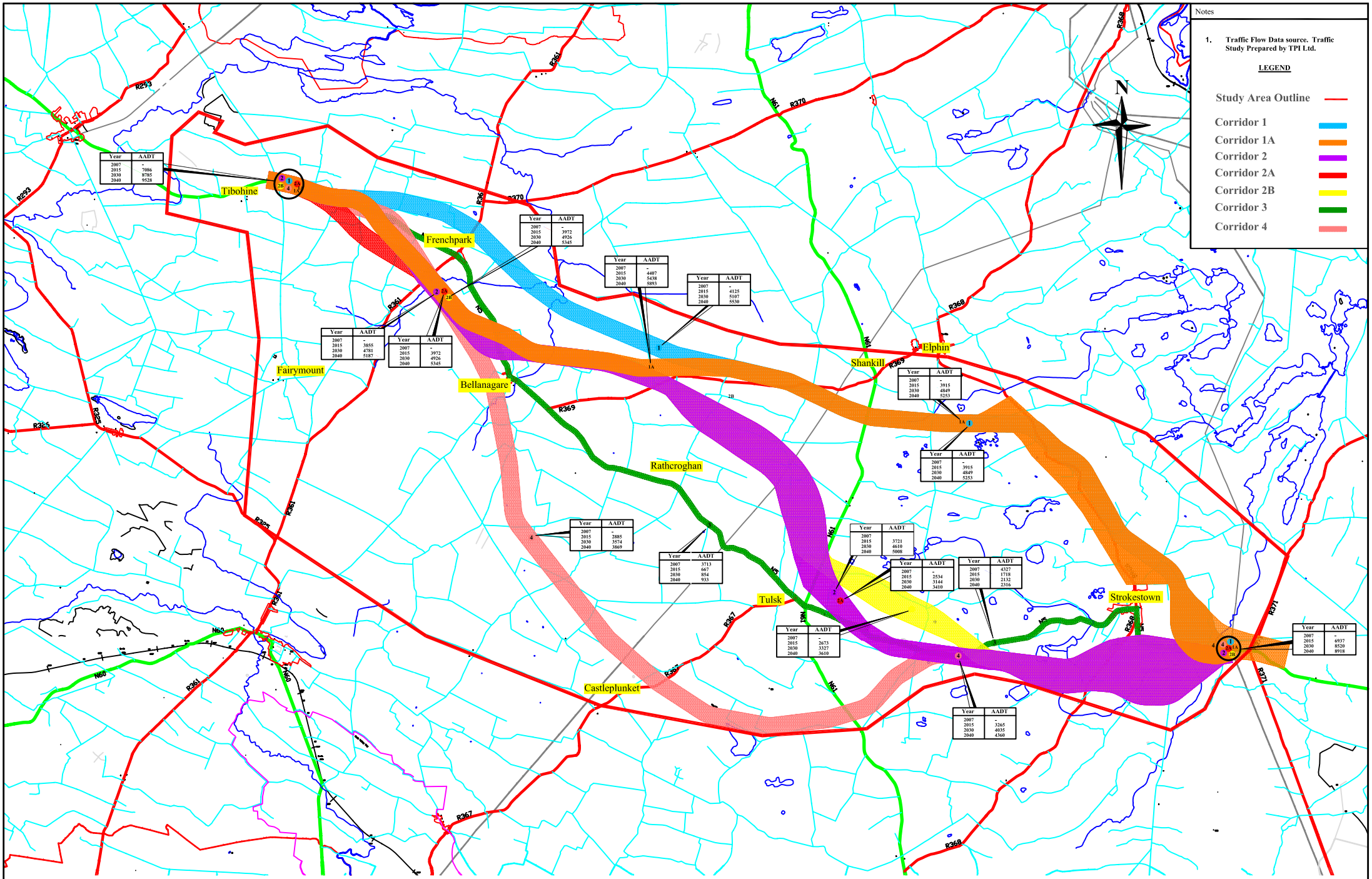
Date: September 2007



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Rev	Description	Checked	Approved	Date
1		MK	MK	12/03/09

Project No. & Docs. RN04250 N5 Strategic Corridor-Route Selection Report

Drawing Title: Predicted Traffic Flows

File Folder: R:\RN04250\N5SC\Kevin\Traffic\RN04250-t2-352\Traffic • Layout 1\Layout1.dwg

Drawing No.: Figure ES6

Layout: 1 of 1

Drawn: Kevin Geoghegan

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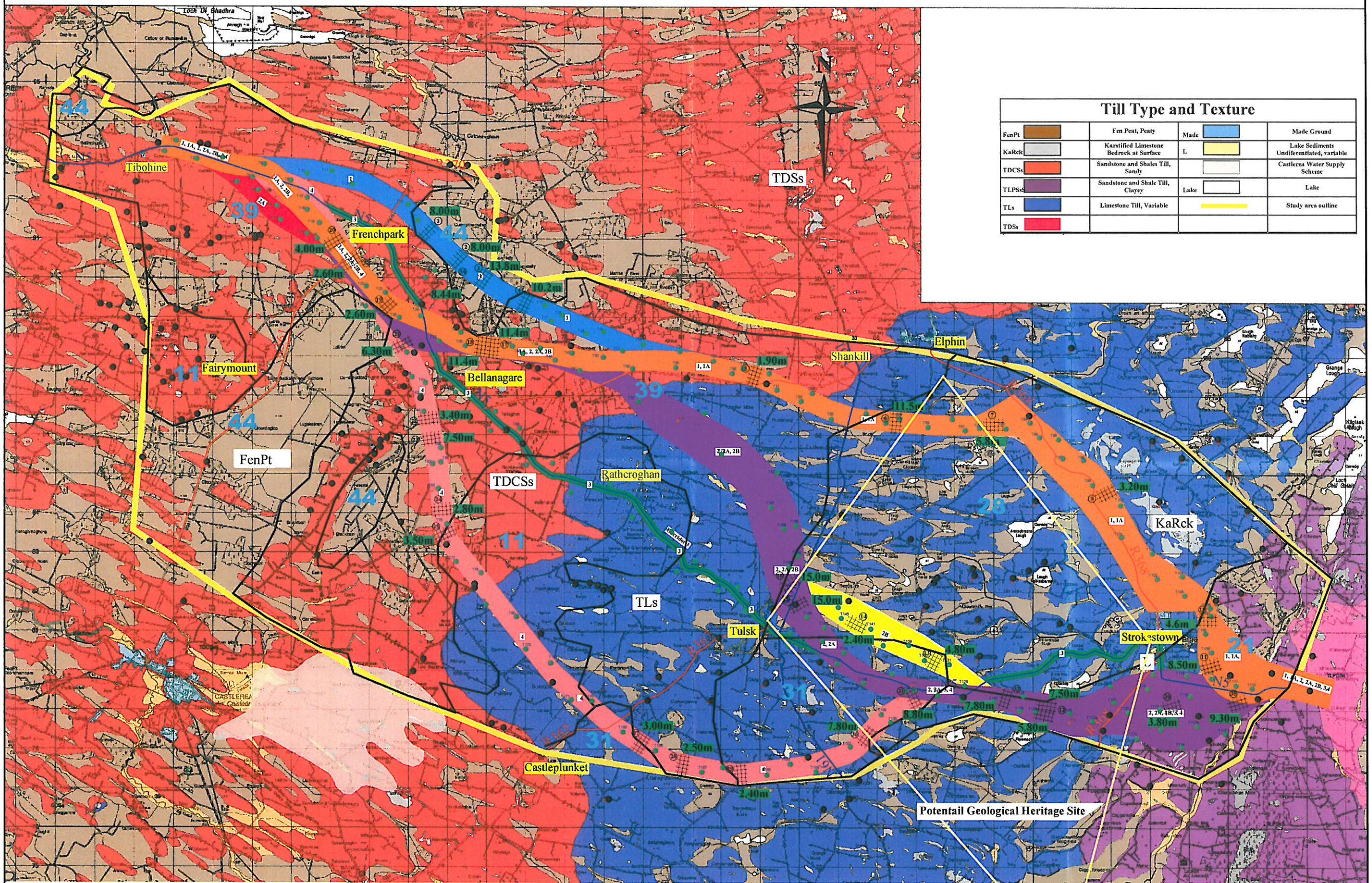
Date: March 2009



Notes

1. Study Area Soils & Probes
2. Source = Teagasc & GSI Ground Soils Map

LEGEND

- Study Area Outline
- Corridor 1
- Corridor 1A
- Corridor 2
- Corridor 2A
- Corridor 2B
- Corridor 3
- Corridor 4

GSI General Soils

Gleys, Mostly Silurian Shale	11
Gleys, Sandstone Glacial Till	21
Greybrown Podzolics, Mostly Limestone Till	28
Minimal Grey-Brown Podzolics, Limestone Glacial Till	31
Gleys, Limestone Glacial Till	39
Basin Peat	44

- Probe Locations
- Average Depth Of Probes (10.2m)
- Trial Pits
- Wells
- Potential Geological Heritage Site

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Rev	Description	Checked	Approved	Date
1	Post Peer Review			28/02/08

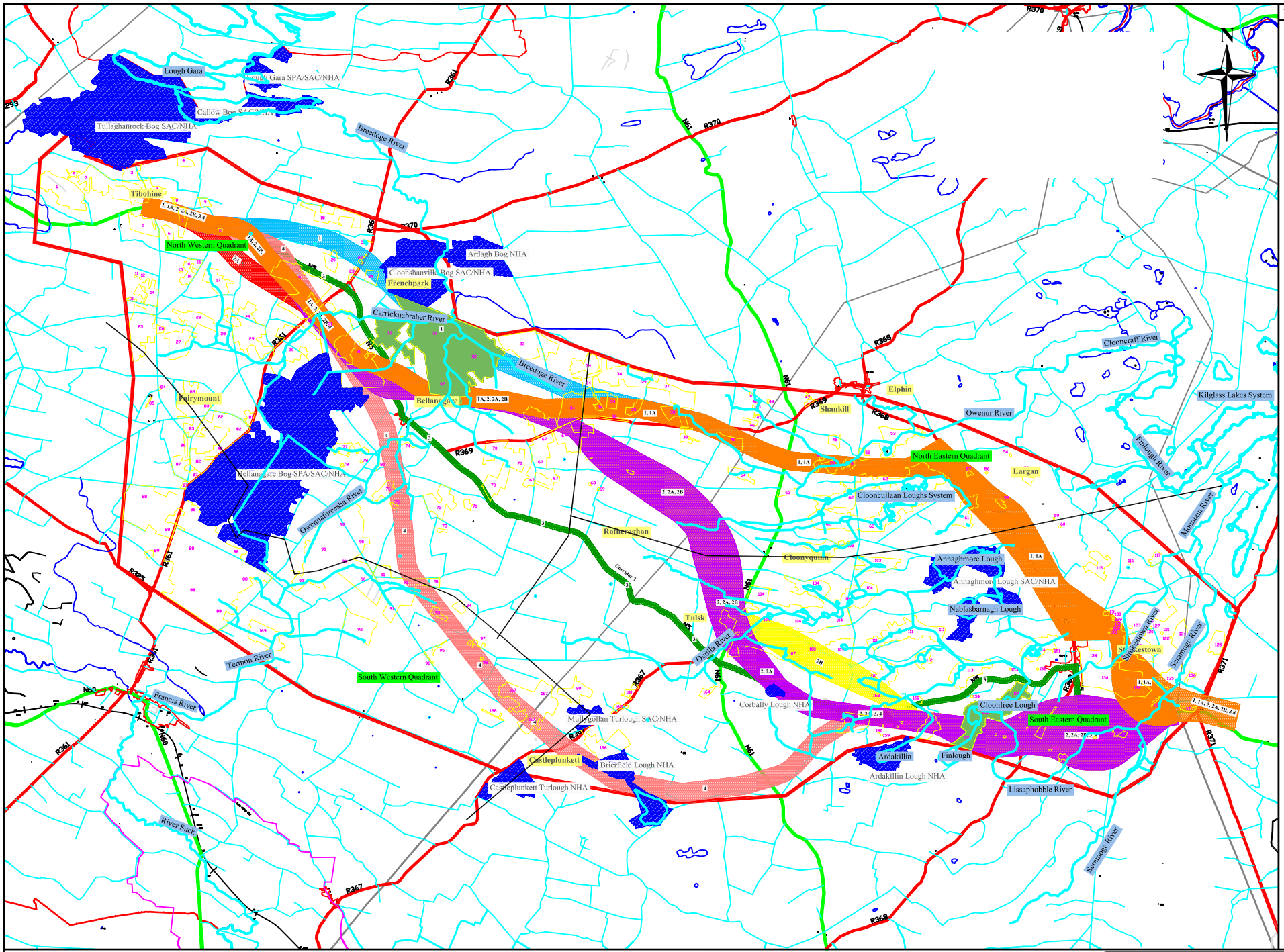
Project No. & Desc. RN04250 N5 Strategic Corridor- Route Corridor Selection

Drawing Title: Soils & Geology

File Folder: X:\RN04250 N5SC\12 Route Selection Report\Drawings\Final Dwgs-Draft 2\Final Dwgs X:\RN04250\04250-13-355 [Rob&Ros&Long]\Long

Drawing No.: Figure ES7 | Layout: 1 of 1

Drawn: Patrick Flynn | Scale V: N/A | Scale H: 1:100000 | Date: September 2007



Notes

Legend

- Study Area Outline
- Corridor 1
- Corridor 1A
- Corridor 2
- Corridor 2A
- Corridor 2B
- Corridor 3
- Corridor 4
- Ecology Constraints
- Ecology B Rating
- Designated Sites (NHA/SAC/SPA)
- Lakes and Watercourses
- Watershed Boundary

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Rev	Description	Checked	Approved	Date
1	Post Peer Review			28/02/08

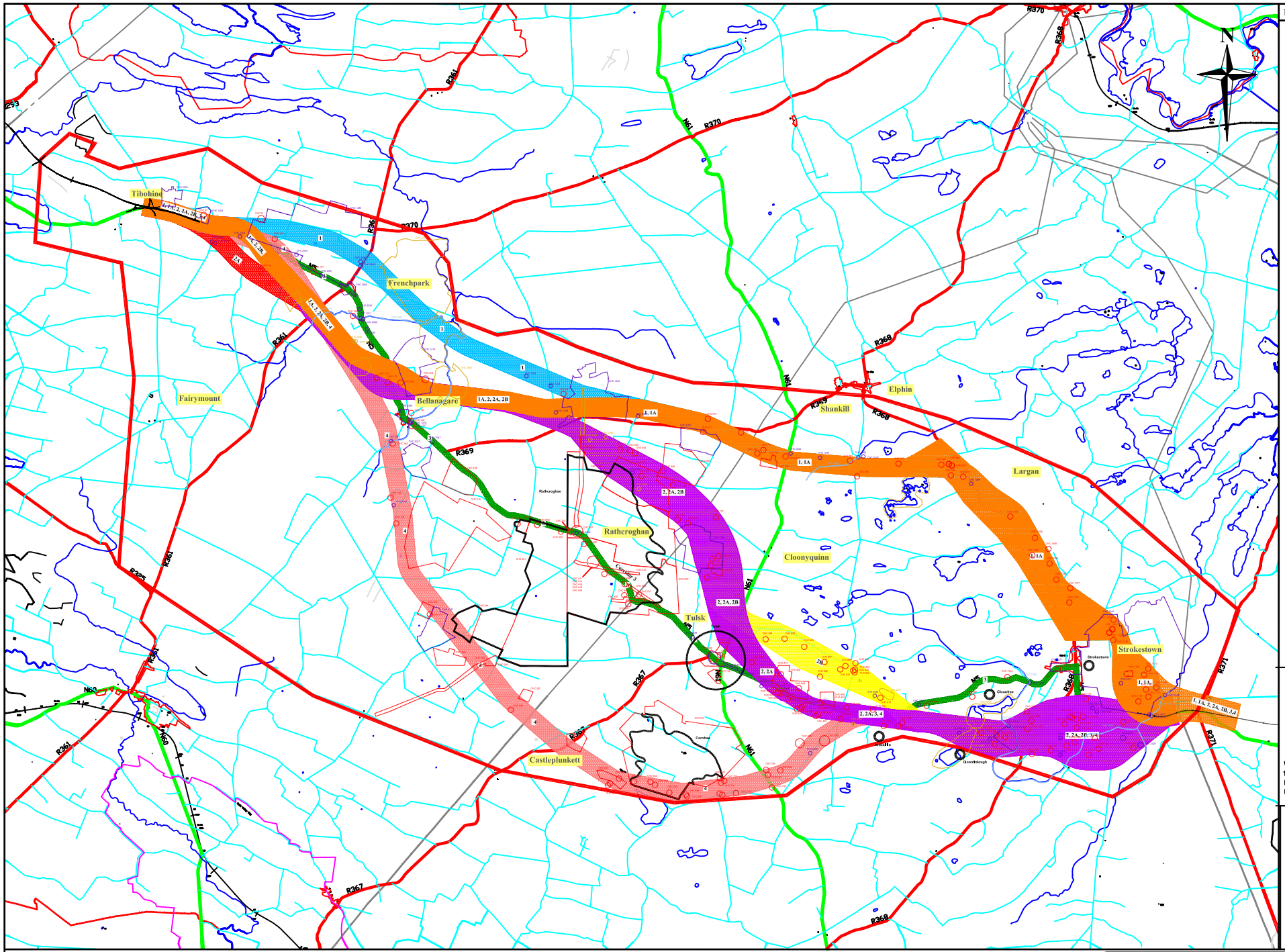
Project No. & Desc. RN04250 N5 Strategic Corridor - Route Corridor Selection

Drawing Title: Ecology

File Folder: R:\RN04250 N5SC\12 Route Selection Report\Drawings\Final Drwgs\Draft 2\Final Drwg\ES8\RN04250-ES8 (Ecology).dwg

Drawing No.: Figure ES8 | Layout: 1 of 1

Drawn: CG | Scale V: NA | Scale H: 1:100,000 | Date: September 2007



Notes

Legend

- Study Area Outline
- Corridor 1
- Corridor 1A
- Corridor 2
- Corridor 2A
- Corridor 2B
- Corridor 3
- Corridor 4

Archaeological Development Services Limited

Windsor House,
11 Fairview Strand,
Fairview,
Dublin 1.

Tel: 01-8531009
Fax: 01 8531036
Web: www.adsireland.ie
Email: info@adsireland.ie

- Archaeological Constraints: Recorded Monuments
- Archaeological Constraints: Rivers
- Archaeological Constraints: Areas of Potential
- Architectural Heritage Constraints
- Key Constraints

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Rev	Description	Checked	Approved	Date
1	Post Peer Review			28/02/08

Project No. & Desc. RN04250 N5 Strategic Corridor - Route Corridor Selection

Drawing Title: Archaeology

File Folder: R:\RN04250 N5SC\12 Route Selection Report\Drawings\Final Drgs-Draft 2\Final Drgs RSR\RN04250-CN005\Archaeology\.dwg

Drawing No.: Figure ES9

Layout: 1 of 1

Drawn: CG

Scale V: NA

Scale H: 1:100,000

Date: September 2007

Notes

1. Emerging Preferred Route Corridor

Proposed N5 Ballaghaderreen Bypass
To Westport
N5
Ballaghaderreen
Emerging Preferred Route Corridor
R361 to R362
R370 to Carrick-on-Shannon
Ballinameen
Cloonshanville Bog
Frenchpark
Breedoge River
Carricknabrahar River
Study Area
Carricknabrahar River
Owennaforeeshal River
Emerging Preferred Route Corridor
N61 To Boyle
Elphin
R369 To Elphin
Shankill Cross
Owenur River
Fairymount
Bellanagare
Bellanagare Bog
Owennaforeeshal River
Clooncullaun Lakes
Study Area
Ratheroghan
Toonyquin
Annaghmore Lough
R371 To Ballymahon
Emerging Preferred Route Corridor
Scramoge River
Tulsk
Ogulla River
Strokestown
Cloonfree Lough
N5 Scramoge Schaeme
To Dublin
R371 To Longford
Scramoge River
Lissalway
Castlerea
R367 To Ballintober
Castleplunkett
Carns
Fin Lough
N61 To Roscommon
N61 To Roscommon
Scale 0 500 1000 1500 2000

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Rev	Description	Checked	Approved	Date
1	Post Peer Review			28/02/08

Project No. & Desc.	RN04250	N5 Strategic Corridor-Route Selection Report	
Drawing Title	Emerging Preferred Route Corridor		
File Folder	R:\RN04250 N5SC\12 Route Selection Report\Drawings\Final Drgs-Draft 2\Final Drg RSR\RN04250-r2-370 (Emerging Preferred Route Corridor)	Drawing No.: Figure ES10	Layout 1 of 1
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2 INTRODUCTION

2.1 The Brief

Roscommon National Road Design Office (NRDO) was commissioned, in May 2004, by Roscommon County Council to advance the N5 Strategic Corridor Scheme in accordance with the NRA[5] National Roads Project Management Guidelines (NRAPMG)[6]. This is a seven stage sequential process through which all national roads schemes are developed:

1. Overall Project Planning;
2. Constraints Study;
3. Route Corridor Selection;
4. Prelim Design/ Land Acquisition Procedures;
5. Contract Documents/ Tender Award;
6. Scheme Construction;
7. Final Account and Closeout.

It provides for the evaluation of engineering, environmental and economic factors, informed by consultations with the public and with an extensive range of public and private bodies and individuals, to identify the optimum road alignment. To date, the N5 Strategic Corridor has progressed through the first two stages and has resulted in the preparation of a Constraints Study Report[7] that identifies the principal constraints and informs the development of feasible route corridors.

The Draft Constraints Study Report was submitted to the NRA in December 2005 and approval to proceed with Phase 3 Route Selection was received on 20th March 2006.

The proposed scheme is now being advanced through Phase 3 Route Selection of the NRPMG. The scope of the works includes:

- Identification, through an iterative process, of feasible route corridors; informed by the Constraints Study Report, further assessment by the design team and its sub-consultants and by consultations;
- To carry out an assessment of the feasible route corridor options in order to evaluate and compare them based on engineering, environmental and economic grounds;
- Based on the assessment outlined above, to determine the overall preferred Route Corridor; and
- Production of the Route Corridor Selection Report.

[5] National Roads Authority
[6] NRA National Roads Project Management Guidelines, March 2003 (NRA DMRB 5.1.2). National Roads Authority
[7] N5 Strategic Corridor Constraints Study Report, December 2005, Roscommon County Council.

2.2 Report Format

This report summarisess the process followed in the assessment and evaluation of the route corridor options that led to the determination of the Emerging Preferred Route Corridor. It consists of two Volumes:

- Volume 1, this volume, contains an Executive Summary, the Route Corridor Selection Report and the technical and environmental reports, and
- Volume 2 contains the Scheme Drawings

The report has been prepared by Roscommon NRDO and the following specialist sub-consultants as follows:

Topic	Sub-Consultant	Comment
Archaeology	Michael MacDonagh, Donegal National Road Design Office	Reviewed existing Archaeological data, prepared Archaeology Chapter and co-ordinate the Archaeological sub-consultants
	Archaeological Development Services Limited	Prepared the Archaeological Assessment and Evaluation Report (Included in Appendix 3C)
Ecology	Prof. Mark Farragher and Prof. John Whelan	Prepared the Ecological Evaluation and Assessment Report (included in Appendix 3D)
Soils and Geology, Hydrology and Hydrogeology	Hydro Environmental	Prepared the Soils and Geology, Hydrology and Hydrogeology Report (included in Appendix 3E and 3F)
Landscape and Visual	MosArt Landscape Architects	Prepared the Landscape and Visual Evaluation and Assessment Report (included in Appendix 3G)
Socio-Economic	Optimize Consultants	Prepared the Socio-Economic Evaluation and Assessment Report (included in Appendix 3I)
Air Quality	RPS Consulting Engineers	Prepared the Air Quality Evaluation and Assessment Report (included in Appendix 3B)
Traffic Study	Transport Planning International Limited (TPi)	Prepared the Traffic Evaluation and Assessment Report (included in Appendix 1)

Table 2.1 List of Sub-Consultants

2.3 Background and Context to the Proposed Scheme

2.3.1 The N5 Route

The N5 National Primary route runs from Westport, Co. Mayo in the west to Longford Town in the midlands where it connects with the N4 National Primary route (see Fig. 2.1). It is listed in the National Roads Needs Study published by the NRA in July 1998 as a “Strategic Corridor Link”, and links the west with the midlands and, via the N4, with Dublin and the eastern region generally (see Fig. 2.2).

The N5 is approximately 134km in length and traverses Counties Mayo, Roscommon and Longford (see Table 2.1 below).

County	Length of N5 (km)
Mayo	62.57
Roscommon	60.64
Longford	10.98
Total	**134.19**

Table 2.2 Length of N5 Route by County

2.3.2 N5 Major Improvement Programme

Significant improvement works have been carried out on the N5 over the past number of years in Mayo and Roscommon. Table 2.2 below summarises the main improvement works completed and those that have received statutory approval:

Scheme Name	Approx. Length (km)	Comment
Castlebar and Swinford Bypass Schemes	32	Completed pre 1999
Charlestown Bypass	18	Opened to traffic in October 2007
Scramoge Scheme	8	Opened to traffic in May 2004
Termonbarry to Longford Scheme	10	Completed pre 1999
Total	**68**	

Table 2.3 N5 Improvement Schemes completed or having Statutory Approval

The planning and design of these and other improvement schemes on the N5 continues to be advanced in accordance with national and local policy. The remaining sections of N5 requiring upgrade are shown in Table 2.3 below:

Section	Approx. Length (km)	NRNS Phase	Comment
Westport to Castlebar	14	Backlog	
Ballaghaderreen Bypass	14	Phase 3	CPO published in 2007
Ballaghaderreen to Tulsk	35	Phase 4	These three schemes collectively form the N5 Strategic Corridor and are the subject of this report
Tulsk Bypass		Not Included	
Strokestown Bypass		Phase 3	
Longford Bypass	3	Phase 3	CPO Published in 2007.
Total	**66**		

Table 2.4 Remaining Sections of N5 requiring improvement

The section of the N5 under consideration as part of the N5 Strategic Corridor Scheme is approx. 35km long and extends from the Ballaghaderreen Bypass tie-in at Rathkeery Townland to the Scramoge Scheme tie-in at Bumlin Townland.

2.4 National, Regional and Local Policy

2.4.1 National Roads Needs Study (NRNS), July 1998

The National Roads Needs Study was published by the NRA in 1998. The objectives were to assess the current condition of all National Routes and to determine the works needed to ensure a safe and efficient network capable of providing a Level of Service D from 1999 to 2019.

Level of Service (LOS) is a capacity related road classification system that ranges from A to F representing decreasing average speeds and worsening driving conditions. LOS D relates to an average inter-urban speed of 80kph with extremely difficult passing and platoon sizes of 5 to 10 cars.

The study provides a nationwide based, phased implementation programme for National Route upgrading. There are four phases, each spanning a 5 year consecutive period from 1999 to 2019, and a backlog phase for sections of road that were deemed to be already at capacity.

The N5 is identified as a Strategic Corridor Link and forms part of the East/ West Road Corridor linking the west and northwest with Dublin and the eastern ports. Two sections of the N5 listed in the NRNS are within the proposed N5 Strategic Corridor Scheme, Strokestown Bypass (Phase 3) and Ballaghaderreen to Tulsk (Phase 4) (see Table 2.3 above).

2.4.2 National Development Plan 2000-2006

The **National Development Plan (NDP2000) (2000-2006)** was published in 2000 and was based on the assessment of the development needs of the Country to ensure that Ireland's recent economic progress was consolidated and built on in a sustainable way. Although this has recently been superseded, it is relevant in that it was the Plan in place during the previous stages of this scheme and during much of the development of the Route Corridor Selection Phase.

Roads form part of the national infrastructure that is in urgent need of expansion to sustain the current level of economic activity and to enhance the potential of less developed regions such as the Border, Midland and Western Region (BMW) (see Fig. 2.3). To achieve this expansion, the NDP2000 outlined the following principal objectives for the development of the National Road System:

- *To improve the reliability of the road transport system by removing bottlenecks, remedying capacity deficiencies and reducing absolute journey times and journey time variance;*
- *To improve internal road transport infrastructure between regions and within regions, contribute to the competitiveness of the productive sector and foster balanced regional development;*
- *To facilitate better access to and from the main ports and airports with the main objective of offsetting the negative effects of peripherality;*
- *To contribute to sustainable transport policies, facilitating continued economic growth and regional development while ensuring a high level of environmental protection;*
- *To help achieve the objectives of the Government's Road Safety Strategy in relation to the reduction in facilities and serious injuries caused by road accidents.*

The strategy for National Roads Infrastructure relevant to the N5, as outlined in the last NDP2000, includes a motorway from Dublin to Kinnegad with further major improvements on the N4 along the North West Route and on the N5 along the Western Corridor (see Fig 2.4). The NDP2000 pitched the level of investment in the non-motorway national route system to achieve a minimum LOS D on 90% of the network.

The strategy envisaged for the national primary roads involved the adoption of an integrated planning approach with the identification of improvement needs and route selections for substantial sections of the routes rather than focusing solely on the delivery of town bypasses.

2.4.3 Transport 21 and National Development Plan 2007-2013

Transport 21 (2006-2015) provides a blueprint for the development of National Transport Infrastructure over the coming decade and is supported by government commitment to a multi-annual financial investment framework. The Transport 21 objectives are integrated into the new National Development Plan (2007-2013).

In relation to National Roads, Transport 21 seeks to improve the Strategic Road Links to the West and Northwest by upgrading the N4 and the N5 National Primary Routes (See Fig. 2.5).

The **National Development Plan (2007-2013) (NDP)** sets out a programme of integrated investments that will underpin Ireland's ability to grow in a manner that is economically, socially and environmentally sustainable.

Among the general goals underpinning the NDP and steering the associated investment priorities are:

- ***Decisively tackle structural infrastructure deficits*** *that continue to impact on competitiveness, regional development and general quality of life and to meet the demands of the increasing population,*

- ***Integrate regional development within the National Spatial Strategy framework*** *of gateway cities and Hub town to achieve the goals of economic growth in the regions and provide for major investment in the rural economy.*

The first investment priority is Economic Infrastructure and its associated key objectives include:

- To create a road network, in line with the timetable in Transport 21, that will see the completion of major inter-urban routes and will upgrade links generally between the National Spatial Strategy Gateway Centres and improve the non-national road network

Under the Economic Infrastructure Priority, the key strategic objection of the Transport Programme, consistent with the policy goals set out in Transport 21, is the creation of a road network that will promote regional, national and international competitiveness.

The N5 National Primary Road connects the linked Hub Towns of Castlebar/ Ballina with the Midlands Gateway and, via other National Routes, with the eastern Gateways of Dundalk and Dublin. It is categorised as a "Route to Border/ North West and West" in the NDP (See Figure 2.6 below).

2.4.4 National Spatial Strategy

The **National Spatial Strategy for Ireland (2002-2020)** (NSS) is a twenty year planning framework designed to achieve a better balance of social, economic, physical development and population growth between regions.

The Government uses the NSS to spell out the basis on which all areas of the Country will have the opportunity to develop to their potential within a national spatial planning framework for the period up to 2020. In particular, the strategy identifies four gateways (Galway, Sligo Letterkenny/ Derry and Athlone/ Mullingar/ Tullamore) and four hubs (Tuam, Castlebar/ Ballina, Cavan and Monaghan) within the BMW Region.

The N5 National Primary Route is identified as a Strategic Radial Corridor within the NSS providing links between the western and northwestern gateways and hubs and those located in the east of the country (see Fig. 2.7).

2.4.5 Regional Planning Guidelines

Regional Planning Guidelines (RPG) are prepared by each of the eight Regional Authorities for their respective functional areas in accordance with the Planning and Development Acts. These guidelines provide a strategic approach to the planning of the regions by translating National Policy, as outlined in the Spatial Strategy in particular, to regional level and ultimately to local level through the County Development Plans and Development Board Strategies.

The N5 route is of particular significance to the West Region and the Midland Region and is included in the RPGs adopted by both.

The **West RPG** outline the importance of the N5 as:

- a communications/ access route serving the linked hub of Castlebar/ Ballina and
- a means of reducing the Peripherality of the West Region both nationally and internationally.

Upgrading the N5 is included in the *Overall Regional Infrastructural Priorities* necessary to achieve the planning and development objectives for the region (see Fig 2.8).

The Midland RPG outline the importance of the N5 as a key linkage between the Midland Region and the West Region.

2.4.6 Roscommon County Development Plan

The Roscommon County Development Plan 2002 (hereinafter referred to as RCDP) was adopted on 19th July, 2002 and sets out a framework for the sustainable physical development of the County.

County Roscommon is an inland county located in the Border, Midland and Western Region. The N5 National Primary Route divides the county, approx., in half. It links Roscommon and the west/ northwest gateways and hubs with those located in the midlands and east of the country.

The RCDP has, as its Transport Aim, *to develop a safer, more efficient and integrated transport system that will improve the road network and other forms of transport to serve the urban and rural population*. The principal road transport policies associated with this aim include:

- To develop and improve the safety and carrying capacity of the road network in the County,
- To seek priority investment for strategic schemes on the National Road network in the County.

The County Development Plan identifies a number of objectives in order to achieve its aim. Those most relevant to the N5 National Primary Road include:

- To implement improvement to National Primary Roads as listed in Schedule 2 – this includes “Upgrade N5 road between Termonbarry and Mayo Boundary”,
- To reserve and maintain free of development land corridors for the provision of town bypasses including Ballaghaderreen, Bellanagare, Frenchpark, Tulsk and Strokestown.

2.4.7 Roscommon County Development Board Strategy (2002-2012)

General

County/ City Development Boards were established primarily to facilitate the co-ordination and integration of services at a local level and to develop and oversee the implementation of a ten-year strategy for the county/city. Roscommon County Development Board adopted the "Strategy for the Economic, Social and Cultural Development of County Roscommon" in 2002.

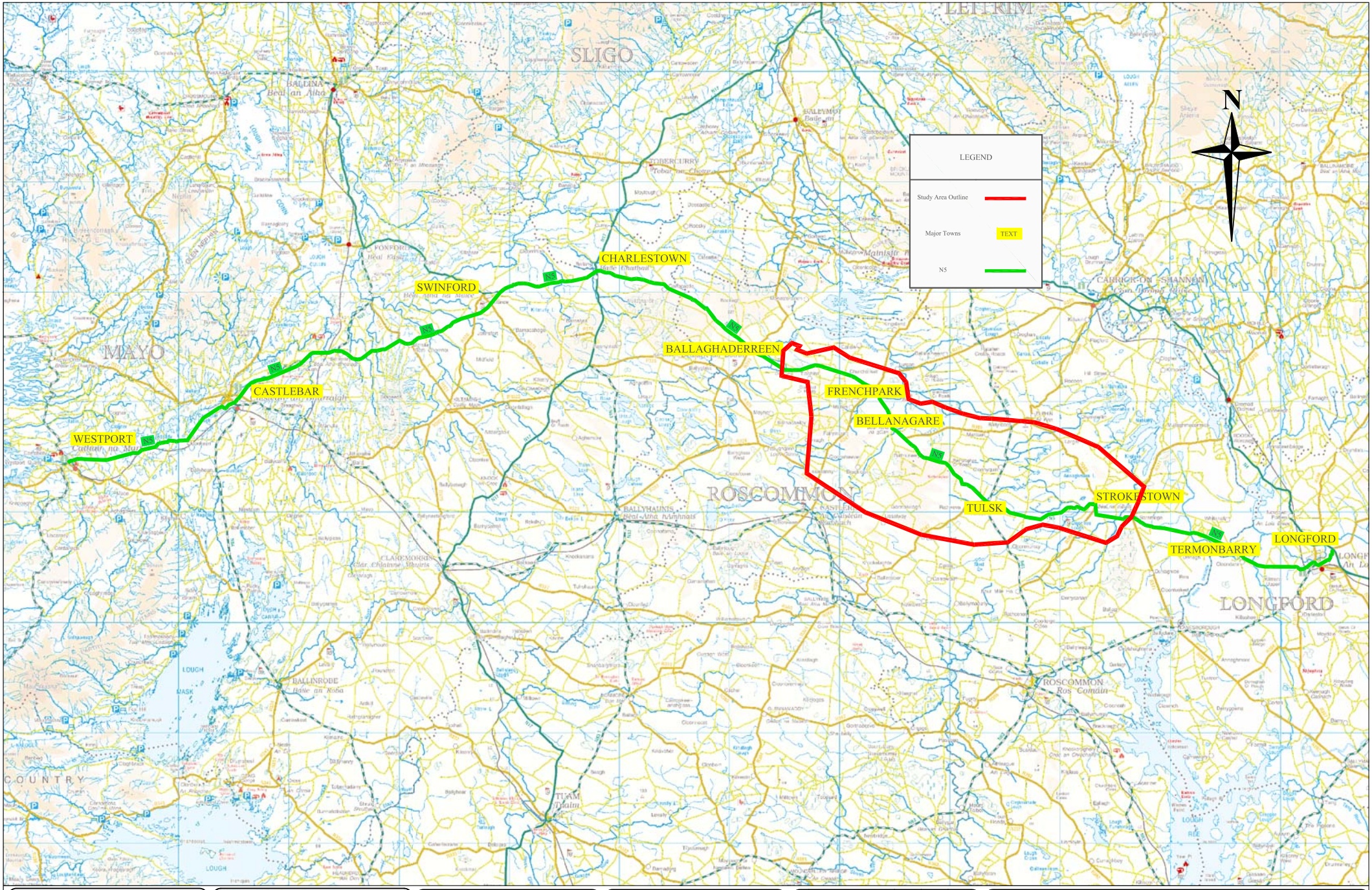
Strategic Goals

The Board developed a "Vision" for the county and set a number of Strategic Goals to achieve it including "*To develop and enhance the economic well-being in County Roscommon so as to facilitate existing and future economic growth, in line with balanced regional development*"

The supporting Roads and Transport Objective is "*To ensure that the transport system is developed and upgraded to a level that can support increased economic, social and cultural development of the county*" and the associated Strategic Actions include:

- *Develop and improve the quality and safety of all primary, secondary, regional and local routes in Roscommon with priority to upgrading the N5, N6, N61 and N63,*

- *Develop a quality road network linking into the major settlements in the region.*



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An tÚdarás um Bóithre Náisiúnta

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Racecourse Road,
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M. Curley, B.E., C.Eng.
Senior Engineer.

Rev	Description	Chk.	App.	Date

Project: N5 STRATEGIC CORRIDOR STUDY

Component: ROUTE CORRIDOR SELECTION REPORT

Title: N5 National Primary Route (Sheet 1 of 1)

Job No.: 250

Scales: Not to Scale

Date: 14-12-2007

Filename: n/a

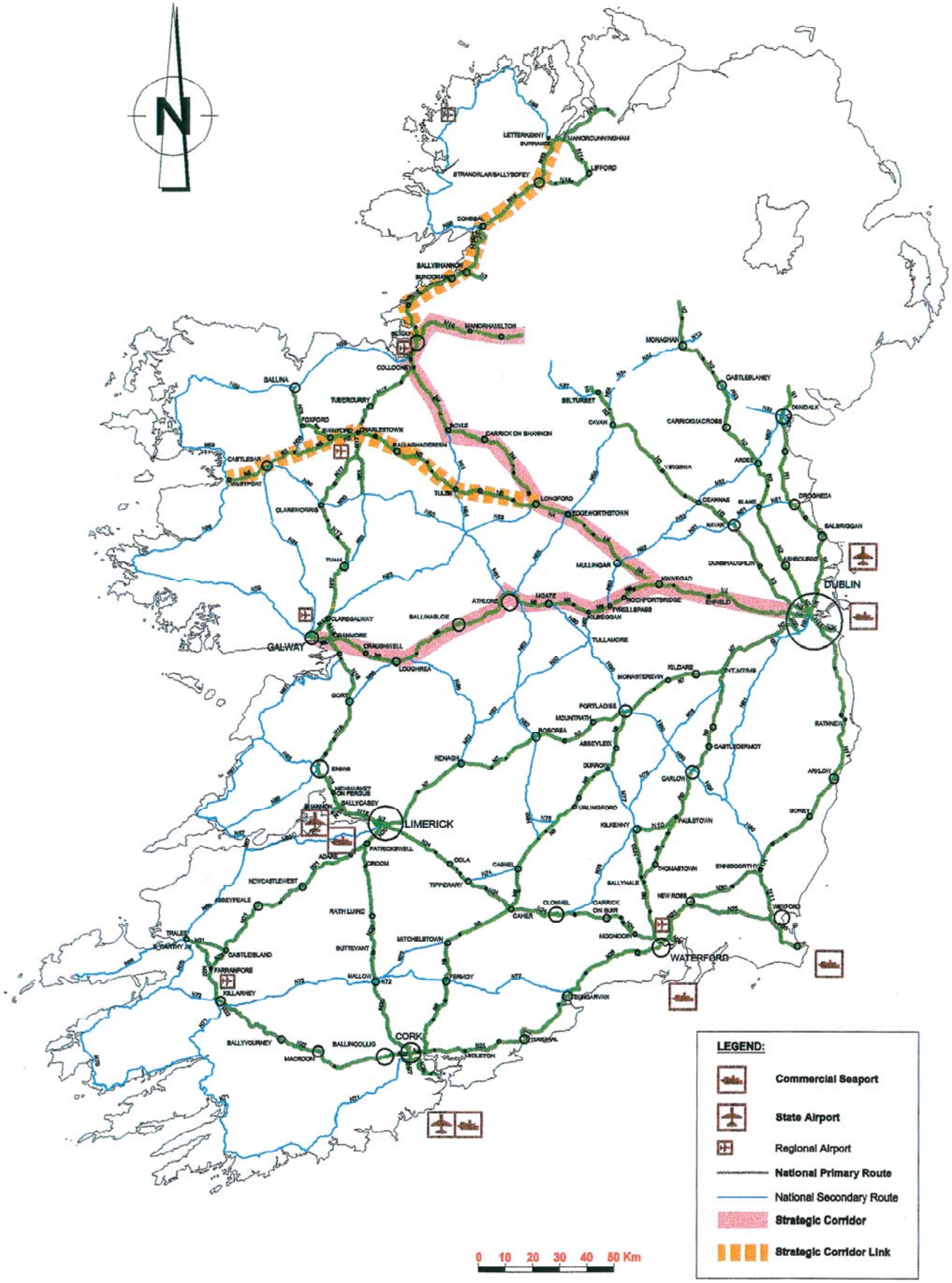
Drawing No.: FIG 2.1

Issue: WIP

Design: Celine Greaney

Drawn: Celine Greaney

Checked: Mark Keaveny



East / West Road Corridor

Map 3

Rev	Description	Chk.	App.	Date
A	Draft Report			31-10-05

Project: N5 STRATEGIC CORRIDOR STUDY
Component: ROUTE CORRIDOR SELECTION REPORT
Title: Strategic Corridor Link (sheet 1 of 1)
Job No.: 250
Scales: Not to Scale
Date: 14-12-2007
Filename: n/a
Drawing No.: FIG 2.2
Issue: WIP
Design: Celine Greaney
Drawn: Celine Greaney
Checked: Mark Keaveny

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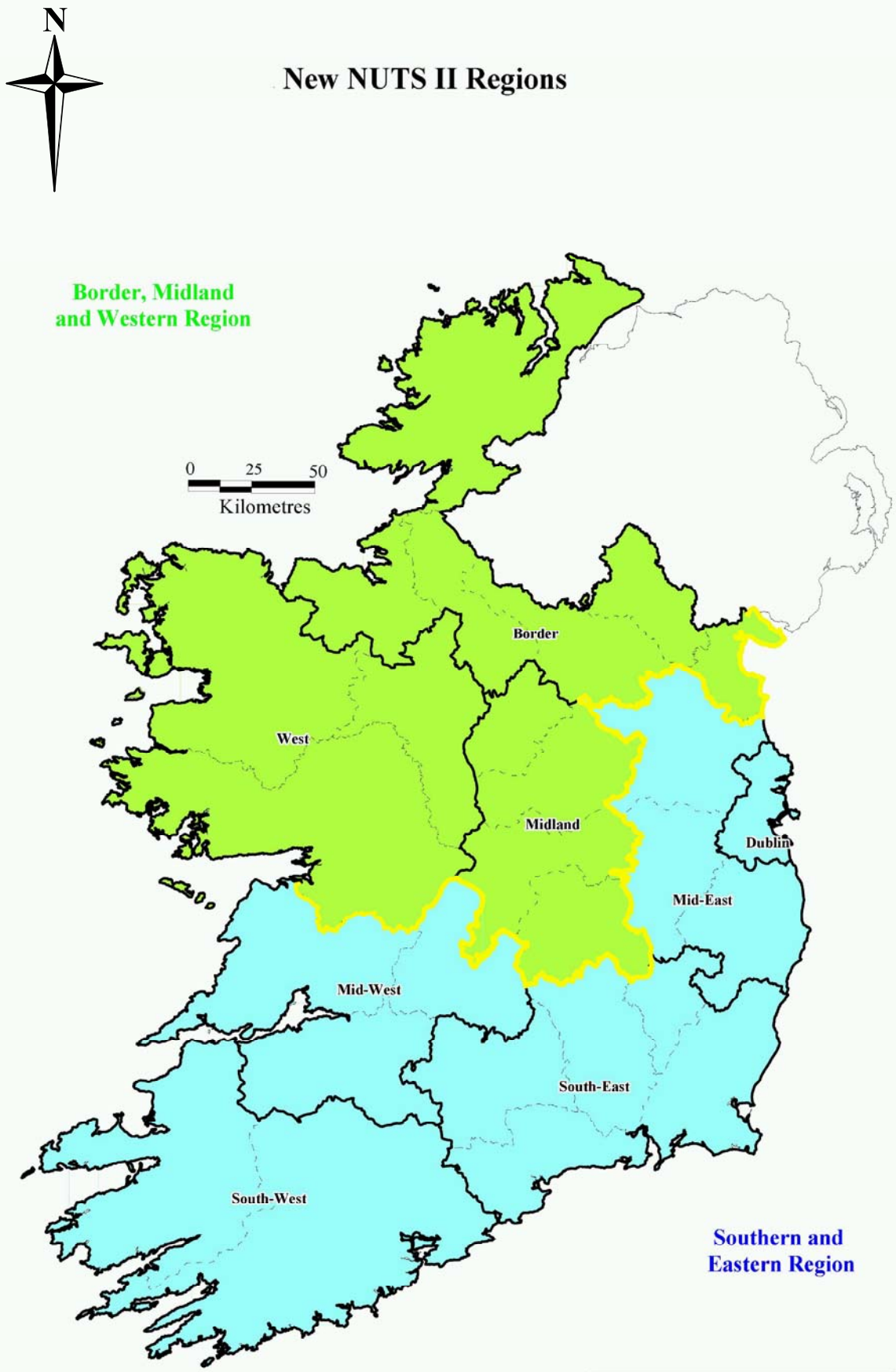
New NUTS II Regions



Rev	Description	Chk.	App.	Date
A	Draft Report			31-10-05

Project: N5 STRATEGIC CORRIDOR STUDY
Component: ROUTE CORRIDOR SELECTION REPORT
Title: BMW Region
Filename: n/a
Drawing No.: FIG 2.3
Job No: 250
Issue: WIP
Scales: Not to Scale
Date: 14-12-2007
Design: Celine Greaney
Drawn: Celine Greaney
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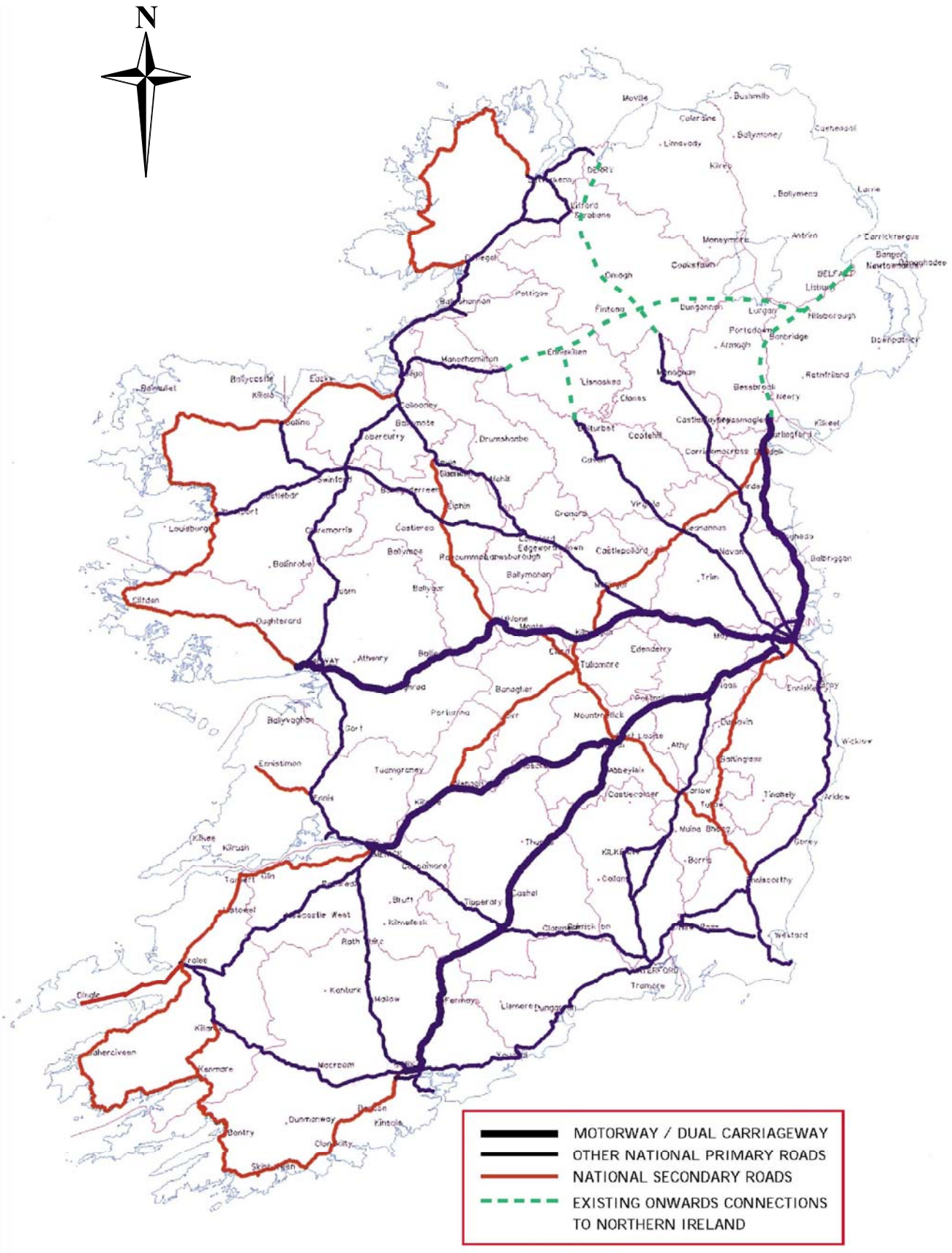
INVESTMENT IN ROAD IMPROVEMENTS 2000 - 2006



Rev	Description	Chk.	App.	Date
A	Draft Report			31-10-05

Project: N5 STRATEGIC CORRIDOR STUDY
Component: ROUTE CORRIDOR SELECTION REPORT
Title: NDP Road Improvements (sheet 1 of 1)
Job No: 250
Scales: Not to Scale
Date: 14-12-2007
Filename: n/a
Drawing No.: FIG 2.4
Issue: WIP
Design: Celine Greaney
Drawn: Celine Greaney
Checked: Mark Keaveny

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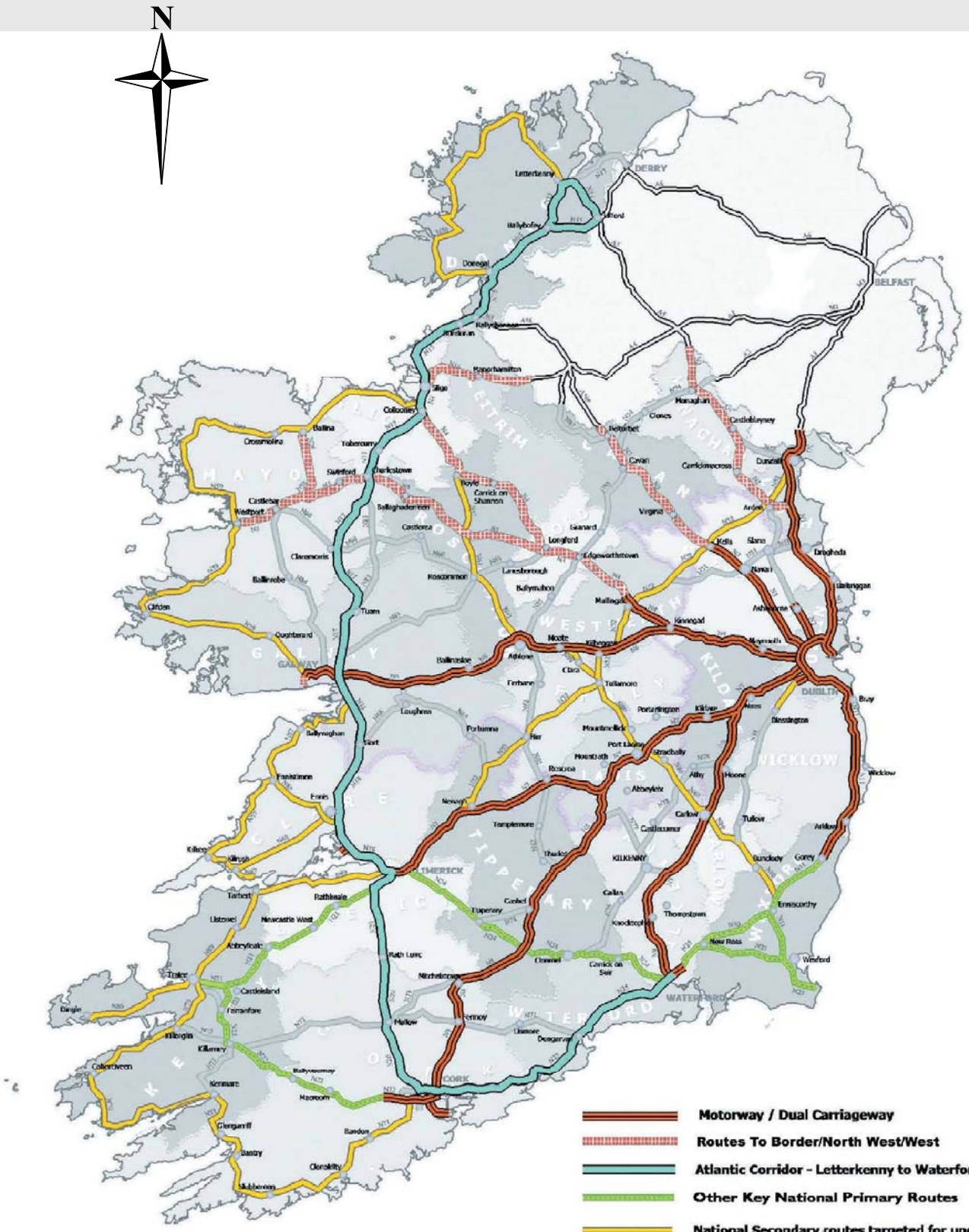
National Roads Network 2015



Rev	Description	Chk.	App.	Date

Project: N5 STRATEGIC CORRIDOR STUDY
Component: ROUTE CORRIDOR SELECTION REPORT
Title: Transport 21 Road Improvements (sheet 1 of 1)
Job No: 250
Scales: Not to Scale
Date: 14-12-2007
Filename: n/a
Drawing No.: FIG 2.5
Issue: WIP
Design: Celine Greaney
Drawn: Celine Greaney
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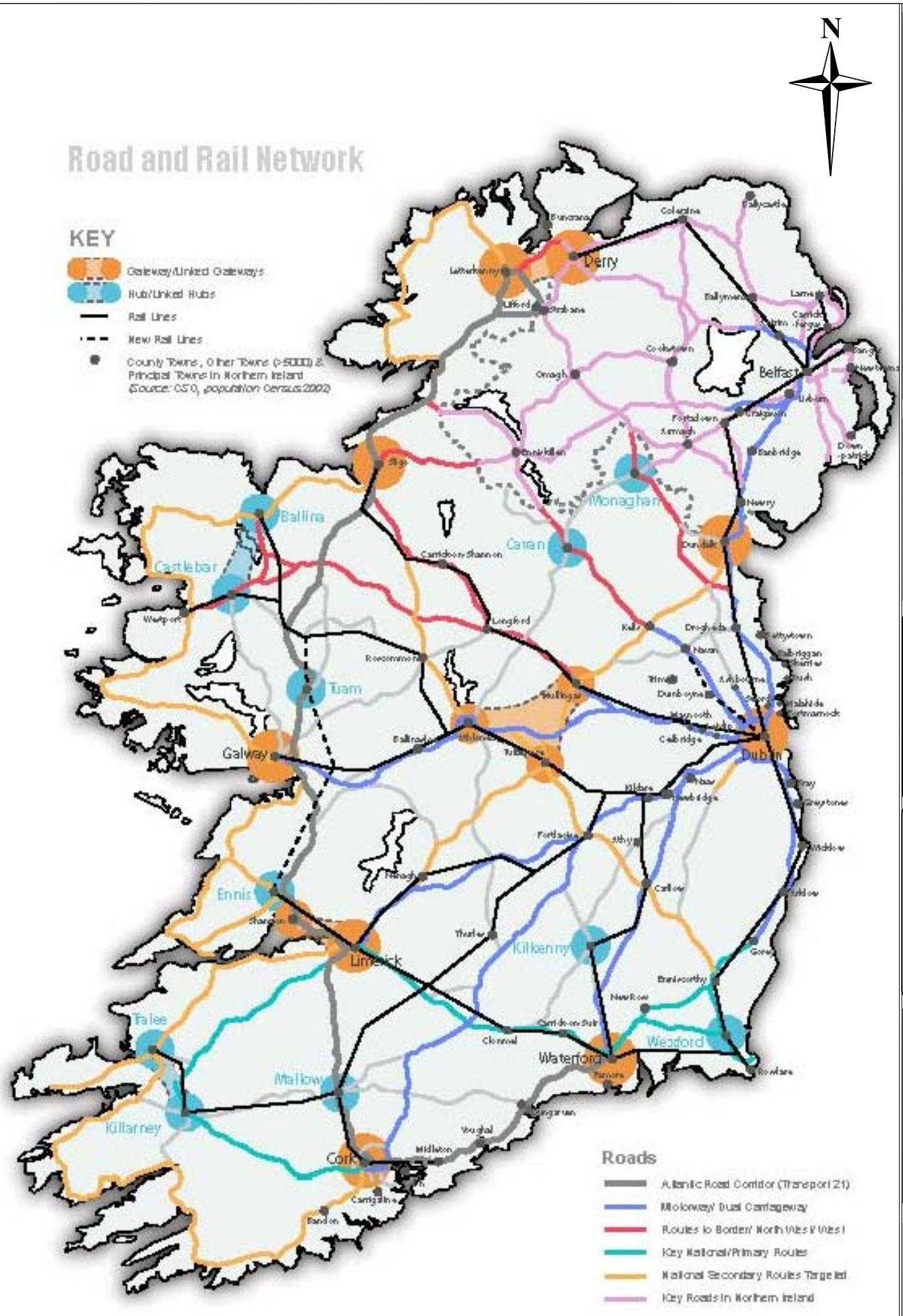

Rev	Description	Chk.	App.	Date

Project: N5 STRATEGIC CORRIDOR STUDY
Component: ROUTE CORRIDOR SELECTION REPORT
Title: NDP 2007 Road Improvements (sheet 1 of 1)
Job No: 250
Scales: Not to Scale
Date: 14-12-2007
Filename: n/a
Drawing No.: FIG 2.6
Issue: WIP
Design: Celine Greaney
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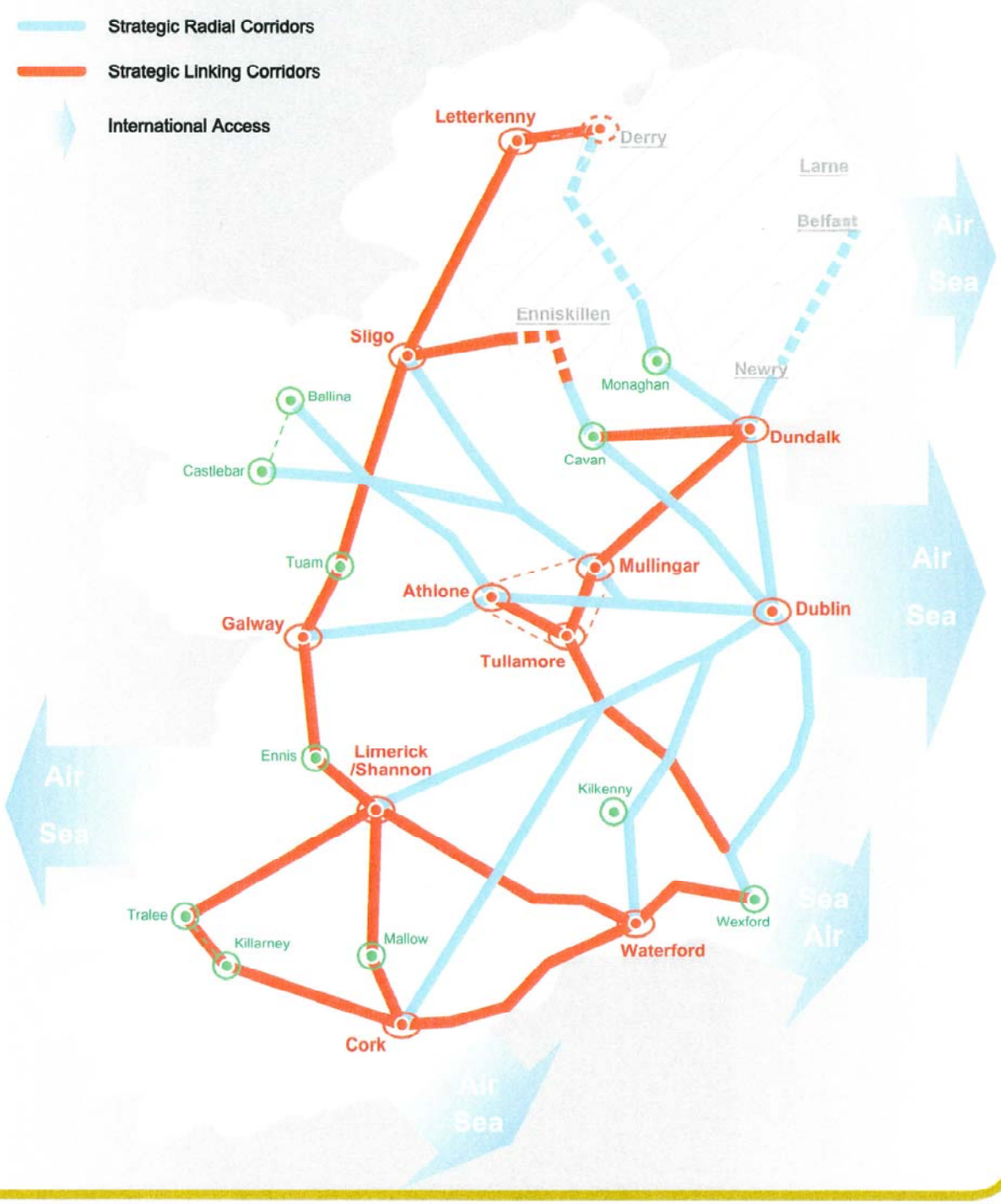
Map 3 National Transport Framework



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Project	N5 STRATEGIC CORRIDOR STUDY			Job No. 250
Component	ROUTE CORRIDOR SELECTION REPORT	Title	NSS Gateways and Hubs (Sheet 1 of 1)	Issue WIP
Scales	Not to Scale	Date 14-12-2007	Filename N/A	Drawing No.: FIG 2.7
Design	Celine Greaney	Drawn Celine Greaney	Checked Mark Keaveny	

Rev	Description	Chk.	App.	Date

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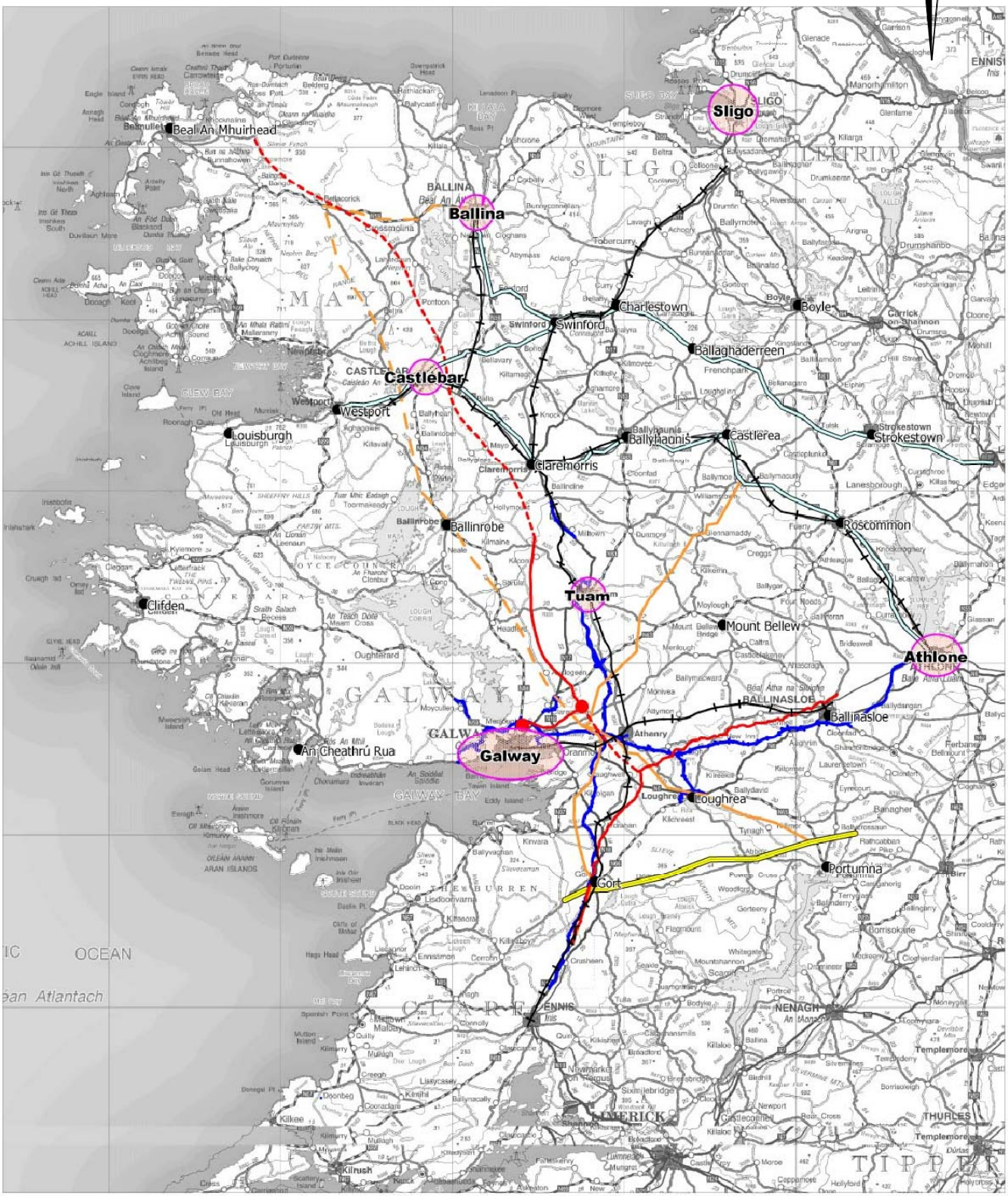

Galway County Council
IT Section

County Buildings
Prospect Hill
Galway

www.galway.ie

West Regional Authority

MAP 1

INFRASTRUCTURAL PRIORITIES

- Gas Substation
- Gas Pipe
- Proposed Gas Pipeline
- 220kv
- 440kv
- Proposed 220kv
- Wester Rail Corridor / InterCity Routes
- NRA
- Proposed Road Upgrades
- Keytowns
- Hubs / Gateways

Project: N5 STRATEGIC CORRIDOR STUDY
Component: ROUTE CORRIDOR SELECTION REPORT
Title: West RPG (Sheet 1 of 1)
Job No: 250
Issue: WIP
Scales: Not to Scale
Date: 14-12-2007
Filename: N/A
Drawing No.: FIG 2.8
Design: Celine Greaney
Drawn: Celine Greaney
Checked: Mark Keaveny

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3 DESCRIPTION OF ROUTE CORRIDOR OPTIONS

3.1 Introduction

The development and assessment of route corridor options, leading to the determination of the preferred route corridor based on engineering, environmental and economic factors, is one of the most important phases in the development of National Roads Schemes.

This section outlines the first step in this phase – the development of Feasible Route Corridors. It begins by providing an overview of the route corridor option development process followed by a detailed description of each of the seven route corridor options identified.

3.2 Development of Feasible Route Corridor Options

The development of feasible route corridors is informed by the Constraints Study Report[8] (CSR). The CSR was prepared on behalf of Roscommon County Council by Roscommon National Roads Design Office (RNRDO) in 2006. The study area was defined having regard to key constraints identified from a preliminary review of existing information sources and to the need to allow the development of feasible route corridors during the subsequent stages of the scheme.

The purpose of the scheme is to upgrade the N5 National Primary Route between Ballaghaderreen and Scramoge. Hence, the western and eastern boundaries of the constraints study area were defined with respect to the proposed Ballaghaderreen Bypass Scheme tie-in and the completed Scramoge Scheme tie-in locations respectively.

The northern and southern boundaries were defined by reference to known environmental and physical (built and natural) constraints, the requirement to allow for feasible options to be developed and employing the knowledge and experience of the design team.

The boundaries remained under review throughout the preparation of the Constraints Report to allow the accumulation of information to inform amendments where necessary.

The constraints study area identified covers approx. 328 km^2, is centred on the existing N5 National Primary Route, is orientated on a west-east axis and measures 34.5km wide by 11.5km deep. Within this area constraints, that could hinder the development of route corridors and ultimately the final road alignment were identified based on a combination of desk studies supplemented by site visits/ windscreen surveys and consultation, etc., and were grouped under the following headings:

Planning and Land Use
Settlement Patterns – Urban and rural – Tibohine, Frenchpark, Bellanagare, Tulsk, Strokestown, Fairymount, Mantua, Cloonyquin and other local communities. Other rural settlement is dispersed mainly along existing roads.
Particular Use - Existing dwellings and other buildings, areas used for agriculture and industry, zoned areas around Strokestown and Elphin, recreation and amenity area, locations of forestry and sensitive building (Churches, schools, graveyards, community facilities, etc.)
Planning Search – outside of towns and villages to show locations where development is likely to take place within next five years

[8] N5 Strategic Corridor Constraints Study Report 2006, Roscommon County Council.

Utilities
Water Services – Sources of public water supply (Lough Gara, Lisheen Lake, Castlerea, Castleland (Tulsk) and Gortnagoyne (Bellanagare)) as well as local supplies were identified. Also, the locations of large diameter watermains and water and wastewater treatment facilities were identified)
Telecom Services – In general, there is a relatively even distribution of telecom services throughout the study area, with the exception of the Fibre Optic trunk cables that represent a particular constraint. These are located between Castlerea and Frenchpark along the R361 and between Strokestown and Elphin along the R368.
ESB – Again the network is relatively evenly dispersed throughout the study area with the exception of two very high voltage Trunk Network lines. The Cashla-Flagford (220kV) line crosses through the centre of the study area and is likely to be perpendicular to most options while the Lanesborough-Flag ford (110kV) line crosses at the extreme eastern part of the study area.
Landownership
Farm size is approx. equal throughout the study area with over 50% of farms being less than 50 acres.
Ecology
Designated Sites – there are ten designated conservation sites within or adjoining the study area – Lough Gara (pNHA/cSAC/SPA), Bellanagare Bog (pNHA/cSAC/SPA), Brierfield (pNHA), Castleplunkett Turlough (pNHA), Mullygollan Turlough (pNHA/cSAC), Cloonshanville Bog (pNHA/cSAC), Ardagh Bog (pNHA), Ardakillin Lough (pNHA), Annaghamore Lough (pNHA/cSAC) and Corbally Lough (pNHA). In addition, there are a further 33 areas within a 33 Km radius, 18 of which are within a 6Km radius.
Rare or Protected Plant Species – there are none recorded within study area
Protected Fauna – Some of the water features have records of White-clawed Crayfish, Lamprey and Otter. Winter waders use the aquatic environments of the eastern section.
Sites of Potential Ecological Value – 175 sites with potential ecological value were identified. These will receive additional consideration during the evaluation of the route corridor options.
Principal Aquatic Features – The main watercourses include Breedoge, Carricknabraher, Owennaforeesha, Francis, Frances, Termon, Ogulla, Owenur, Strokestown, Scramoge and Mountain Rivers. The main lake systems are located in the eastern section and include the Clooncullaan Lakes, Annaghmore Lakes and the Nablasbarnagh Lakes.
Archaeology
Overview – The entire study area and north Roscommon in general is rich in archaeological and cultural heritage features. Over 1300 Cultural Heritage Constraints were identified and mapped within the study area.
Key Archaeological Constraints – 7 key cultural heritage constraints and their associated core were identified: • Rathcroghan • Tulsk Medieval Borough • Ardakillin • Cloonfree • Strokestown House • Cloonfinlough • Carnfree (Carns)

Existing Road Network and Traffic
Existing N5 – Is a National Primary Route linking the West and Northwest with Dublin and the eastern ports.
Geometry- Substandard with respect to alignment and cross-section leading to little overtaking opportunity and an average paved width of 6m along approx. 90% of its length in study area. 459 junctions and 518 field accesses along the existing route. Existing road pavement classified as weak with evidence of cracking.
Traffic – Existing traffic flows varies along the route but averages approx. 4500 vehicles per day.
Geology and Landscape
Bedrock – The bedrock is primarily Upper Carboniferous undifferentiated Visean Limestone
Overburden – the overburden consists principally of gleys and podzolics derived from limestone till with significant areas of fen peat.
Drainage – The study area consists of four broad drainage sheds all of which drain towards the Shannon River. North west quadrant drains via the Carricknabraher and Owennaforeesha Rivers. The south western quadrant drains via the Termon, Francis and Frances rivers. The north eastern quadrant via the Owenur River and the south eastern quadrant via the Ogulla, Scramoge, Strokestown and Mountain Rivers.
Landscape – West of the N61 the land is predominately flat to undulating lowland. There are extensive areas of bog and the soils are generally described as wet and organic. East of the N61 consists of rolling lowland and drumlin features. There are several lakes and watercourses.
Legislation
Irish and EU – The main legislation surrounding the area of road scheme development includes Roads and associated areas, Health and Safety, and Environmental.

Table 3.1 General Outline of Constraints

The constraints were identified by the design team, including the Project Archaeologist, the Cultural Heritage sub-consultant and Ecological sub-consultant, and incorporate the results of extensive consultation with over 50 public and private bodies as well as ongoing public consultation including a “public consultation day” held in July 2005.

Using the constraints report as a basis and continuing the information gathering and appraisal exercise with the design team, its sub-consultants, continued consultation with public and private bodies and the general public, the seven feasible route corridors were developed based on optimising the balance between engineering, environmental and economic considerations.

Each corridor, with the exception of Option 3, is nominally 500m wide and will allow a considerable amount of flexibility to mitigate by avoidance during the next stage, Preliminary Design (Phase 4), once the preferred route corridor has been determined.

3.3 Route Corridor Option 1

Route Corridor Option 1 stretches from Ratra/ Teevnacreeva at its western extremity to Scramoge/ Treanaceeve at its eastern tie-in, representing a length of approx. 33.7km (See Drawing No. RN04250-12-349 Layout 1-5). It is generally 0.5km (500m) wide, is located north of the existing N5, covers an area of 1739ha, connects the proposed N5 Ballaghaderreen Bypass with the recently completed N5 Scramoge Road Scheme and passes through 59 townlands (see Table 3.1 below). It should be noted that the number of townlands included in the scheme may change through the subsequent design stages. To facilitate ease of perception, the following detailed description of the route has been divided into discrete sections based on recognisable features in the landscape.

Keelbanada	Ratra	Teevnacreeva	Rathkeery	Glebe East
Turlagharee	Sheepwalk	Portaghard	Frenchpark Demesne	Carrowbane
Cloonshanville	Ballaghcullia	Carrigeenynaghtan	Loughbally	Carrigeenacreeha
Brackloon	Carrigeenagappul	Mullenduff	Athroe	Corry West
Corry East	Cloonyeffer	Clogher More	Cartronagor	Raheen
Carrownamorheeny	Creeve	Runnaruag	Shankill	Gortnacrannagh
Cherryfield or Drishagah	Killeen West	Cloonboyoge	Ovaun	Lurgan
Killeen East	Tullyloyd	Tullycartron	Lugboy	Clooncullaan
Cregga	Caldragh	Cuilrevagh	Doonard Beg	Tullen
Lettreen	Doonard More	Doon	Doughloon	Corskeagh
Kildalloge	Lavally	Vesnoy	Cloonradoon	Kilmore
Newtown	Bumlin	Scramoge	Treanaceeve	

Table 3.2 Route 1 Townlands

West Tie-in to R361 (Boyle) Road (approx. 6300m)

Option 1, in common all of the options, commences in Ratra townland where it overlaps with the proposed N5 Ballaghaderreen Bypass Scheme in order to ensure an adequate tie-in proposal can be developed. It then progresses in a generally eastern direction passing through Frenchpark Demesne Townland and north of Frenchpark town crossing the R361 (Boyle) road. The road crossing is outside the speed limit zone for the town but due to urban sprawl/ ribbon development there is an increased number of houses along the road. The topology is relatively flat with a slight overall fall from west (90m[9]) to east (80m). The subsoil classification is predominately sandstone and shale till[10].

R361 (Boyle) Road to Owennaforeesha River (approx. 3200m)

The route then turns slightly more southerly passing along the southern edge of Cloonshanville Bog that is designated as a proposed Natural Heritage Area (pNHA) and a Candidate Special Area of Conservation (cSAC). The route crosses Local Primary Road LP1217, the Carricknabraher River and the Owennaforeesha River. Most of this section is characterised by flat boggy/ peaty land with a slight fall towards the rivers. The subsoil classification is predominately fen peat.

[9] All level/ elevation detail is given "Above Ordnance Datum" relative to Malin Head.
[10] All subsoil classifications are based on Map 3: Subsoil Map (Teagasc Classification) for North Roscommon, Teagasc, November 2004.

Owennaforeesha River to Brackloon Road (LP1215) (approx. 3000m)

Running in a predominately easterly direction this section passes through a section of forestry and bog followed by marginal/ peaty land before crossing the Brackloon Road (LP1215) in Brackloon Townland. The ground rises slightly from the rivers (70m) towards the road (80m). The subsoil classification is predominately fen peat with a small section of sandstone and shale till near LP1215.

Brackloon Road (LP1215) to R369 Road (Bellanagare to Elphin Road) (approx. 4500m)

Continuing in a predominately easterly direction this section passes through primarily pasturelands interspersed with small pockets of forestry. The topography is again flat at approx. 80m AOD. It crosses the R369 Regional Road between Bellanagare and Elphin at Cartronagor Townland. The subsoil classification is predominately sandstone and shale till with small areas of fen peat near the R369.

R369 to N61 National Secondary Road (approx. 2300m)

Again this section passes through primarily pasturelands interspersed with occasional small pockets of forestry. The topography is relatively flat but includes a number of small drumlins. Overall there is a slight fall towards the N61 at approx. 65m AOD. It crosses the N61 at Gortnacrannagh Townland approx. 6km north of Tulsk. The subsoil classification is divided between sandstone and shale till on the western portion and limestone till along the eastern side.

N61 to the R368 Road (Elphin to Strokestown) (approx. 5000m)

This section runs in an easterly direction. It crosses the Owenur River and Local Primary Road LP1412 in Lurgan Townland near Ballyoughter Bridge. Ballyoughter Lough and its associated flood area are within the corridor. The corridor continues easterly and skirts to the north of the "Clooncullaan Loughs" system and in particular along the northern periphery of Clooncullaan Lough before crossing Regional Road R368. The area is predominately flat and around the 60m AOD with the exception of the area around Clooncullaan Lake where levels fall slightly to approx. 50m AOD. The soil classification is primarily limestone till interjected with fingers of fen peat centred at the two lakes.

R368 Road to the Local Road LP1405 (Kilmore Road) (approx. 5400m)

From its intersection with the R368, this corridor takes a pronounced south-easterly direction approximately paralleling it as far as Local Road LP1405 at Lavally Townland. This section is notably different from the preceding sections in that it is located primarily along the sides of the hills of Cregga, Cuilrevagh (Greywood Hill) and Kiltrustan which rise to the east of the corridor. The land undulates along this landscape between approx. 60m AOD and 130m AOD contrasting with the relatively flat boggy landscape around Lough Annaghmore and its associated cSAC and pNHA located approx. 0.8km to the west of the corridor. The land is predominately pastureland and generally of better quality. The soil classification is primarily limestone till but there are significant area of rock outcrop and several recorded karstic features evident in the area. A large quarry operation (Laragan Quarries) is located on the eastern side of Greywood Hill.

Kilmore Road (LP1405) to the East Tie-in (approx. 4000m)

Continuing in a south-easterly direction the landscape has returned to the flat poorer land characteristic of the western portion of the corridor. From approx. 70m AOD at LP1405, the ground levels drop to approx. 50m AOD in the vicinity of Mountain River between Vesnoy and Cloonradoon Townlands approx. 1200m east of Strokestown Town and 800m east of Strokestown House. Remaining relatively flat, the land varies from pastureland north of Strokestown River to low-lying boggy ground with pockets of bog and forestry particularly in the vicinity of the Strokestown River and from there to the Scramoge River and existing N5. The soil classification is

primarily limestone till interjected with fingers of fen peat and with sandstone and shale till at the tie-in.

3.4 Route Corridor Option 2

Route Corridor Option 2 extends from Ratra/ Teevnacreeva at its western extremity to Scramoge/ Treanaceeve at its eastern tie-in, representing a length of approx. 34.6km (See Drawing No. RN04250-12-349 Layout 11-15). It is generally 0.5km (500m) wide. West of Bellanagare and East of Ardakillin the corridor is located generally south of the existing N5 while in the reaming middle section it is generally north of the existing N5. It covers an area of 2764ha, connects the proposed N5 Ballaghaderreen Bypass with the recently completed N5 Scramoge Road Scheme and passes through 81 townlands (see Table 3.3 below). It should be noted that the number of townlands included in the scheme may change through the subsequent design stages. To facilitate ease of perception, the following detailed description of the route has been divided into discrete sections based on recognisable features in the landscape.

Keelbanada	Ratra	Teevnacreeva	Rathkeery	Glebe East
Turlagharee	Sheepwalk	Portaghard	Turlaghnamaddy	Dungar
Mullen	Corskeagh	Leggatinty	Derreen	Knockroe
Cashel	Ballaghcullia	Ballynahowna	Bellanagare	Carrigeenynaghtan
Drummin	Tonaknick	Carrigeenacreeha	Peak	Mullenduff
Garrynphort	Corry West	Kilvoy	Ballyconboy	Clogher Beg
Clogher More	Cartron	Ballymurray	Grallagh	Lisnagard
Flaskagh More	Tullintuppeen	Boyanagh	Ross More West	Flaskagh Beg
Cloonyquin	Camoge	Cloonmahaan	Steill	Attiballa
Foxborough	Castleland	Derryquirk	Tulsk	Carrownageelaun
Ardkeenagh	Corbally	Ardkeenagh (Plunkett)	Cloonanart Beg	Corrabeg
Kilcooley	Clooncullaan	Sroove	Lissaphuca	Bloomfield
Ardakillin	Cloonfree	Cloonrane	Lisnahirka	Cloonfinlough
Cloonslanor	Corboghil	Carrowclogher	Carrowntryla	Farnmore
Farnbeg	Newtown	Ballyhammon	Carrownaskeagh	Castlenode
Lisaphobble	Bellmount or Cloggernagh	Ashbrook or Knocknabarnaboy	Bumlin	Scramoge
Treanaceeve				

Table 3.3 Route 2 Townlands

West Tie-in to R361 (Castlerea) Road (approx. 5800m)

Option 2, in common all of the options, commences in Ratra townland where it overlaps with the proposed N5 Ballaghaderreen Bypass Scheme in order to ensure an adequate tie-in proposal can be developed. It then progresses in a generally south-easterly direction crossing Local Secondary Road LS5629 on the border between Turlaghnamaddy and Dungar Townlands before continuing on to cross Regional Road R361 (Castlerea Road) south of Frenchpark in the townlands of Mullen and Corskeagh. The topology is relatively flat with a slight overall fall from west (90m) to east (80m) at the R361, although there is a gradual rise from the south-western boundary of the corridor towards Fairymount Hill about 5km away. West of Turlaghnamaddy Townland the subsoil classification is predominately sandstone till and shale changing to fen peat from Turlaghnamaddy

eastwards to the R361. Land cover follows the subsoil pattern with pastureland in the west changing to a mixture of peat and forestry on the eastern side of this section.

R361 (Castlerea) Road to Existing N5 Road (approx. 2600m)

The route continues in a southeasterly direction crossing the Carricknabraher River immediately east of the R361 and the existing N5 National Primary Route at Derreen/ Cashel Townlands. The topography shows a slight rise eastwards away from the river. This section is characterised by mainly boggy ground with some forestry at the western end. It sits immediately north (approx. 400m) of Bellanagare Bog that covers an extensive area (approx. 12.9km^2) and is designated as a cSAC, SPA and pNHA. The subsoil classification is predominately fen peat.

Existing N5 Road to Owennaforeesha River (approx. 1700m)

This section proceeds in an easterly direction crossing two local secondary roads (LS5640 and LS5641) before reaching the Carricknabraher River at the Cashel/ Drummin townland boundary. The ground falls gently from west to east towards the river. The soil classification is divided almost evenly on the Local Secondary Road LS5641, the western part being primarily sandstone and shale till with fen peat to the east.

Owennaforeesha River to R369 Road (Bellanagare to Elphin Road) (approx. 3300m)

Continuing in a predominately easterly direction this section crosses Local Secondary Road LS5642 at Carrigeenacreeha before crossing the Brackloon Road (LP1215) and the R369 near their intersection at Garrynphort Townland. The ground rises slightly from the rivers (70m) towards the R369 road (80m). The subsoil classification is predominately sandstone and shale till with some dispersed pockets of fen peat. There is forestry over a distance of approx. 1 km at the eastern end with the remaining land bordering on pasture/ boggy.

R369 to Local Primary Road (LP1419) (approx. 4500m)

From the R369, Corridor 2 takes a generally southeastern direction crossing the Mantua Road (LP1218) at Cartron Townland before following approximately along Local Secondary Road LS6118 until its crossing of Local Primary Road LP1419 at Flaskagh More. With the exception of the first 500m which has forestry, this section is primarily pastureland in nature. There are a number of dwellings and farm complexes along LS6118 that pose a particular constraint in this area. In addition, this section hugs the lower reaches of the “Rathcrohan Plateau” which rises gently, approximately perpendicular to the line of the corridor, in a southwesterly direction. Rathcroghan is one of the Key Archaeological Constraints identified in the Constraints Report, however, the proposed route is outside the identified core of this monument. The topology is relatively flat with a gentle rise from the R369 (80m AOD) to approx. 90m in Catron Townland and a gentle fall again towards the LP1419 at Flaskagh More interrupted only by a small hillock. The subsoil classification is evenly divided between sandstone and shale till on the western portion and limestone till along the eastern side.

LP1419 to the Existing N5 at Ardkeenagh (Plunkett) (approx. 5200m)

Route Corridor 2 takes a southerly direction crossing Local Road LS6025 before reaching the N61 National Secondary Road at Castleland Townland just north of Tulsk Village (approx. 1.4km). Tulsk Medieval Borough is one of the seven Key Archaeological Constraints identified in the Constraints Report and part of its core encroaches on the corridor in this section. From here it proceed in a more easterly direction crossing the Ogulla River on the eastern border of Castleland before crossing the existing N5 road at Ardkeenagh (Plunkett) Townland. The topology along this section varies between undulating pasture land at either end and a significant section of low-lying boggy area centred on the N61 in the middle. It begins by skirting along the eastern slopes of Camoge Hill (between 70m and 90m AOD) before descending down to the boggy areas surrounding the N61 (approx. 60m AOD) and rises again across Ardkeenagh “Hill” at approx.

85m AOD before dropping to about 65m AOD at Corbally Lough NHA located just south of the existing N5. The soil classification is primarily limestone till at either end with the middle half and the area around Corbally Lough comprising fen peat.

Along the existing N5 from Ardkeenagh (Plunkett) to Ardakillin (approx. 3800m)

This part runs in a primarily easterly direction and predominately along the existing N5 between Ardkeenagh (Plunkett) and Ardakillin Townlands. Corbally Lough NHA, which is bounded by the existing N5, is located within the corridor at its eastern side. As well as proceeding along the existing N5 this section crosses Local Secondary Road LS6095 and Local Primary Road LP1422 in the vicinity of "Simpsons" cross. The eastern part of this section passes north of Ardakillin Lough, a designated NHA, and the Ardakillin Key Archaeological Constraint. The topology shows a gentle fall towards "Simpsons" Cross at the LP1422 (from about 65m to 60m AOD) followed by flat boggy ground along the remainder of the section. The soil classification is primarily limestone till but with a finger of fen peat crossing the corridor west of LP1422.

Existing N5 at Ardakillin to R368 Road (Strokestown to Roscommon) (approx. 4500m)

Continuing in a primarily easterly direction this section passes predominantly flat land punctuated only by a small hillock in Lisnahirka Townland. The route passes along the northern slopes of this hillock before passing between Cloonfree Lough (North) and Fin Lough (South) near to the shores of Cloonfree Lough. It then proceeds to cross Local Road LP1421 and a tributary of the Scramoge River in the vicinity of Cloonfinlough Bridge and ending at the R368 road in Cloonslanor Townland approx. 1 Km from Strokestown. Other than between the lakes and in the vicinity of the R368 where it is boggy/ flat, the land is generally used as pasture farmland. The two lakes are approx. 500m apart and the corridor crosses an area that is subject to flooding and appears to be poorly drained. Fin Lough is associated with one of the Key Archaeological Constraints but is located to the south and outside the corridor. The topology is generally flat (60m) apart from the hillock which rises to approx. 66m AOD and at the R368 where is drops gently to approx. 50m AOD. The soil classification is mainly limestone till but with significant areas of fen peat particularly between the lakes but also surrounding the watercourse serving Ardakillin Lough (NHA) and an area centred on the R368.

R368 Road (Strokestown to Roscommon) to East Tie-in (approx. 3200m)

Again, continuing in a primarily easterly direction this section rises gently from approx. 50m towards the N5 at Farnbeg (60m AOD) where is passes through the existing GAA grounds. It then proceeds along the existing N5 falling to approx. 50m at the junction with Local Primary Road LP1425 and remaining relatively flat from here crossing the Scramoge River to the east tie-in at Scramoge Townland. The soil classification is variable ranging from limestone till on the western side to sandstone and shale till along the eastern tie-in and a substantial area of Lacustrine deposits in between.

3.5 Route Corridor Option 1A

This option was developed following Workshop 1 where in consultation with the design team and all the sub-consultants it was considered that there were benefits from considering a hybrid option that incorporated parts of option 1 and option 2.

Route Corridor Option 1A extends from Ratra/ Teevnacreeva at its western extremity to Scramoge/ Treanaceeve at its eastern tie-in, representing a length of approx. 34.2km (See Drawing No. RN04250-12-349 Layout 6-10). It is generally 0.5km (500m) wide. West of Bellanagare it is located generally south of the existing N5 while east of Bellanagare it is generally north of the existing N5. It covers an area of 1709ha, connects the proposed N5 Ballaghaderreen Bypass with the recently completed N5 Scramoge Road Scheme and passes through 70 townlands (see Table 3.2 below). It should be noted that the number of townlands included in the scheme may change through the subsequent design stages. This route option is formed by a combination of Route Corridor Option 2 and Route Corridor Option 1 connected by a short stretch between Carrigeenacreeha and Cloonyeffer Townlands north east of Bellanagare. To facilitate ease of perception, the following detailed description of the route has been divided into discrete sections based on recognisable features in the landscape.

Keelbanada	Ratra	Teevnacreeva	Rathkeery	Glebe East
Turlagharee	Sheepwalk	Portaghard	Turlaghnamaddy	Dungar
Mullen	Corskeagh	Leggatinty	Derreen	Knockroe
Cashel	Ballaghcullia	Ballynahowna	Bellanagare	Carrigeenynaghtan
Drummin	Tonaknick	Carrigeenacreeha	Peak	Mullenduff
Garrynphort	Corry West	Kilvoy	Brackloon	Athroe
Corry West	Corry East	Cloonyeffer	Clogher More	Cartronagor
Raheen	Carrownamorheeny	Creeve	Runnaruag	Gortnacrannagh
Shankill	Cherryfield or Drishagah	Killeen West	Cloonboyoge	Ovaun
Lurgan	Killeen East	Tullyloyd	Tullycartron	Lugboy
Clooncullaan	Cregga	Caldragh	Cuilrevagh	Doonard Beg
Tullen	Lettreen	Doonard More	Doon	Doughloon
Corskeagh	Kildalloge	Lavally	Vesnoy	Cloonradoon
Kilmore	Newtown	Bumlin	Scramoge	Treanaceeve

Table 3.4 Route 1A Townlands

West Tie-in to R361 (Castlerea) Road (approx. 5800m)

Option 1A, in common all of the options, commences in Ratra townland where it overlaps with the proposed N5 Ballaghaderreen Bypass Scheme in order to ensure an adequate tie-in proposal can be developed. It then progresses in a generally south-easterly direction crossing Local Secondary Road LS5629 on the border between Turlaghnamaddy and Dungar Townlands before continuing on to cross Regional Road R361 (Castlerea Road) south of Frenchpark in the townlands of Mullen and Corskeagh. The topology is relatively flat with a slight overall fall from west (90m) to east (80m) at the R361, although there is a gradual rise from the south-western boundary of the corridor towards Fairymount Hill about 5km away. West of Turlaghnamaddy Townland the subsoil classification is predominately sandstone till and shale changing to fen peat from Turlaghnamaddy eastwards to the R361. Land cover follows the subsoil pattern with pastureland in the west changing to a mixture of peat and forestry on the eastern side of this section.

R361 (Castlerea) Road to Existing N5 Road (approx. 2600m)

The route continues in a southeasterly direction crossing the Carricknabraher River immediately east of the R361 and the existing N5 National Primary Route at Derreen/ Cashel Townlands. The topography shows a slight rise eastwards away from the river. This section is characterised by mainly boggy ground with some forestry at the western end. It sits immediately north (approx. 400m) of Bellanagare Bog that covers an extensive area (approx. 12.9km^2) and is designated as a cSAC, SPA and pNHA. The subsoil classification is predominately fen peat.

Existing N5 Road to Owennaforeesha River (approx. 1700m)

This section proceeds in an easterly direction crossing two local secondary roads (LS5640 and LS5641) before reaching the Carricknabraher River at the Cashel/ Drummin townland boundary. The ground falls gently from west to east towards the river. The soil classification is divided almost evenly on the Local Secondary Road LS5641, the western part being primarily sandstone and shale till with fen peat to the east.

Owennaforeesha River to Brackloon Road (LP1215) (approx. 3000m)

This section departs from Route Option 2 and continues in a predominately easterly direction to cross Local Secondary Road LS5642 at Carrigeenacreeha before crossing the Brackloon Road (LP1215) and the R369 at Mullenduff Townland. The ground rises slightly from the rivers (70m) towards the LP1215 road (80m). The subsoil classification is predominately sandstone and shale till with some dispersed pockets of fen peat. There is forestry over a distance of approx. 1 km at the eastern end with the remaining land bordering on pasture/ boggy.

Brackloon Road (LP1215) to R369 Road (Bellanagare to Elphin Road) (approx. 4400m)

This section merges with Route Corridor Option 1 and continues in a predominately easterly direction passing through primarily pasturelands interspersed with pockets of forestry principal among which is along the first 550m. The topography is again flat at approx. 80m AOD. It crosses the R369 Regional Road between Bellanagare and Elphin at Cartronagor Townland. The subsoil classification is predominately sandstone and shale till with small areas of fen peat near the R369.

R369 to N61 National Secondary Road (approx. 2300m)

Again this section passes through primarily pasturelands interspersed with occasional small pockets of forestry. The topography is relatively flat but includes a number of small drumlins. Overall there is a slight fall towards the N61 at approx. 65m AOD. It crosses the N61 at Gortnacrannagh Townland approx. 6km north of Tulsk. The subsoil classification is divided between sandstone and shale till on the western portion and limestone till along the eastern side.

N61 to the R368 Road (Elphin to Strokestown) (approx. 5000m)

This section runs in an easterly direction. It crosses the Owenur River and Local Primary Road LP1412 in Lurgan Townland near Ballyoughter Bridge. Ballyoughter Lough and its associated flood area are within the corridor. The corridor continues easterly and skirts to the north of the “Clooncullaan Loughs” system and in particular along the northern periphery of Clooncullaan Lough before crossing Regional Road R368. The area is predominately flat and around the 60m AOD with the exception of the area around Clooncullaan Lake where levels fall slightly to approx. 50m AOD. The soil classification is primarily limestone till interjected with fingers of fen peat centred at the two lakes.

R368 Road to the Local Road LP1405 (Kilmore Road) (approx. 5400m)

From its intersection with the R368, this corridor takes a pronounced south-easterly direction approximately paralleling it as far as Local Road LP1405 at Lavally Townland. This section is

notably different from the preceding sections in that it is located primarily along the sides of the hills of Cregga, Cuilrevagh (Greywood Hill) and Kiltrustan which rise to the east of the corridor. The land undulates along this landscape between approx. 60m AOD and 130m AOD contrasting with the relatively flat boggy landscape around Lough Annaghmore and its associated cSAC and pNHA located approx. 0.8km to the west of the corridor. The land is predominately pastureland and generally of better quality. The soil classification is primarily limestone till but there are significant area of rock outcrop and several recorded karstic features evident in the area. A large quarry operation (Laragan Quarries) is located on the eastern side of Greywood Hill.

Kilmore Road (LP1405) to the East Tie-in (approx. 4000m)

Continuing in a south-easterly direction the landscape has returned to the flat poorer land characteristic of the western portion of the corridor. From approx. 70m AOD at LP1405, the ground levels drop to approx. 50m AOD in the vicinity of Strokestown River between Vesnoy and Cloonradoon Townlands approx. 1200m east of Strokestown Town and 800m east of Strokestown House. Remaining relatively flat, the land varies from pastureland north of Strokestown River to low-lying boggy ground with pockets of bog and forestry particularly in the vicinity of the Strokestown River and from there to the Scramoge River and existing N5. The soil classification is primarily limestone till interjected with fingers of fen peat and with sandstone and shale till at the tie-in.

3.6 Route Corridor Option 2A

Route Corridor Option 2A extends from Ratra/ Teevnacreeva at its western extremity to Scramoge/ Treanaceeve at its eastern tie-in, representing a length of approx. 35.0km (RN04250-12-349 Layout 16-20). This Route Corridor Option is identical to Option 2 between the R361 south of Frenchpark (Mullen Townland) and its crossing of the N5 at Ardkeenagh (west of Strokestown). It is generally 0.5km (500m) wide. West of Bellanagare and East of Ardakillin the corridor is located generally south of the existing N5 while in the remaining middle section it is generally north of the existing N5. It covers an area of 2761ha, connects the proposed N5 Ballaghaderreen Bypass with the recently completed N5 Scramoge Road Scheme and passes through 82 townlands (see Table 3.4 below). It should be noted that the number of townlands included in the scheme may change through the subsequent design stages. To facilitate ease of perception, the following detailed description of the route has been divided into discrete sections based on recognisable features in the landscape.

Keelbanada	Ratra	Teevnacreeva	Rathkeery	Glebe East
Turlagharee	Sheepwalk	Portaghard	Turlaghnamaddy	Dungar
Mullen	Corskeagh	Leggatinty	Derreen	Knockroe
Cashel	Ballaghcullia	Ballynahowna	Bellanagare	Carrigeenynaghtan
Drummin	Tonaknick	Carrigeenacreeha	Peak	Mullenduff
Garrynphort	Corry West	Kilvoy	Ballyconboy	Clogher Beg
Clogher More	Cartron	Ballymurray	Grallagh	Lisnagard
Flaskagh More	Tullintuppeen	Boyanagh	Ross More West	Flaskagh Beg
Cloonyquin	Camoge	Cloonmahaan	Steill	Attiballa
Foxborough	Castleland	Derryquirk	Tulsk	Carrownageelaun
Ardkeenagh	Corbally	Ardkeenagh (Plunkett)	Cloonanart Beg	Corrabeg
Kilcooley	Clooncullaan	Sroove	Lissaphuca	Bloomfield
Ardakillin	Cloonfree	Cloonrane	Lisnahirka	Cloonfinlough

Cloonslanor	Corboghil	Carrowclogher	Carrowntryla	Farnmore
Farnbeg	Newtown	Ballyhammon	Carrownaskeagh	Castlenode
Lisaphobble	Bellmount or Cloggernagh	Ashbrook or Knocknabarnaboy	Bumlin	Scramoge
Treanaceeve	Raheely			

Table 3.5 Route 2A Townlands

West Tie-in to R361 (Castlerea) Road (approx. 5800m)

Option 2A, commences in Ratra townland where it overlaps with the proposed N5 Ballaghaderreen Bypass Scheme in order to ensure an adequate tie-in proposal can be developed. It then progresses in a generally south-easterly direction departing from the existing N5 earlier than Option 2 and climbing higher on the lower slopes of Fairymount Hill at approx. 105m AOD. It crosses Local Primary Roads LP1223 and LP1222 before crossing Local Secondary Road LS5629 on the border between Turlaghnamaddy and Dungar Townlands. It continues on to cross Regional Road R361 (Castlerea Road) south of Frenchpark in the townlands of Mullen and Corskeagh. The topology rises from the N5 (90m) up the lower reaches of Fairymount Hill to approx. 105m before falling gradually back to approx. 80m at the R361. West of LS5629 the subsoil classification is predominately sandstone and shale till changing to fen peat from here eastwards to the R361. Land cover follows the subsoil pattern with pastureland in the west changing to a mixture of peat and forestry on the eastern side of this section.

R361 (Castlerea) Road to Existing N5 Road (approx. 2600m)

Option 2A merges with Options 2 in the vicinity of the R361 road and continues in a southeasterly direction crossing the Carricknabraher River immediately east of the R361 and the existing N5 National Primary Route at Derreen/ Cashel Townlands. The topography shows a slight rise eastwards away from the river. This section is characterised by mainly boggy ground with some forestry at the western end. It sits immediately north (approx. 400m) of Bellanagare Bog that covers an extensive area (approx. 12.9km^2) and is designated as a cSAC, SPA and pNHA. The subsoil classification is predominately fen peat.

Existing N5 Road to Owennaforeesha River (approx. 1700m)

This section proceeds in an easterly direction crossing two local secondary roads (LS5640 and LS5641) before reaching the Carricknabraher River at the Cashel/ Drummin townland boundary. The ground falls gently from west to east towards the river. The soil classification is divided almost evenly on the Local Secondary Road LS5641, the western part being primarily sandstone and shale till with fen peat to the east.

Owennaforeesha River to R369 Road (Bellanagare to Elphin Road) (approx. 3300m)

Continuing in a predominately easterly direction this section crosses Local Secondary Road LS5642 at Carrigeenacreeha before crossing the Brackloon Road (LP1215) and the R369 near their intersection at Garrynphort Townland. The ground rises slightly from the rivers (70m) towards the R369 road (80m). The subsoil classification is predominately sandstone and shale till with some dispersed pockets of fen peat. There is forestry over a distance of approx. 1 km at the eastern end with the remaining land bordering on pasture/ boggy.

R369 to Local Primary Road (LP1419) (approx. 4500m)

From the R369, Corridor 2 takes a generally southeastern direction crossing the Mantua Road (LP1218) at Cartron Townland before following approximately along Local Secondary Road LS6118 until its crossing of Local Primary Road LP1419 at Flaskagh More. With the exception of the first 500m which has forestry, this section is primarily pastureland in nature. There are a

number of dwellings and farm complexes along LS6118 that pose a particular constraint in this area. In addition, this section hugs the lower reaches of the "Rathcrohan Plateau" which rises gently, approximately perpendicular to the line of the corridor, in a southwesterly direction. Rathcroghan is one of the Key Archaeological Constraints identified in the Constraints Report, however, the proposed route is outside the identified core of this monument. The topology is relatively flat with a gentle rise from the R369 (80m AOD) to approx. 90m in Catron Townland and a gentle fall again towards the LP1419 at Flaskagh More interrupted only by a small hillock. The subsoil classification is evenly divided between sandstone and shale till on the western portion and limestone till along the eastern side.

LP1419 to the Existing N5 at Ardkeenagh (Plunkett) (approx. 5200m)

Route Corridor 2 takes a southerly direction crossing Local Road LS6025 before reaching the N61 National Secondary Road at Castleland Townland just north of Tulsk Village (approx. 1.4km). Tulsk Medieval Borough is one of the seven Key Archaeological Constraints identified in the Constraints Report and part of its core encroaches on the corridor in this section. From here it proceed in a more easterly direction crossing the Ogulla River on the eastern border of Castleland before crossing the existing N5 road at Ardkeenagh (Plunkett) Townland. The topology along this section varies between undulating pasture land at either end and a significant section of low-lying boggy area centred on the N61 in the middle. It begins by skirting along the eastern slopes of Camoge Hill (between 70m and 90m AOD) before descending down to the boggy areas surrounding the N61 (approx. 60m AOD) and rises again across Ardkeenagh "Hill" at approx. 85m AOD before dropping to about 65m AOD at Corbally Lough NHA located just south of the existing N5. The soil classification is primarily limestone till at either end with the middle half and the area around Corbally Lough comprising fen peat.

Along the existing N5 from Ardkeenagh (Plunkett) to Ardakillin (approx. 3800m)

This part runs in a primarily easterly direction and predominately along the existing N5 between Ardkeenagh (Plunkett) and Ardakillin Townlands. Corbally Lough NHA, which is bounded by the existing N5, is located within the corridor at its eastern side. As well as proceeding along the existing N5 this section crosses Local Secondary Road LS6095 and Local Primary Road LP1422 in the vicinity of "Simpsons" cross. The eastern part of this section passes north of Ardakillin Lough, a designated NHA, and the Ardakillin Key Archaeological Constraint. The topology shows a gentle fall towards "Simpsons" Cross at the LP1422 (from about 65m to 60m AOD) followed by flat boggy ground along the remainder of the section. The soil classification is primarily limestone till but with a finger of fen peat crossing the corridor west of LP1422.

Existing N5 at Ardakillin to R368 Road (Strokestown to Roscommon) (approx. 4500m)

Continuing in a primarily easterly direction this section passes predominantly flat land punctuated only by a small hillock in Lisnahirka Townland. The route passes along the southern slopes of this hillock before passing between Cloonfree Lough (North) and Fin Lough (South) at approx. mid-distance between both. It then proceeds to rise to Local Road LP1421 that it crosses before dropping down again toward a tributary of the Scramoge River on the border between Cloonfinlough and Carrowclogher Townlands. It then continues a short distance to cross the R368 road approx. 2.2 Km from Strokestown. The land is undulating varying between pastureland along the higher ground and boggy land at three main locations – centred on the watercourse serving Ardakillin Lough (NHA), between Cloonfree and Fin Loughs and centred on the tributary of the Scramoge River. The two lakes are approx. 500m apart and the corridor crosses an area that is subject to flooding and appears to be poorly drained. Fin Lough is associated with one of the Key Archaeological Constraints but is located to the south and outside the corridor. The topology is undulating being approx. 50m in the low-lying areas and rising to about 65m on higher areas. The soil classification follows the topology with limestone till on higher ground and fen peat on the lower ground surrounding the watercourses and between the lakes.

R368 Road (Strokestown to Roscommon) to East Tie-in (approx. 3200m)

This section of Option 2A continues in a primarily eastern direction but follows a "wide-U" shaped course. Passing through pastureland the route rises gently along Carrowntryla Hillock to approx. 60m before falling toward the Scramoge River tributary at about 50m AOD at the Carrownaskeagh Townland boundary. Continuing at this approx. level along the lower slopes of Ballyhammon hillock the route crosses Local Primary Road LP1425. There is significant urban sprawl/ ribbon development along this road particularly in recent years. Continuing through the flat pastureland, the route passes south of Castlenode House and north of an old Corn and Flax Mill before crossing the Scramoge River on the townland boundary between Castlenode and Teevnacreeva. The route ten proceeds over poorly drained pastureland to the east tie-in at Scramoge. The soil classification is variable ranging from limestone till on the western side to sandstone and shale till along the middle section and a substantial area of Lacustrine deposits towards the east tie-in.

3.7 Route Corridor Option 2B

Route Corridor Option 2B stretches from Ratra/ Teevnacreeva at its western extremity to Scramoge/ Treanaceeve at its eastern tie-in, representing a length of approx. 34.5km (See Drawing No. RN04250-12-349 Layout 21-25). This Route Corridor Option is identical to Option 2 between the west tie-in and the N61 at Steill Townland. It follows an alternative route between Steill and its crossing of the existing N5 at Ardakillin. Between Ardakillin and the east tie-in Route Option 2B is identical to Route Option 2A. It is generally 0.5km (500m) wide. West of Bellanagare and East of Ardakillin the corridor is located generally south of the existing N5 while in the remaining middle section it is generally north of the existing N5. It covers an area of 2752ha, connects the proposed N5 Ballaghaderreen Bypass with the recently completed N5 Scramoge Road Scheme and passes through 88 townlands (see Table 3.5 below). It should be noted that the number of townlands included in the scheme may change during the subsequent design stages. To facilitate ease of perception, the following detailed description of the route has been divided into discrete sections based on recognisable features in the landscape.

Keelbanada	Ratra	Teevnacreeva	Rathkeery	Glebe East
Turlagharee	Sheepwalk	Portaghard	Turlaghnamaddy	Dungar
Mullen	Corskeagh	Leggatinty	Derreen	Knockroe
Cashel	Ballaghcullia	Ballynahowna	Bellanagare	Carrigeenynaghtan
Drummin	Tonaknick	Carrigeenacreeha	Peak	Mullenduff
Garrynphort	Corry West	Kilvoy	Ballyconboy	Clogher Beg
Clogher More	Cartron	Ballymurray	Grallagh	Lisnagard
Flaskagh More	Tullintuppeen	Boyanagh	Ross More West	Flaskagh Beg
Cloonyquin	Camoge	Cloonmahaan	Steill	Attiballa
Foxborough	Castleland	Derryquirk	Tulsk	Carrownageelaun
Ardkeenagh	Corbally	Ardkeenagh (Plunkett)	Cloonanart Beg	Corrabeg
Lisaneane	Clooneigh	Corragarve	Correagh	Cartron
Moneyboy	Nadnaveagh	Kilcooley	Clooncullaan	Sroove
Lissaphuca	Bloomfield	Ardakillin	Cloonfree	Cloonrane
Lisnahirka	Cloonfinlough	Cloonslanor	Corboghil	Carrowclogher
Carrowntryla	Farnmore	Farnbeg	Newtown	Ballyhammon
Carrownaskeagh	Castlenode	Lisaphobble	Bellmount or Cloggernagh	Ashbrook or Knocknabarnaboy
Bumlin	Scramoge	Treanaceeve		

Table 3.6 Route 2B Townlands

West Tie-in to R361 (Castlerea) Road (approx. 5800m)

This section is identical to Option 2 and in common all of the options, commences in Ratra townland where it overlaps with the proposed N5 Ballaghaderreen Bypass Scheme in order to ensure an adequate tie-in proposal can be developed. It then progresses in a generally south-easterly direction crossing Local Secondary Road LS5629 on the border between Turlaghnamaddy and Dungar Townlands before continuing on to cross Regional Road R361 (Castlerea Road) south of Frenchpark in the townlands of Mullen and Corskeagh. The topology is relatively flat with a slight overall fall from west (90m) to east (80m) at the R361, although there is a gradual rise from the south-western boundary of the corridor towards Fairymount Hill about 5km away. West of Turlaghnamaddy Townland the subsoil classification is predominately sandstone till and shale changing to fen peat from Turlaghnamaddy eastwards to the R361. Land cover follows the subsoil pattern with pastureland in the west changing to a mixture of peat and forestry on the eastern side of this section.

R361 (Castlerea) Road to Existing N5 Road (approx. 2600m)

The route continues in a southeasterly direction crossing the Carricknabraher River immediately east of the R361 and the existing N5 National Primary Route at Derreen/ Cashel Townlands. The topography shows a slight rise eastwards away from the river. This section is characterised by mainly boggy ground with some forestry at the western end. It sits immediately north (approx. 400m) of Bellanagare Bog that covers an extensive area (approx. 12.9km^2) and is designated as a cSAC, SPA and pNHA. The subsoil classification is predominately fen peat.

Existing N5 Road to Owennaforeesha River (approx. 1700m)

This section proceeds in an easterly direction crossing two local secondary roads (LS5640 and LS5641) before reaching the Carricknabraher River at the Cashel/ Drummin townland boundary. The ground falls gently from west to east towards the river. The soil classification is divided almost evenly on the Local Secondary Road LS5641, the western part being primarily sandstone and shale till with fen peat to the east.

Owennaforeesha River to R369 Road (Bellanagare to Elphin Road) (approx. 3300m)

Continuing in a predominately easterly direction this section crosses Local Secondary Road LS5642 at Carrigeenacreeha before crossing the Brackloon Road (LP1215) and the R369 near their intersection at Garrynphort Townland. The ground rises slightly from the rivers (70m) towards the R369 road (80m). The subsoil classification is predominately sandstone and shale till with some dispersed pockets of fen peat. There is forestry over a distance of approx. 1 km at the eastern end with the remaining land bordering on pasture/ boggy.

R369 to Local Primary Road (LP1419) (approx. 4500m)

From the R369, Corridor 2B (following Option 2) takes a generally southeastern direction crossing the Mantua Road (LP1218) at Cartron Townland before following approximately along Local Secondary Road LS6118 until its crossing of Local Primary Road LP1419 at Flaskagh More. With the exception of the first 500m which has forestry, this section is primarily pastureland in nature. There are a number of dwellings and farm complexes along LS6118 that pose a particular constraint in this area. In addition, this section hugs the lower reaches of the "Rathcrohan Plateau" which rises gently, approximately perpendicular to the line of the corridor, in a southwesterly direction. Rathcroghan is one of the Key Archaeological Constraints identified in the Constraints Report, however, the proposed route is outside the identified core of this monument. The topology is relatively flat with a gentle rise from the R369 (80m AOD) to approx. 90m in Catron Townland and a gentle fall again towards the LP1419 at Flaskagh More interrupted only by a small hillock. The subsoil classification is evenly divided between sandstone and shale till on the western portion and limestone till along the eastern side.

LP1419 to the Existing N61 (approx. 3100m)

Route Corridor 2B follows Option 2 and takes a southerly direction crossing Local Road LS6025 before reaching the N61 National Secondary Road at Castleland Townland just north of Tulsk Village. Tulsk Medieval Borough is on of the seven Key Archaeological Constraints identified in the Constraints Report and part of its core encroaches on the corridor in this section. The topology along this section varies between undulating pasture land along the first part and a significant section of low-lying boggy area on the approach to the N61. It begins by skirting along the eastern slopes of Camoge Hill (between 70m and 90m AOD) before descending down to the boggy areas surround the N61 (approx. 60m AOD). The soil classification is evenly divided with limestone till along the high ground on the northern portion and fen peat on the low ground approaching the N61.

Existing N61 to Ardakillin (approx. 5900m)

It is along this section only that Option 2B varies from Option 2. Option 2B proceeds in a generally easterly direction through undulating farmland. From Steill Townland it crosses peaty/ boggy low ground (approx. 55m AOD) and the Ogulla River and Local Road LP1420. The corridor continues approx. parallel to LP1420 and begins to climb up onto the pastureland of Derryquirk Hillock (approx. 70m AOD) before falling back down to boggy land on the far east side of the hillock (approx. 55m AOD). The ground begins to rise again to Correagh Hillock (approx. 65m AOD) and again falling the far side of the hillock to peaty land (approx. 55m AOD) through which it continues as far as its crossing of the N5 at Ardakillin where it re-merges with Route Corridor Option 2. The

soil classification follows the topology being limestone till on higher ground and fen peat along low ground.

Existing N5 at Ardakillin to R368 Road (Strokestown to Roscommon) (approx. 4500m)

Continuing in a primarily easterly direction this section passes follows the path of Option 2A along predominantly flat land punctuated only by a small hillock in Lisnahirka Townland. The route passes along the southern slopes of this hillock before passing between Cloonfree Lough (North) and Fin Lough (South) at approx. mid-distance between both. It then proceeds to rise to Local Road LP1421 that it crosses before dropping down again toward a tributary of the Scramoge River on the border between Cloonfinlough and Carrowclogher Townlands. It then continues a short distance to cross the R368 road approx. 2.2 Km from Strokestown. The land is undulating varying between pastureland along the higher ground and boggy land at three main locations – centred on the watercourse serving Ardakillin Lough (NHA), between Cloonfree and Fin Loughs and centred on the tributary of the Scramoge River. The two lakes are approx. 500m apart and the corridor crosses an area that is subject to flooding and appears to be poorly drained. Fin Lough is associated with one of the Key Archaeological Constraints but is located to the south and outside the corridor. The topology is undulating being approx. 50m in the low-lying areas and rising to about 65m on higher areas. The soil classification follows the topology with limestone till on higher ground and fen peat on the lower ground surrounding the watercourses and between the lakes.

R368 Road (Strokestown to Roscommon) to East Tie-in (approx. 3200m)

This section is also identical to Option 2A and continues in a primarily eastern direction but follows a “wide-U” shaped course. Passing through pastureland the route rises gently along Carrowntryla Hillock to approx. 60m before falling toward the Scramoge River tributary at about 50m AOD at the Carrownaskeagh Townland boundary. Continuing at this approx. level along the lower slopes of Ballyhammon hillock the route crosses Local Primary Road LP1425. There is significant urban sprawl/ ribbon development along this road particularly in recent years. Continuing through the flat pastureland, the route passes south of Castlenode House and north of an old Corn and Flax Mill before crossing the Scramoge River on the townland boundary between Castlenode and Teevnacreeva. The route ten proceeds over poorly drained pastureland to the east tie-in at Scramoge. The soil classification is variable ranging from limestone till on the western side to sandstone and shale till along the middle section and a substantial area of Lacustrine deposits towards the east tie-in.

3.8 Route Corridor Option 3

Route Corridor Option 3 represents the online **Do-minimum Option** and is included for comparison purposes. It extends from Ratra/ Teevnacreeva at its western extremity to Scramoge/ Treanaceeve at its eastern tie-in, representing a length of approx. 35.7km (See Drawing No. RN04250-12-349 Layout 26-30). It is generally 0.15km (150m) wide. This corridor is centred along the existing N5 National Primary Route and passes through the towns/ villages of Frenchpark, Bellanagare, Tulsk and Strokestown. It covers an area of 535ha, connects the proposed N5 Ballaghaderreen Bypass with the recently completed N5 Scramoge Road Scheme and passes through 51 townlands (see Table 3.6 below). To facilitate ease of perception, the following detailed description of the route has been divided into discrete sections based on recognisable features in the landscape.

Ratra	Teevnacreeva	Rathkeery	Glebe East	Turlagharee
Sheepwalk	Portaghard	Turlaghnamaddy	Dungar	Frenchpark Demesne
Corskeagh	Cloonshanville	Leggatinty	Derreen	Knockroe
Cashel	Gortnagoyne	Tullaghan	Bellanagare	Carrowreagh
Rathkineely	Rathnallog	Moneylea	Glenballythomas	Toberrory
Carrowntoosan	Knockavurrea	Ballyconboy	Drimnagh	Steill
Grange	Castleland	Tulsk	Carrownageelaun	Ardkeenagh
Corbally	Ardkeenagh (Plunkett)	Cloonanart Beg	Kilcooley	Clooncullaan
Lissaphuca	Ardakillin	Cloonfree	Lisroyne	Cloonslanor
Farnmore	Farnbeg	Newtown	Bumlin	Scramoge
Treanaceeve				

Table 3.7 Route 3 Townlands

West Tie-in to Frenchpark (approx. 6300m)

Option 3, in common all of the options, commences in Ratra townland where it overlaps with the proposed N5 Ballaghaderreen Bypass Scheme. It then progresses along the existing N5 route passing through Frenchpark Village and its associated speed limit zone which is approx. 0.8km long. There are 17 public road junctions along this section including Regional Road R361 (Boyle to Castlerea). In addition, there are many dwelling house and other junctions on either side of the road and in particular through the village. There are no major watercourse crossings along this section. The subsoil classification is predominately sandstone and shale till but skirting an area of fen peat from Turlaghnamaddy eastwards to the R361. Land cover follows the subsoil pattern and is predominately pastureland.

Frenchpark to Bellanagare (approx. 4100m)

Continuing along the existing N5 road, this section passes through the village of Bellanagare and its associated speed limit zone which is approx. 1.1km long. There are 7 public road junctions along this section in addition to many dwelling house and other junctions along this section and in particular through the village. Major watercourses crossed include the Carricknabraher River just east of Frenchpark and the Owennaforeesha River in Bellanagare. The subsoil classification is predominately sandstone and shale till and land cover is predominately pastureland.

Bellanagare to Tulsk (approx. 11900m)

Following the existing N5 road, this section passes through the village of Tulsk and its associated speed limit zone which is approx. 1.5km long. In addition, it passes through the core of two of the seven Key Archaeological Constraints identified during the Constraints Study, Rathcroghan and Tulsk Medieval Borough. There are 14 public road junctions along this section including the R369 Bellanagare to Elphin Regional Road, the R367 Tulsk to Castleplunkett Regional Road and the N61 Boyle to Athlone National Secondary Road. In addition there are many dwelling house and other junctions located along either side of this section in particular through Tulsk Village. The Ogulla River crossing in Tulsk is the main watercourse. The subsoil classification is predominately sandstone till along the first third of this section followed by limestone till along the remaining part. Land cover is primarily pastureland.

Tulsk to Strokestown (approx. 10500m)

Continuing along the existing N5 road, this section passes through the town of Strokestown and its associated speed limit zone which is approx. 2.5km long. In addition, it passes adjacent to Corbally Lough (NHA), Cloonfree Core Archaeological Monument and close to Strokestown House another key archaeological constraints. There are 14 public road junctions along this section including the R368 Roscommon Regional Road. In addition there are many dwelling house and other junctions located along either side of this section in particular through the town. The main watercourses crossed include an unnamed watercourse leading to Cloonfree Lough and the “Strokestown” River. The subsoil classification is predominately sandstone till. Land cover is primarily pastureland.

Strokestown to East Tie-in (approx. 2900m)

Again, this section follows the existing N5 and overlaps a little with the Scramoge Scheme to ensure an adequate tie-in can be constructed. There are 3 public road junctions along this section including the Local Primary Road LP1425 along which a large number of dwellings have now been developed. In addition there are a number of dwelling houses, a GAA pitch, A Golf Club and other junctions located along either side of this section. The Scramoge River is the main watercourse crossed. The subsoil classification varies between sandstone till, sandstone and shale till and Lacustrine deposits along the tie-in. Land cover is a mixture of pastureland, forestry and poorly drained/ boggy agricultural land.

3.9 Route Corridor Option 4

Route Corridor Option 4 stretches from Ratra/ Teevnacreeva at its western extremity to Scramoge/ Treanaceeve at its eastern tie-in, representing a length of approx. 38km (See Drawing No. RN04250-12-349 Layout 31-35). It is generally 0.5km (500m) wide and is located generally south of the existing N5. It covers an area of 2400ha, connects the proposed N5 Ballaghaderreen Bypass with the recently completed N5 Scramoge Road Scheme and passes through 70 townlands (see Table 3.7 below). It should be noted that the number of townlands included in the scheme may change during subsequent design stages. To facilitate ease of perception, the following detailed description of the route has been divided into discrete sections based on recognisable features in the landscape.

Keelbanada	Ratra	Teevnacreeva	Rathkeery	Glebe East
Turlagharee	Sheepwalk	Portaghard	Turlaghnamaddy	Dungar
Mullen	Corskeagh	Leggatinty	Derreen	Knockroe
Cornamucklagh and Falmore	Bellanagare	Mountdruid	Kilcorkey	Ballyglass
Rathmoyle	Gortnasillagh	Glenvela	Drishaghaun West	Castleruby
Carrowkeel	Drishaghaun East	Lisheen	Tonereagh	Toberelva
Mullygollan	Slevin	Ardeevin	Ballaghabawbeg	Lismurtagh
Ballaghabawmore	Dooneen	Carrowbaun	Rathmore	Manor
Sheegeeragh	Cloonyogan	Ballydaly	Carrownrinny	Corker
Clooncullaan	Sroove	Lissaphuca	Bloomfield	Ardakillin
Cloonfree	Cloonrane	Lisnahirka	Cloonfinlough	Cloonslanor
Corboghil	Carrowclogher	Carrowntryla	Farnmore	Farnbeg
Newtown	Ballyhammon	Carrownaskeagh	Castlenode	Lisaphobble
Bellmount or Cloggernagh	Ashbrook or Knocknabarnaboy	Bumlin	Scramoge	Treanaceeve
Killaster				

Table 3.8 Route 4 Townlands

West Tie-in to R361 (Castlerea) Road (approx. 5800m)

Route Corridor Option 4 follows essentially the same path as Option 2 along this section to the R361 south of Frenchpark.It commences in Ratra townland where it overlaps with the proposed N5 Ballaghaderreen Bypass Scheme in order to ensure an adequate tie-in proposal can be developed. It then progresses in a generally south-easterly direction crossing Local Secondary Road LS5629 on the border between Turlaghnamaddy and Dungar Townlands before continuing on to cross Regional Road R361 (Castlerea Road) south of Frenchpark in the townlands of Mullen and Corskeagh. The topology is relatively flat with a slight overall fall from west (90m) to east (80m) at the R361, although there is a gradual rise from the south-western boundary of the corridor towards Fairymount Hill about 5km away. West of Turlaghnamaddy Townland the subsoil classification is predominately sandstone till and shale changing to fen peat from Turlaghnamaddy eastwards to the R361. Land cover follows the subsoil pattern with pastureland in the west changing to a mixture of peat and forestry on the eastern side of this section.

R361 (Castlerea) Road to Owennaforeesha River (approx. 4200m)

From the R361, Option 4 departs on a southerly direction crossing the Carricknabraher River immediately east of the R361. It then proceeds through boggy ground skirting along the northern boundary of the Bellanagare Bog (pNHA, cSAC and SPA), which is itself located on elevated ground south of Frenchpark and Bellanagare villages, before traversing pastureland as it drops back to cross the Owennaforeesha River and Local Primary Road LP1221. The topography shows a rise eastwards away from the Carricknabraher (80m) up the side of the rise to Bellanagare Bog peaking at Knockroe hillock (110m) before falling back towards the Owennaforeesha at 80m. The subsoil classification is predominately fen peat apart from a finger of sandstone till between Knockroe and the LP1221.

Owennaforeesha River to LP1219 (approx. 5800m)

This section continues in a generally southerly direction skirting the western slopes of Ballyglass/ Rathkineely Hill crossing Local Primary Road LP1220 before reaching Local Secondary Road LS5657 and veering to a south-easterly direction across Rathmoyle Hill and on to Local Primary Road LP1219. The Rathcroghan Key Archaeological Constraint is located to the east and north but the Corridor lies outside both the RMP and the core of Rathcroghan. The topology shows a general and gentle rise in ground levels away from the Owennaforeesha River (80m) to the summit of Rathmoyle Hill (140) and then gradually falling to approx. 130m at the LP1219. The ground varies from pastureland in the vicinity of the roads to boggy lands at the western section in Mountdruid and Killaster townlands to large areas of forestry along the slopes of Ballyglass/ Rathkineely hill. The soil classification is predominately fen peat on the northern portion with a finger of sandstone till along LP1220. The south-eastern portion is dominated by sandstone till. There are no major watercourses in this section.

LP1219 to the R367 Road (Tulsk to Castleplunkett) (approx. 4000m)

Continuing in a predominately south-easterly direction this section crosses Regional Road R367 at Mullygollan Townland. The Rathcroghan Key Archaeological Constraint is located to the north but the corridor lies outside both the RMP and the core of Rathcroghan. The topology is predominately level at 130-125m but gradually falls to approx. 110m at the R367 crossing. Land cover is principally pastureland with isolated pockets of forestry. The soil classification is predominately sandstone till throughout. There are no major watercourses in this section.

R367 to N61 National Secondary Route (Boyle to Athlone) (approx. 5500m)

Progressing in a mainly easterly direction this section passes through Brierfield Lough NHA and skirts along the southern periphery of the Carnfree Key Archaeological Constraint as outlined in the Constraints Report. The topology is relatively flat along the first third at approx. 100m AOD, then it rises slightly across the Carnfree “Plateau” at approx. 120m before falling back to approx. 75m at the N61 National Secondary Road crossing point at Manor townland. Land cover is principally pastureland. The soil classification is predominately sandstone till throughout. There are no major watercourses in this section.

N61 to the Existing N5 at Ardakillin (approx. 5000m)

Route Corridor 4 takes a north easterly from the N61 and runs approximately parallel to Local Primary Road LP1422 until it meets the existing N5 at Ardakillin. It passes to the west and north of Ardakillin Lough NHA and crosses a number of small watercourses. The topology along this section falls from the N61 to approx. 60m AOD and remains generally at that level throughout. The land is mainly pastureland becoming increasingly poorly drained and boggy on the approach to the N5. Apart from a section near the N61, the soil classification is primarily fen peat.

Existing N5 at Ardakillin to R368 Road (Strokestown to Roscommon) (approx. 4500m)

Continuing in a primarily easterly direction, Option 4 converges with Option 2 and traverses predominantly flat land punctuated only by a small hillock in Lisnahirka Townland. The route passes along the northern slopes of this hillock before passing between Cloonfree Lough (North) and Fin Lough (South) near to the shores of Cloonfree Lough. It then proceeds to cross Local Road LP1421 and a tributary of the Scramoge River in the vicinity of Cloonfinlough Bridge and ending at the R368 road in Cloonslanor Townland approx. 1 Km from Strokestown. Other than between the lakes and in the vicinity of the R368 where it is boggy/ flat, the land is generally used as pasture farmland. The two lakes are approx. 500m apart and the corridor crosses an area that is subject to flooding and appears to be poorly drained. Fin Lough is associated with one of the Key Archaeological Constraints but is located to the south and outside the corridor. The topology is generally flat (60m) apart from the hillock which rises to approx. 66m AOD and at the R368 where is drops gently to approx. 50m AOD. The soil classification is mainly limestone till but with significant areas of fen peat particularly between the lakes but also surrounding the watercourse serving Ardakillin Lough (pNHA) and an area centred on the R368.

R368 Road (Strokestown to Roscommon) to East Tie-in (approx. 3200m)

Again, continuing in a primarily easterly direction this section rises gently from approx. 50m towards the N5 at Farnbeg (60m AOD) where is passes through the existing GAA grounds. It then proceeds along the existing N5 falling to approx. 50m at the junction with Local Primary Road LP1425 and remaining relatively flat from here crossing the Scramoge River to the east tie-in at Scramoge Townland. The soil classification is variable ranging from limestone till on the western side to sandstone and shale till along the eastern tie-in and a substantial area of Lacustrine deposits in between.

4 ENGINEERING

4.1 Introduction

Each of the seven route corridor options was developed, assessed and evaluated in relation to engineering criteria as detailed in this section.

4.2 Existing Road Network

4.2.1 Existing National Routes

The N5 is a National Primary Route extends from Westport to Longford and connecting the west/ northwest with Dublin, the eastern ports and the east of the Country generally. It is the main traffic route within the corridor and its upgrade is the subject of this report.

The N5 National Primary Road within the strategic corridor study area is approximately 35km long and passes through the towns/ villages of Frenchpark, Bellanagare, Tulsk and Strokestown. The existing road is substandard and does not comply with the current geometric design standards detailed in the Design Manual for Roads and Bridges (DMRB).

The N61 is a National Secondary Road stretching from Athlone to Boyle and connects the N6 National Primary/ Motorway with the N4 National Primary Route.

The N61 intersects the N5 at a substandard crossroads junction located at Tulsk Village.

4.2.2 Existing Regional Roads

There are four Regional Roads crossing through the Strategic Corridor Area, R361, R367, R368 and R369. R361 carries traffic through the western end of the study area from Castlerea through Frenchpark and on to Boyle. Regional road R367 carries traffic from Ballymoe to Tulsk. Regional road R368 carries traffic from Fourmilehouse to Elphin via Strokestown and on to Carrick-on-Shannon. Regional road R369 carries traffic from the N5 south-east of Bellanagare to Elphin.

The Regional Roads primarily facilitate access between the towns and villages, via the National Road network, to the general economy.

4.2.3 Existing Local Roads

There are many local roads within the study area (see Drawing No. RN04250-12-350). Their primary function is to serve as a communications vehicle for local communities and to provide access to the wider market through the regional and national networks.

4.3 Existing N5 National Primary Route

4.3.1 Overview

The existing N5 Road and in particular the section within the study area is substandard with respect to current design standards[11]. A drive-through survey of the road confirms its poor condition, as does the technical information collected and presented in the N5 Improvement Study[12]. A brief outline of the main finding of that report is given in the following paragraphs.

[11] NRA Design Manual for Roads and Bridges (DMRB) – the standard to which all National Roads must be designed since its introduction by the NRA in March 2001.
[12] N5 Improvement Study, Roscommon National Roads Design Office, Nov. 2002.

4.3.2 Horizontal Alignment

The horizontal alignment is generally below standard and does not provide adequate overtaking opportunities. The DMRB recommends that a minimum "Overtaking Value" of 30% is required on a standard single carriageway National Primary Route. None of the route complies with this requirement and the average overtaking value is approx. 12% in both directions.

4.3.3 Vertical Alignment

The vertical alignment is generally less of a problem than the horizontal, however, there are a number of areas where there are hidden dips and the vertical alignment does not comply with current standards.

4.3.4 Cross-section

Practically all of the N5 west of Scramoge Cross (intersection of R371 and N5) is significantly substandard with respect to cross-section. The section between Bellanagare and Strokestown is particularly poor where the road pavement is less than 8m wide (the minimum for reduced single carriageway) along its entire length.

Overall, only 14% of the route meets the paved carriageway requirements for Standard Single Carriageway cross-section (12.3m) and this is further reduced when verge widths are considered. Table 4.1 below gives a breakdown of the average cross-section in each section.

Section	% Route <=7.3m Paved Width	% Route ≥7.3m <12.3m Paved Width	% Route ≥12.3m Paved Width
Tibohine to Frenchpark	0	100	0
Frenchpark to Bellanagare	100	0	0
Bellanagare to Tulsk	100	0	0
Tulsk to Strokestown	29	12	59
All of Existing N5 within Scheme	47	39	14

Table 4.1 Existing N5 Cross-Section

The above information is given in thematic format on Drawing No. RN04250-12-351.

4.3.5 Pavement Condition

A Falling Weight Deflectometer (FWD) survey was carried out on the N5, in May 2001 by the Pavement Monitoring and Maintenance Division of the NRA, as part of the N5 Improvement Study. The results of these tests indicated that all of the pavement between Frenchpark and Tulsk was in a very weak condition and displayed extensive cracking in the wheel track and at the verge area. Some areas were also described as having weak sub-grade characteristics. The Pavement Improvement works carried out to date have concentrated in the sections west of Frenchpark and east of Tulsk.

4.3.6 Public Road Accesses

Currently there are 85 public road accesses/ junctions along the N5 within the study area.

Access is an important consideration when assessing an improvement to a national road. Adequate access has to be provided to allow for efficient utilisation of any road, however junctions also form hazards to road users and reduce the traffic carrying capacity of the road. A well-developed junction strategy strikes a balance between the above conflicting factors to ensure a safe and efficient road. Access to and from the existing Regional Road network is generally considered a strategic economic and social requirement. Access from other local roads will generally be rationalised as far as possible to reduce the number of direct access junctions.

4.3.7 Private Accesses

There are currently approx. 374 house, farm or commercial accesses onto the N5. This figure does not include field gates.

Private accesses cause 'edge friction' on a road, which presents additional hazards to drivers and reduces a roads capacity. The objective for a new route would be to have no such access onto the new road.

4.3.8 Farm Accesses

Field accesses are especially problematic as they encourage slow moving traffic onto primary routes, hindering traffic, and encourage larger vehicles to turn on the road. Accesses cause a constraint to the development of on line solutions. There are a total of 518 farm accesses directly from the N5 this includes farm and field accesses.

Again, elimination of direct field accesses will be an objective in the development of any new road.

4.3.9 Drainage

Road runoff from the existing N5 in rural areas generally drains into the surrounding land. With the exception of a small number of areas, there is no evidence of positive drainage facilities. There are a significant number of watercourses crossed by the existing N5 – principally the Carricknabraher River, Owennaforeesha River, Ogulla River, Cloonfree, and Scramoge River.

4.4 Traffic Study

4.4.1 Introduction

Traffic information is central to the road scheme development process as it provides data for many of the design parameters including:

- Engineering:
    - Capacity – Traffic flow results and predictions are used to determine the adequacy of the capacity provided by a road in terms of Level of Service (LOS) at the opening and design years. The most critical locations are at junctions. All of these have been assessed and found to provide more than adequate capacity at both opening and design years (2015 and 2029).
    - Geometry – Together with LOS, traffic flow is one of the main determinants of the road cross-section
    - Junctions – Traffic flows and patterns are a significant input into the determination of junction strategy and design, e.g. low traffic levels with low turning movements may result in a simple junction being designed while high traffic flows with high turning movements may result in a requirement for a grade separated or other type junction.

- Environmental – Human Beings, Air, Noise, Vibration and Socio Economic are the principal environmental topics influenced by traffic, however, there may be secondary implications on other topics including landscape and visual.

- Economic – Traffic data is used as an input to the Cost Benefit Analysis process.

Transportation Planning International (TPi) was appointed by Roscommon County Council to prepare a Traffic Report for the N5 Strategic Corridor Scheme. The report is included in full in Appendix 1 to this report. There were six primary objectives for the Traffic Study:

- Carry out detailed traffic surveys,

- Build and validate a traffic model for the road scheme,

- Determine traffic flows on the existing road network, predict future traffic flows on the existing road network and for each of the route corridor options,

- Assess and evaluate the route corridor options based on traffic engineering criteria,

- Determine the emerging preferred route corridor based on traffic engineering criteria,

- Provide traffic information necessary for other engineering, environmental and economic topics, e.g. Noise, Air Quality, Cost Benefit Analysis.

4.4.2 Traffic Survey

Detailed traffic surveys were carried out in January/ February 2007 and June 2008 comprising:

- Origin-Destination Survey at Tulsk in the vicinity of the N5/ N61 Junction;

- Automatic Number Plate Recognition Surveys at 10 locations;

- Manual Classified Counts (MCC) undertaken at 12 locations;

- Automatic Traffic Counts on road links at 18 locations within the study area for a two week period. A manual classified count was carried out at one additional location;

- Vehicle Journey Time Surveys were carried out on the existing N5 and four other routes.

In addition, the NRA Permanent Traffic Counter located at Frenchpark (Frenchpark N05-11) was used to augment this information and particularly in the Traffic Model Validation process.

4.4.3 Traffic Model

A traffic model for the study area was developed using the SATURN suite of computer programs to enable an accurate assessment of traffic issues. The model is based on the above traffic survey and a zoning system that comprises 38 zones.

Accuracy of the estimated matrix O/D movements was assessed, by comparing matrix trip volumes against target counted flows. The results show that over 99% of movements have a GEH of ≤ 4 (85% is generally taken to be satisfactory).

Validation of the traffic model is carried out by:

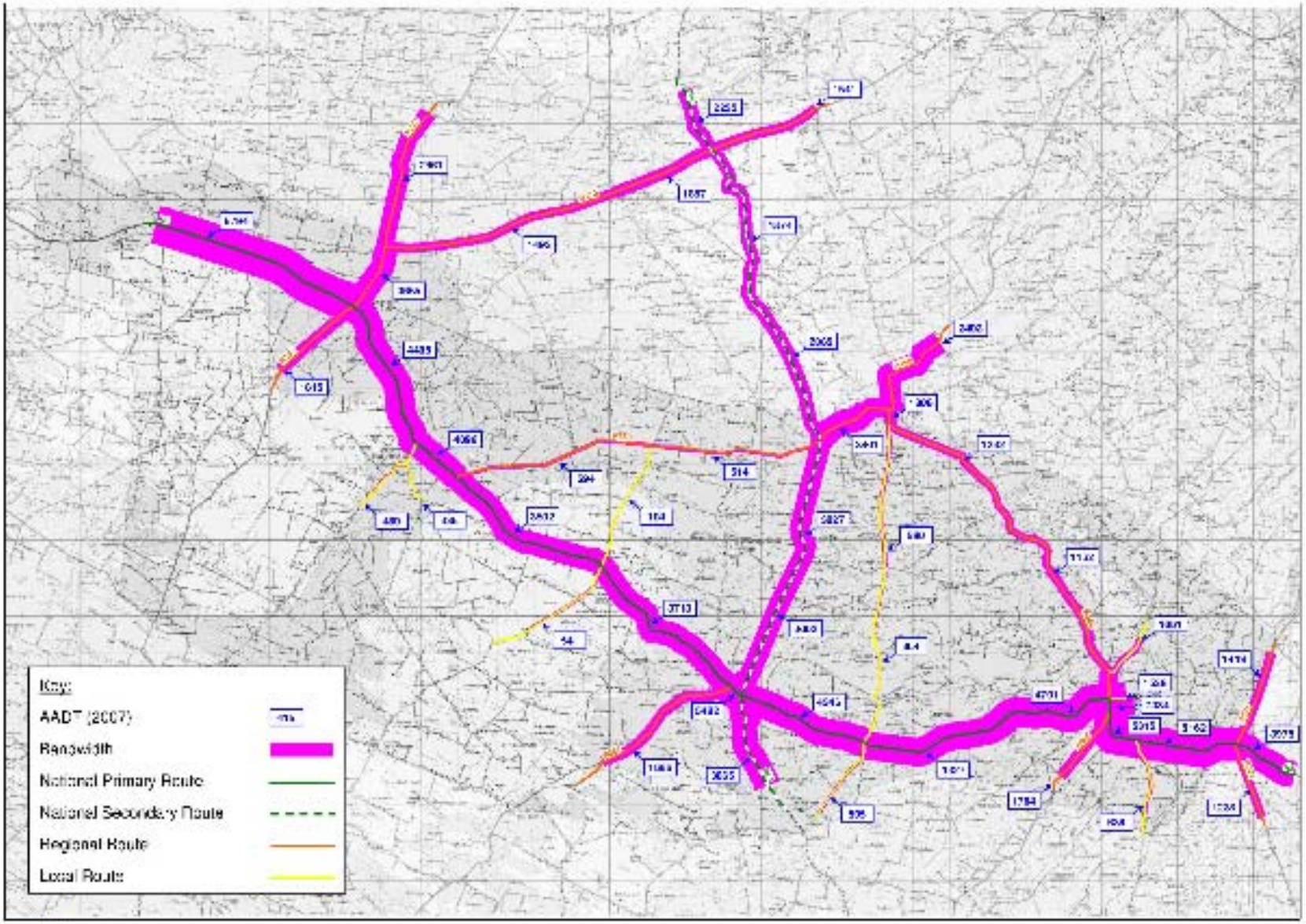
1. Comparing the assigned hourly traffic flows with the observed traffic flows; and

2. Comparing the modelled Journey Times with the observed Journey times.

These Validation Criteria are set out in Appendix 3, Table 7.1 of the NRA Project Appraisal Guidelines and in each case the requirements of the Acceptability Guideline were exceed.

4.4.4 Traffic Flow

The above traffic model was used to determine the base year (2007) traffic flows on the road network within the study area and to predict the future traffic flows for each route corridor options for Opening Year (2015), Design Year (2030) and Horizon year (2040). Figure 4.1 over shows the base year traffic flows.



Base Year (2007) AADTs and Bandwidths

Figure 4.1

Traffic flow predictions for future years are based on traffic flow growth figures on individual road types throughout the study area. These growth figures are derived from the NRA traffic growth guidelines; rebased to 2007 (see Table 4.2 below).

Road Type	2007-2015		2007-2030		2007-2040	
	Car & LGV	HGV	Car & LGV	HGV	Car & LGV	HGV
National Primary	1.220	1.242	1.496	1.625	1.602	1.875
National Secondary	1.200	1.214	1.442	1.547	1.542	1.769
Non National	1.117	1.110	1.243	1.275	1.288	1.376

Table 4.2 Future Traffic Growth Figure Rebased

Source: TPi Traffic Report

The results of the Traffic Flow Predictions are shown, in summary, on Drawing No. RN04250-12-352.

Traffic flow along the exiting N5 (2007) varies between 4096 AADT and 5794 AADT with approx. 12% Heavy Commercial Vehicles (HCV). Traffic flow along the N5 at the design year has grown to between 5312 and 8785 vehicles with approx. 12% HCV. Traffic transfer for each of the route corridor options is approximately equal. It is anticipated that practically all through traffic will transfer and between 62% and 81% of "all traffic" will transfer to each option.

4.4.5 Traffic Assessment and Evaluation

The traffic modelling report indicated that there will be broadly similar traffic levels and diversion rates for each of Option 1, 1A, 2, 2A, and 2B. Option 3 does not achieve the scheme's objectives, while Option 4 is longer than the other options and will achieve lower traffic transfer rates.

4.4.6 Ranking - Traffic

Having regard to the above and the detailed Traffic Report, Table 4.3 below gives the relative ranking of each route corridor option in relation to Traffic.

Corridor	1	1A	2	2A	2B	3	4
Ranking	1	1	1	1	1	7	6

Table 4.3 Ranking – Traffic

The Traffic Report indicates that, overall, with the exception of Options 3 and 4, there is little difference between the route corridor options.

4.5 Road Accidents

An analysis of recorded accidents over the 11-years period 1994-2004 has been carried out and is summarised in Table 4.4 below. Over this period there have been a total of 10 fatalities and 44 serious injury accidents on this section of the N5.

Accident Type	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*TOTAL*
Fatal	0	1	2	2	2	2	0	1	0	0	0	**10**
Serious Injury	3	4	3	2	7	7	8	1	1	6	2	**44**
Minor Injury	2	5	10	8	9	10	5	3	5	9	2	**68**
TOTAL	**5**	**10**	**15**	**12**	**18**	**19**	**13**	**5**	**6**	**15**	**4**	**122**

Table 4.4 Ranking – Traffic

The above results have been mapped thematically using the MapInfo Geographic Information System (GIS) and the results analysed to determine road accident patterns (see Drawing No. RN04250-12-353). This shows a pattern of "accident clusters" within the study area – 16 on the existing N5 road. These clusters appear to coincide with three primary factors:

- Within urban centres,
- In the vicinity of junctions, and
- Where the existing road geometric features are poorest.

It is anticipated that all corridors, with the exception of Route Corridor 3, would lead to a significant improvement in all three primary coincident factors.

4.6 Design Standards

The geometric design of a road scheme is governed by the National Roads Authority Design Manual for Roads and Bridges (DMRB), March 2000 as amended and the UK DMRB as amended by NRA Addenda.

4.6.1 Design Standards

The principal standards concerning road geometry and used on this scheme are outlined in table 4.4 below:

Standard Number	Standard Title
NRA TD 9	Road Link Design
NRA TD 27	Cross Sections and Headroom
TD 42/95 as amended by NRA Addendum 42	Geometric Design of Major/ Minor Priority Junctions
TD 16 as amended by NRA Addendum 16	Geometric Design of Roundabouts
TD 22 as amended by NRA Addendum 22	Layout of Grade Separated Junctions
TD 40 as amended by NRA Addendum 40	Layout of Compact Grade Separated Junctions

Table 4.5 Principal Design Standards Used

Other standards, advice notes and guidelines from the NRA DMRB and the UK DMRB are used as appropriate/ required.

4.6.2 Cross Section and Capacity

The two main determinants of road geometry parameters are road cross-section (Road Type/ Category) and Design Speed.

Road cross-section is capacity related and is primarily a function of traffic flow and Level of Service (LOS) although other factors such as route consistency and location may be important considerations.

4.6.3 Design Speed and Classification

Roads are designed such that their geometric alignment features, e.g. horizontal and vertical curvature, sight distances, super-elevation, etc, provide for a Design Speed that is consistent with the anticipated vehicle speed of the road and that the road cross-section is adequate to ensure the required capacity is achieved.

Table 2 of NRA TD 9 stipulates the Design Speed to be used on sections of road where a mandatory speed limit applies. Table 5.3 below is a reproduction of the parameters likely to be relevant to this scheme.

Mandatory Speed Limit		Design Speed
Mph	Km/h	Km/h
40	64	70A

Table 4.6 Design Speed for Mandatory Speed Limit (extract)

Outside of speed limit areas, the Design Speed is determined by a process of iteration of alternative alignments to achieve a balance between the various engineering, economic and environmental factors. The Design Speed, which is a function of Alignment Constraint, Layout Constraint and Mandatory Speed Limits, is determined for each alignment by reference to NRA TD 9 Figure 1: Selection of Design Speed (Rural Roads) as reproduced in Fig. 4.2 over.

4.6.4 Sight Distances

Stopping Sight Distance and Full Overtaking Sight Distance (FOSD) are the two sight distance parameters prescribed in relation to road design.

4.6.5 Horizontal Alignment

The horizontal alignment of a road scheme comprises a series of straights joined by curves representing the best fit to the planimetric features between two tie-in points having regard to engineering, environmental and economic considerations.

Horizontal curves are used to provide safe smooth transitions between changes in horizontal alignment direction. There are three components to every curve:

- The Circular Curve and its associated superelevation;
- The transition curve at either end;
- The straights/ tangents connected by the curve.

With the exception of Route Corridor Option 3, horizontal alignments complying with the desirable minimum parameters of radius and super-elevation can be accommodated. Route Option 3 is based on the existing N5 and would not accommodate such design parameters.

In addition to the above minimum desirable requirements, and in combination with the vertical alignment, road cross-section and junction strategy, horizontal curves with appropriate radii

should be provided to facilitate the achievement of the overtaking value described in section 5.5. Again, this would be difficult along option 3 due to the large number of existing dwellings and other properties in the vicinity of the existing road.

4.6.6 Vertical Alignment

The vertical alignment of a road scheme comprises a series of straights (gradients) joined by curves representing the best fit to the relief topography between two tie-in points having regard to engineering, environmental and economic considerations.

The desirable maximum gradient for single carriageway national and regional roads is 5% while that for local roads is 6%. These can be relaxed to 6% and 8% respectively in difficult conditions. All roads provided as part of the bypass scheme comply with these requirements. There are no absolute minimum gradients, although, minimum gradients of between 0.3% and 0.5% are desirable for drainage purposes. However, the achievement of this is not a design requirement and the vertical alignment is not manipulated to achieve it.

Vertical parabolic curves are used at changes of gradient. There provision is primarily concerned with the achievement of the appropriate sight distances and on comfort grounds. Crest curves are used at the top of hills and sag curves are used at the bottom of valleys. A convenient method of specifying curves is the K Value which is the curve length divided by the algebraic change of gradient (%) and approximates to the radius divided by 100.

Crest curves for speeds in excess of 50kph are based on achieving the minimum desirable stopping sight distance. All of these values can be achieved on each of the options with the exception of Option 3 where existing development restricts the design opportunities.

4.6.7 Ranking – Road Geometry

Having regard to the above, Table 4.4 below gives the relative ranking of each route corridor options in relation to road geometry. With the exception of Corridor Option 3, each of the other corridors provides opportunity to develop road alignments that meet all road design standards as determined in accordance with the DMRB.

Corridor	1	1A	2	2A	2B	3	4
Ranking	1	1	1	1	1	7	1

Table 4.7 Ranking – Road Geometry

4.7 Structures

4.7.1 Structures Overview

The provision of structures on a road scheme is required principally to facilitate road, access and watercourse constraints. The junction strategy will not be developed in sufficient detail to allow determination of the exact number of structures required to facilitate roads and accesses until completion of the Preliminary Design Phase. It is likely that a similar number and type of structure would be required for each of the options with the exception of Option 3 where, because of its “online” nature, the provision of grade separation would be restricted. Instead, it would be necessary to collect access and side roads via collector roads and rationalise the number of access onto the mainline.

All options will require the provision of watercourse crossings and, based on the characteristics of each corridor and the watercourses, the estimated number of bridges and culverts is given in Table 4.9 below.

Route	1	1A	2	2A	2B	3	4
Bridge	4	4	4	6	6	4	5
Culvert	3	3	9	8	9	5	10
Total	7	7	13	14	15	9	15

Table 4.8 Watercourse Structures

4.7.2 Ranking - Structures

Having regard to the above the relative ranking of each route corridor option in relation to Structures has been based on the number of watercourse crossings and is given in Table 4.10 below.

Corridor	1	1A	2	2A	2B	3	4
Ranking	1	1	4	5	6	3	6

Table 4.9 Ranking – Structures

4.8 Soils and Geology

4.8.1 Bedrock

The underlying bedrock geology of the area primarily comprises Lower Carboniferous limestone, predominately of undifferentiated visean, but on the extreme western part of the corridor it is associated with the Kilbryan and Oakport formations. The extreme eastern side of the study area encroaches on the Lower Carboniferous Courceyan sandstone of the Fearnaght formation. The area around Bellanagare is associated with the Upper Carboniferous sandstone of the Boyle formation (See Drawing No. RN04250-12-354).

4.8.2 Physiographic Landscape and Overburden

The physiographic nature of the landscape is predominately flat to undulating lowland varying from mainly wet and organic soils throughout the majority of the study area to mainly dry soils near the southern boundary. Rolling lowland and Drumlin features predominate east of the N61. In addition there are significant basin bog areas north of Frenchpark and south of Bellanagare. Based on the soil type classifications prepared by the Geological Survey of Ireland and Teagasc, the primary soil types are gleys and podzolics derived from limestone glacial tills with a limited amount from sandstone glacial tills at the eastern extremity (see Drawing No. RN04250-12-355).

4.8.3 Soils and Geology Assessment and Evaluation Summary

The assessment and evaluation of soils and geology has engineering, environmental and economic implications (see Appendix 3E) and was based on three principal factors:

- The length of each route crossing known peat areas - moderated by the depth of peat,
- The length of each route crossing areas where the subsoil is unlikely to be suitable for reuse as engineering fill – primarily gley soils,
- The preliminary earthworks analysis for each route.

The limestone nature of the bedrock is likely to give rise to karstic features throughout the study area and will require further consideration at the preliminary design stage. This constraint is likely to be approximately equal for each of the options due to the consistency of bedrock type.

Route options that pass through peat areas are likely to have higher construction cost, difficult engineering constraints and possible elevated environmental impacts. The Preliminary Site Investigation (Probing) targeted these soft ground areas to get an indication of the extent and depth of soft ground present (See Site Investigation Summary – Appendix 6 and Drawing No. RN04250-12-355). This information was used to provisionally determine the amount of peat likely to be encountered along each of the route corridor options and the results are presented in Table 4.11 below. Note that these quantities are based on limited data and are used for comparative purposes only.

Parameter	Corr. 1	Corr. 1A	Corr. 2	Corr. 2A	Corr. 2B	Corr. 3	Corr. 4
Peat m^3 000's	1,428	774	1,353	1,290	964	135	835
Ranking	7	2	6	5	4	1	3

Table 4.10 Peat Material along Corridor Options (Provisional)

Some of the glacial tills may be acceptable, in engineering terms, for general earthworks although this is less likely in those areas described as consisting mainly of wet and organic soils overburden. The determination of material acceptability will be made following ground investigations carried out during the preliminary design and subsequent phases of the scheme. However, for the purposes of route selection, soils classified by the GSI as Gleys (See Drawing No. RN04250-12-356) have been assumed to be unacceptable and the length of each route crossing such material has been determined. Table 4.12 below summarises the results of this analysis.

Parameter	Corr. 1	Corr. 1A	Corr. 2	Corr. 2A	Corr. 2B	Corr. 3	Corr. 4
Length in Gleys (m)	19,400	23,300	29,000	29,200	28,800	22,000	30,100
Ranking	1	3	5	6	4	2	7

Table 4.11 Soft Ground along Corridor Options

Earthworks Balance refers to the ability to balance the amount of acceptable material required for road construction with the amount of acceptable material excavated as part of the construction works. Generally, the nearer a scheme is to producing an earthworks balance the lower the economic cost of the construction works. In addition, there are environmental benefits since material has to be neither imported nor exported from the scheme. Thus, the environmental effects are localised and dealt with as part of the scheme.

A preliminary earthworks analysis has been carried out based on tentative centreline alignments developed for each route corridor option and a preliminary sub-surface ground model based on a range of data sources including:

- The depth to bedrock as indicated in the Well database from GIS;
- The depth of soft material as indicated by Glover's Preliminary Site Investigation Results;
- Results of the trial pits done on Planning Applications within the route corridors;
- Soils Descriptions as drafted in the document from Teagasc – Methodology for Subsoils Mapping.

The resulting analysis has been summarised in Table 4.13 below. This table shows the anticipated amount of material available within each option and the amount of fill material

required. Subtracting one from the other gives an indication of the potential earthwork balances for each route corridor option. In order to put a monetary value on the earthworks, the volume of import was multiplied by a factor of four because, based on standard NRA Construction Rates, the average price of importing material is four times more expensive than simply excavating and placing acceptable material within the site. The amount of suitable material was added to the amount of import (x4) to give an indication of the overall relative earthworks costs.

Corridor	Option 1	Option 1A	Option 2	Option 2A	Option 2B	Option 3	Option 4
Assumed Rock m^3	678,000	656,000	147,000	331,000	165,000	38,000	48,000
Assumed Suitable m^3	357,000	574,000	858,000	744,000	555,000	485,000	452,000
Total Suitable m^3	1,035,000	1,230,000	1,005,000	1,075,000	720,000	523,000	500,000
Fill m^3	1,554,000	1,218,000	1,367,000	1,365,000	1,008,000	743,000	980,000
Percentage F/C	66%	100%	73%	79%	71%	71%	51%
Import m^3	519,000	-11,000	363,000	290,000	288,000	219,000	480,000
Import x 4	2,076,000	-44,000	1,452,000	1,160,000	1,152,000	876,000	1,920,000
Suitable + Import m^3	3,111,000	1,186,000	2,457,000	2,235,000	1,872,000	1,399,000	2,480,000
Ranking	7	1	6	4	3	2	5

Table 4.12 Preliminary Earthworks Analysis

4.8.4 Ranking – Soils and Geology (Engineering)

The amount of peat and other soft ground is likely to be the greatest determinants of earthworks cost both in monetary and environmental terms. Therefore, having regard to the above the relative ranking of each route corridor option in relation to Soils and Geology is given in Table 4.14 below.

Corridor	1	1A	2	2A	2B	3	4
Ranking	4	2	7	4	3	1	4

Table 4.13 Ranking – Soils and Geology (Engineering)

4.9 Sources of Material

In order to identify the main possible sources of granular material that is required for the construction of the proposed road scheme, the GSI Quarry Database[13] for Roscommon and the Quarry Registers[14] in Roscommon, Longford and Mayo County Councils have been queried and the principal licensed quarries identified. The locations of these in relation to the proposed road scheme are indicated on Drawing No. RN04250-12-357. In summary, there are 16 quarries within 20km of the proposed scheme and a further 9 within 30km of the study area.

[13] Give exact name of database
[14] explain what the quarry registers are

4.10 Overall Assessment – Engineering

This paragraph should be read in conjunction with Chapter 4 – Engineering, Chapter 5 – Utilities and Chapter 9 - Safety.

The ranking of each of the route corridor options in relation to engineering topics has been outlined in Chapters 4, 5 and 9. These have been collated and presented in Table 4.15 below.

Corridor\ Topic	1	1A	2	2A	2B	3	4
Traffic	1	1	1	1	1	7	6
Road Geometry	1	1	1	1	1	7	1
Structures	1	1	4	5	6	3	6
Utilities	1	1	4	5	3	7	6
Soils and Geology	4	2	7	4	3	1	4
Road Safety Audit	1	2	4	5	3	7	6
TOTAL	9	8	21	21	17	32	29
Overall Preference	**2**	**1**	**4**	**4**	**3**	**7**	**6**

Table 4.14 Overall Preference - Engineering

5 UTILITIES

5.1 Introduction

All of the route corridor options, with the exception of Corridor 3 – the online option, traverse a predominately rural environment, which has a relatively low density of services present (Water, Electricity and Telecoms). Corridor 3 passes through the towns of Frenchpark, Bellanagare, Tulsk and Strokestown and would involve significant conflict with all services.

Construction of the scheme, especially at the tie-in and road crossing locations, will cause both interference and disruption to a number of services. Inevitably, there will be a requirement to re-route some of the services and protect others.

The following companies and organisations were contacted to ascertain in so far as is possible the extent and locations of their existing plant, both under and over ground, and their plans for upgrading existing or providing new/ additional plant/ services in the vicinity of the proposed corridors:

(a) Eircom,

(b) Electricity Supply Board (ESB) and ESBI,

(c) Roscommon County Council Water Services,

(d) Bord Gáis, and

(e) Mobile Phone Companies - O_2, Vodafone, Meteor and Three

Drawing No. RN04250-12-359 and RN04250-12-360, Volume 2 indicate the known services in the vicinity of the proposed route corridors based on the details provided by the above organisations.

5.2 Eircom

5.2.1 Telecoms Distribution Lines

Eircom, as the sole telecoms land network operator operating within the study area, has an extensive distribution network covering the entire study area within which the route corridor options were developed. Typically, this network tends to follow the existing road network. Therefore, with the exception of Corridor 3, Eircom plant poses a relatively equal constraint on all corridors. Corridor 3 represents the online option following the existing N5 and passing through the main towns along the route. Telecoms plant is located along almost the entire existing N5 with significant concentrations at each of the towns. Option 3 generates by far the greater number of conflicts and is therefore the least favoured option.

5.2.2 Fibre-Optic Telecoms Lines

The underground fibre-optic telecoms network forms the “backbone” of the telecommunications network. Interference with this network can involve significant costs as well as potential disruption to a large number of users. There are two fibre-optic lines within the study area,

- Loughglynn to Frenchpark (along L1226, L1224 and R361) – this line approaches from the south and terminates in Frenchpark. It crosses Route Corridor Options 1A, 2, 2A, 2B, 3 and 4 affecting these equally but not affecting Option 1 which passes north of Frenchpark,

- Elphin to Strokestown (along R368) – this line approaches from the north and terminates in Strokestown. It crosses Route Corridor Options 1 and 1A only.

Overall, there is no significant difference between the route corridor options with respect to the fibre-optic telecoms lines.

Drawing RN04250-12-359, Volume 2 shows the distribution of telecoms plant in relation to all of the route corridor options.

5.3 ESB and ESBI

Initial consultations between the Electricity Supply Board (ESB) and the design team have identified a number of locations where there are conflicts between the route corridor options and ESB plant (based on mapping details supplied by ESB- See Drawing RN04250-12-359). These conflicts are of three categories:

- Local Distribution Network (220V to 10kV),
- High Voltage Distribution Network (38kV), and
- Very High Voltage Transmission Network (110kV and 220kV).

It is considered prudent that, where possible, diversion works be carried out in advance of the main construction contract.

Exact details of all necessary diversions/ re-routing will be agreed in advance with the ESB and ESBI. Further, all mapping details must be confirmed during the subsequent phases of the scheme development and in particular at construction stage.

5.3.1 ESB Low Voltage Conflicts

Based on the mapping information supplied by the ESB, there is an extensive distribution network covering the entire study area within which the route corridor options were developed. Typically, this network tends to follow the existing road network. Therefore, with the exception of Corridor 3, ESB distribution plant poses a relatively equal constraint on all corridors. Corridor 3 represents the online option following the existing N5 and passing through the main towns along the route. ESB distribution plant is located along almost the entire existing N5 with significant concentrations at each of the towns and generates the greater number of conflicts and is therefore the least favoured option.

5.3.2 ESB High Voltage Conflicts

The Carrick-on-Shannon – Castlerea 38kV ESB line enters the study area just west of Elphin and runs in a south westerly direction crossing the N5 at Rathcroghan. From here it continues in the same direction approx. along Local Road No. LP1219. This ESB line crosses each of the feasible route corridor options approximately perpendicularly and therefore poses an equal constraint to each.

5.3.3 ESB Very High Voltage Conflicts (Transmission Network)

Initial consultations between the design team and the ESB and ESB International identified a number of conflicts with three very high voltage lines (forming part of the ESB “Backbone” Transmission Network) and the route corridor options (See Drawing RN04250-12-359):

- Flagford – Tonroe 110kV Transmission Line: This electricity line passes north of all of the route corridor options but is within 150m of their northern edge along the first 2km (approx.) through the townlands of Ratra, Clashcarragh and Turlagharee. This is the road tie-in location and therefore all corridors converge along this stretch. There is no direct impact on any of the corridors; however, works in relation to side roads may be a source of conflict. This will be equal for all corridors options.

- Cashla – Flagford 220kV Transmission Line: This electricity line crosses all route corridor options at their approx. midway point (Option 1 and 1A at Gortnacrannagh and Creeve, Option 2, 2A and 2B at Boyanagh, Flaskagh More, Flaskagh Beg and Ross More West, Option 3, at Carrowntoosan, Option 4 at Toberelva and Tonereagh) and therefore affects each in a similar manner.

- Lanesborough - Flagford 110kV Transmission Line: This electricity line is located within 100m of the eastern tie-in point. The exact tie-in will not be determined until completion of the preliminary/ detailed design phases. It is likely that there will be conflicts between this electricity line and the proposed road, but these are likely to be similar for each route corridor option.

In summary, there are three very high voltage electricity transmission lines that will have an impact on the proposed scheme; however, a similar impact level is associated with each of the seven route corridor options.

5.4 Water Services

5.4.1 Water Supply

Roscommon County Council's Water Services Department provided a copy of their Complete Information for Water Services (CiS) database containing data on all water assets in the County. This was queried to identify:

- Public Water Supply Schemes within or adjacent to the study area,
- Group Water Supply Schemes within or adjacent to the study area,
- The locations of all water pipes with a diameter of 100mm and above,
- The locations of all water supply sources and storage facilities, and
- The locations of all wastewater facilities within or adjacent to the corridors.

All of the above information was mapped and used to assess the relative constraint imposed on each of the route corridor options (see Drawing RN04250-12-360).

5.4.2 Roscommon County Council Water Supply Schemes

There are three Regional Water Schemes operated by Roscommon County Council within or adjacent to the study area:

1. **North Roscommon Regional Water Supply Scheme** – the approximate catchment of this scheme is indicated on drawing RN04250-12-360. It is located in the north western portion of the corridor and serves the population centres Ballaghaderreen, Tibohine, Frenchpark, Fairymount and Bellanagare as well as the surrounding rural area. The primary sources are Lough Gara and an adjacent spring at Cloonmagunnaun. A supplementary spring at Gortnagoyne, near Bellanagare, is also used. The primary storage reservoirs are located at Rathkeery and Lissacurkia with secondary storage at Fairymount and Bellanagare. None of the sources are located within the proposed corridor options. The Rathkeery reservoir is located near to the western tie-in, is unlikely to be affected (apart from alterations to the feeding water mains), and poses an equal constraint on each corridor. The Bellanagare Reservoir is located within Corridor 4 but the width of the corridor allows scope to avoid a direct impact.

2. **Castlerea Rural and Urban Regional Water Supply Scheme** - the approximate catchment of this scheme is indicated on drawing RN04250-12-360. It is located in the

south western portion of the corridor and serves Castlerea and its surrounding hinterland including the population centres of Kilmurry, Lissalway and Castleplunkett. The primary source for the scheme is located immediately south east of Castlerea and over 7km from the nearest route corridor option (Option 4). It is a ground water source and the associated ground water protection zone lies adjacent to stretches to just within the south-south east boundary of the study area (see Hydrology and Hydrological Report, Appendix 3F). The principal storage reservoir is located at Mewlaghadooey Hill, Castleteheen Townland that is located outside the study area. Corridor 4 is the closest to the Castlerea scheme but is approx. 2.5km outside the protection zone.

3. **North East Roscommon Regional Water Supply Scheme** - the approximate catchment of this scheme is indicated on drawing RN04250-12-360. It is covers the northern, eastern and south eastern portions of the study area, but generally not the Lakeland area in the centre, east of the N61. It serves the population centres of Strokestown, Elphin, Roosky, Scramoge, Ballagh and the surrounding hinterland. The primary source for the scheme is located immediately north east of the study area at Grange Lough approx. 2.3km from corridor 1 and 1A. The principal storage is at Kiltrustan Hill Reservoir with some secondary reservoirs located outside the study area. None of the corridors are likely to impact on the source or storage locations.

There is an extensive network of water pipes, mainly distribution, but also transmission, associated with the delivery of the public water supply in County Roscommon and within the Study Area. Roscommon NRDO has queried the database and identified all pipes of 100mm diameter and greater that fall within each of the corridors (See Drawing No. RN04250-12-360). As expected, the towns and villages represent locations where there is an increased concentration of water pipes serving these population centres. Elsewhere, the concentration is much lower and follows a similar pattern to the distribution of residential building along the main roads in particular the existing N5. Option 3, being predominately on-line, represents the greatest interference with water resources and is therefore the least favoured. The remaining corridors, on balance, represent a similar and relatively modest constraint.

5.4.3 Group Water Supply Schemes

There are several group water schemes being operated within the study area. Some are supplied from Roscommon County Council public water mains while others have their own source and storage facilities. The largest concentration of group water schemes is in the lake area east of the N61 National Secondary Route. The principal group water schemes are listed in Table 5.1 below:

Group Water Scheme Name	
Peak Mantua	Clooncullare
Carnakitt	Lisheen
Rathcroghan	Annaghmore
Ardkeenagh	Vesnoy
Ogulla	Kildalloge
Tullyloyd	Cloonfree

Table 5.1 Principal Group Water Schemes

5.4.4 Wastewater Treatment Schemes

Each of the population centres have wastewater treatment facilities and some have plans to upgrade in the near future. With the exception of Corridor Option 3, none of the treatment works are located within the corridors.

5.4.5 Water Services Review

The existing water mains are concentrated in the vicinity of the population centres and along the existing N5 route. Therefore, Option 3 poses the greatest level of interference and is least favoured. The other options pose relatively equal and low interference with water mains.

The source for Ardkeenagh Group Water Scheme is located within Corridors 2 and 2A and, although it is possible to avoid the source within each corridor, it represents a constraint.

Bellanagare reservoir is located on the edge of corridor 4 but could be avoided through the design process.

Having regard to the above, the options 1 and 1A would be most preferred followed by 2B, 4, 2 and 2A. Option 3 is least desirable.

5.5 Bord Gáis

Initial consultations with Bord Gáis indicate that there are no current or planned gas lines along or crossing any of the seven route corridor options.

5.6 Mobile Telephony Networks

Initial consultations were carried out with the four mobile telephony companies:

- Vodafone – Vodafone have a number of telephone masts within the study area but none within any of the proposed route corridor options,
- O_2 – O_2 also have a number of telephone masts within the study area but none within any of the proposed route corridor options,
- Meteor – Meteor do not have masts within any of the corridors, and
- 3 Ireland – 3 Ireland do not have masts within any of the corridor options.

5.7 Ranking - Utilities

Having regard to the above, Table 5.1 below gives the relative ranking of each route corridor option in relation to utility conflicts.

Corridor	1	1A	2	2A	2B	3	4
Ranking	1	1	4	5	3	7	6

Table 5.2 Ranking – Utilities

6 ENVIRONMENTAL

6.1 Introduction

Each of the seven route corridor options was developed, assessed and evaluated in relation to environmental criteria as detailed in this section. The aims of the environmental section include:

- To satisfying the screening criteria for the purposes of Article 27 of the European Communities (Environmental Impact Assessment) Regulations, 1989 to 2001,
- To carry out an assessment of the feasible route corridor options in order to evaluate and compare them based on environmental criteria taking account of interaction with other environmental, engineering and economic parameters,
- Based on the above assessment, to determine the preferred route corridor having regard to environmental, engineering and economic parameters,
- Ensuring full consideration by the Local Authority of the likely environmental effects of the scheme so that decisions can be made with a knowledge of their environmental consequences,
- Allowing the public and statutory environmental bodies to comment on the scheme taking account of their environmental implications.

6.2 The Environmental Reports

The environmental reports (see Table 6.1 below), upon which this Chapter is primarily based and which inform the environmental assessment and evaluation of the corridor options, are summarised in the text below and are included in full in Appendix 3 of this report.

Environmental Topic	Report Prepared by	Appendix
Agriculture and Property	Roscommon National Roads Design Office	03A
Air Quality	RPS Consulting Engineers	03B
Archaeological, Architectural and Cultural Heritage	Archaeological Development Services	03C
Ecology	Department of Environmental Resource Management, University College Dublin	03D
Soils and Geology	Hydro Environmental	03E
Hydrology and Hydrogeology	Hydro Environmental	03F
Landscape and Visual	MosArt Ltd.	03G
Noise and Vibration	Roscommon National Roads Design Office	03H
Socio-Economic	Optimize Consultants Limited	03I

Table 6.1 Environmental Sub-Reports

6.3 Alternatives Examined

Seven Feasible Route Corridor Options (1, 1A, 2, 2A, 2B, 3 and 4) were identified by the design team, which includes the Project Archaeologist and the specialist environmental and technical sub-consultants (See Drawing No. RN04250-12-347). The development of these corridors was informed initially by the Constraints Study Report (See Drawing No. RN04250-12-348) but was continually reviewed throughout the route corridor evaluation and assessment process as additional and more detailed information emerged from the design team, extensive consultations with elected representatives, over 60 public and private bodies as well as ongoing public consultation including a “Public Consultation Day” held in May 2007. A full description of the route corridor development process and of each of the corridor options is included in Section 3 of this report.

Interaction between the environmental topics as well as with the other engineering and economic considerations, was facilitated through the iterative route development process employed. In particular, there were three milestone workshop meetings at which each of the specialist sub-consultants and the NRDO design team discussed the project. This ensured that the project team (including sub-consultants) were fully aware of all interactions.

6.4 Human Beings

The proposed N5 Strategic Corridor Road Scheme will have a range of environmental effects, some positive and some negative, both in relation to the construction of the project and to the subsequent operation of the road. The negative effects have been avoided/ minimised through the determination of the preferred route corridor and will be further attenuated through the design of the proposed road within this corridor and through the provision of specific mitigation measures.

The effects on Human Beings are described by reference to a number of environmental topics of which the principal ones include:

(a) Agriculture and Property,

(b) Air Quality,

(c) Landscape and Visual,

(d) Soils and Geology,

(e) Hydrology and Hydrogeology, and

(f) Noise and Vibration

Individual reports on each of the above have been prepared (See Appendices 3A to 3I) and the main findings and recommendations of each are detailed in the following sections.

6.5 Agriculture and non-Agricultural Property

6.5.1 Corridor Assessment Summary

This section should be read in conjunction with the detailed Agriculture and non-Agricultural Property Report included in full in Appendix 3A.

Six principal factors were considered as part of the Agriculture and Property assessment of the route corridor options:

1. The average farm size and the distribution of farm sizes throughout the study area. This gives a broad indication of any differences in farming intensity within the study area and also, by considering the farm size, the likelihood of farm incomes being supplemented by off-farm activities, e.g. part-time work. The results indicate:

    - The distribution of farm size is relatively uniform and therefore there is likely to be an equal constraint for each corridor option,
    - Farm size is relatively small and it is therefore likely that in some cases farm income will be supplement from other sources,
    - There is little or no difference between the route options in relation to this criteria,

2. The number of farm units intersected by each of the corridors. This gives an indication of the number of individual farms that may be impacted and the level of farm severance along each corridor. Option 3, because it is along the existing route would have the lowest level of land severance. The next option in order of preference is option 1 with options 1A and 2B close followers. Due to the width of the corridors and the potential to mitigate by avoidance there is little difference between any of these options,

3. The Farming Systems employed throughout the Study Area. This gives an indication of how the corridors might affect specialised farms, crop production or otherwise impact on sensitive holdings – such as those with horses. Farming in the area is largely grass based. There is no crop production. Again, Option 3 would be likely to have the least impact with each of the other options have a broadly similar but slight impact on the agriculture of the study area.

4. The land cover pattern traversed by each of the route corridor options was considered in order to give an indication of the relative farming suitability/ productivity of the land in each case. This showed that there was little difference in the land cover pattern along all option with the exception of Option 3 which passes through the built-up areas of the towns and villages along the N5 and does not meet the objectives of the scheme. Option 4 is the longest option and therefore likely to have a greater potential impact. In addition, option 1 passes close to the built-up area around Frenchpark and may have a slightly increased impact potential. There is very little difference between the remaining options but the preference is, in descending order, 1A, 2, 2A and 2B.

5. The Potential Properties Affected (PPA) for each corridor was based on the number of properties located within various bandwidths of the corridor centreline. This is a straightforward counting exercise but must be moderated by the likely future development trends, particularly in or in proximity to towns and villages. Bearing in mind that, with the exception of corridor 3, each option provides significant scope to avoid direct impact during the subsequent design stage, the preferred options are 1A, 1, 2B, 2A, 2, 4, 3.

6. The number of Planning Applications within Each Corridor Option was used to identify any new development trends in the study area and to give an indication of the relative affect of each corridor option on current planning development. There are no new noticeable trends or concentrations in planning applications. In addition, with the exception of corridor 3, there is little difference between the other options.

6.5.2 Ranking – Agriculture and non-Agricultural Property

Having regard to the above and the detailed Agricultural and Non-Agricultural Property Report, Table 6.2 below gives the relative ranking of each route corridor option.

Corridor	1	1A	2	2A	2B	3	4
Ranking	2	1	3	4	5	7	6

Table 6.2 Ranking - Agriculture

6.6 Ecology

6.6.1 Introduction

This section should be read in conjunction with the detailed Ecology Report included in full in Appendix 3D.

The ecological assessment was carried out by Dr. Mark Farragher and Dr. John Whelan and their report is included in full in Appendix 3D. It is based on a desktop study of available information, site visits to sites of ecological interest along each option, river crossing surveys supplemented by consultation with various bodies including the National Parks and Wildlife Service (NPWS) and the Shannon Regional Fisheries.

In addition to the designated sites listed in Table 6.3 below, other important habitats within the study area include Raised Bogs, Blanket Bogs, Cut-over Bogs, Loughs, and Turloughs.

Two of the sixty-eight plant species protected under Wildlife legislation have been recorded in Roscommon but none are present within the study area. Suitable habitats for these species occur throughout the study area.

There are potential Bat Roosts in each of the corridor option and the following species have been recorded in the general area:

- Pipistrellus pippistrellus (Common Pipistrelle),
- Nyctalus Leisleri (Leisler's Bat),
- Pipistrellus pygameus (Soprano Pipistrelle),
- Plecotus auritus (brown long-eared bat), and
- Myotis daubentonii (Daubenton's Bat).

Badger and Otter activity were noted during site visits and is likely to be similar for all corridor options.

The principal watercourses within the study area are the Lung, Termon, Frances, Breedoge, Mountain, Owenur, Ogulla, Strokestown, Owennaforeesha, Carricknabraher and Scramoge. Many of these rivers have significant tributaries and all form part of the River Shannon catchment.

6.6.2 Designated Sites

There are three forms of designated conservation site:

- National Heritage Areas (NHA) – These are nationally important sites for wildlife and are designated/ protected under the Wildlife (Amendment Act), 2000,

- Special Area of Conservation (SAC) – These are wildlife habitats of international importance that are designated/ protected under the EU Habitats Directive as transposed in Irish Law by the European Communities (Natural Habitats) Regulations, 1997.

- Special Protection Areas (SPA) – These are areas of international importance concerned with the maintenance or enhancement of Bird Habitats. They are designated/ protected under the EU Birds Directive.

Table 6.3 lists the designated sites within or in close proximity to the broad Study Area.

Site Name	Site Code	Status
Lough Gara	000587/004048	pNHA/ cSAC/ SPA
Bellanagare Bog	000592	pNHA/ cSAC/ SPA
Brierfield Turlough	000594	pNHA
Castleplunkett Turlough	000598	pNHA
Mullygollan Turlough	000612	pNHA/ cSAC
Cloonshanville Bog	000614	pNHA/ cSAC
Ardagh Bog	001222	pNHA
Ardakillin Lough	001617	pNHA
Annaghmore Lough	001626	pNHA/ cSAC
Corbally Lough	001627	pNHA

Table 6.3 Designate Areas within Study Area

6.6.3 Corridor Assessment Summary

Corridor 1 impinges on Cloonshanville Bog (NHA/ SAC) producing a "severe negative" impact level. It passes close to Annaghmore Lough (NHA/ SAC) producing a "neutral" impact. In addition, it passes through a sensitive part of the Keanspark (No. 32) potential ecological site producing a "major negative" impact.

The Hydrology and Hydrogeology Report prepared by Hydroenvironmental indicates that there will be no impact on the groundwater regime in Bellanagre Bog pNHA cSAC SPA and Cloonshanville Bog (NHA/ SAC) and therefore no associated ecological impact on the sites.

In relation to the aquatic environment, Lough Ballyoughter is located within Corridor 1 and if it is not avoided through the remaining stages would produce a "moderate negative" impact.

Corridor 1A does not impinge on any designated site but passes close to Bellanagare Bog (NHA/ SAC/ SPA) and Annaghmore Lough (NHA/ SAC) producing a "neutral" impact in each case.

In relation to the aquatic environment, Lough Ballyoughter is located within Corridor 1A and if it is not avoided through the remaining stages would produce a "moderate negative" impact.

The Hydrology and Hydrogeology Report prepared by Hydroenvironmental indicates that there will be no impact on the groundwater regime in Bellanagre Bog pNHA cSAC SPA and Cloonshanville Bog (NHA/ SAC) and therefore no associated ecological impact on the sites.

Corridor 2 encroaches on Corbally Turlough (NHA) producing a "severe negative" impact. It passes close to Bellanagare Bog (NHA/ SAC/ SPA) and Ardakillin Lough (NHA) producing a "neutral" impact in each case.

In addition, it passes through a sensitive part of the Cloonrane (No. 150) potential ecological site and an important aquatic environment – between Cloonfree Lough and Fin Lough- producing a "major negative" impact.

The Hydrology and Hydrogeology Report prepared by Hydroenvironmental indicates that there will be no impact on the groundwater regime in Bellanagre Bog pNHA cSAC SPA and Cloonshanville Bog (NHA/ SAC) and therefore no associated ecological impact on the sites.

Corridor 2A encroaches on Corbally Turlough (NHA) producing a "severe negative" impact. It passes close to Bellanagare Bog (NHA/ SAC/ SPA) and Ardakillin Lough (NHA) producing a "neutral" and "neutral" impact respectively.

In addition, it passes through a sensitive part of the Cloonrane (No. 150) potential ecological site and an important aquatic environment – between Cloonfree Lough and Fin Lough- producing a "major negative" impact.

The Hydrology and Hydrogeology Report prepared by Hydroenvironmental indicates that there will be no impact on the groundwater regime in Bellanagre Bog pNHA cSAC SPA and Cloonshanville Bog (NHA/ SAC) and therefore no associated ecological impact on the sites.

Corridor 2B does not impinge on any designated site but, passes close to Bellanagare Bog (NHA/ SAC/ SPA), Corbally Turlough (NHA) and Ardakillin Lough (NHA) producing a "neutralimpact in each case.

In addition, it passes through a sensitive part of the Cloonrane (No. 150) potential ecological site and an important aquatic environment – between Cloonfree Lough and Fin Lough- producing a "major negative" impact.

Corridor 3 encroaches on Corbally Turlough (NHA) producing a "severe negative" impact. It passes close to Bellanagare Bog (NHA/ SAC/ SPA) and Ardakillin Lough (NHA) producing a "neutral" impact in each case.

The Hydrology and Hydrogeology Report prepared by Hydroenvironmental indicates that there will be no impact on the groundwater regime in Bellanagre Bog pNHA cSAC SPA and Cloonshanville Bog (NHA/ SAC) and therefore no associated ecological impact on the sites.

Corridor 4 encroaches on Bellanagare Bog (NHA/ SAC/ SPA) and passes through the northern part of Brierfield Turlough (NHA) producing a "severe negative" impact in each case. It passes close to ArdaKillin Lough (NHA), Castleplunkett Turlough (NHA) and Mollygollan Turlough (NHA/SAC) producing a "neutral" impact in each case.

In addition, it passes through a sensitive part of the Cloonrane (No. 150) potential ecological site and an important aquatic environment – between Cloonfree Lough and Fin Lough- producing a "major negative" impact.

6.6.4 Ranking - Ecology

Having regard to the Corridor assessment carried out by the Ecological sub-consultants, Table 6.4 below gives the relative ranking of each route corridor option.

Corridor	1	1A	2	2A	2B	3	4
Ranking	4	1	6	5	2	3	7

Table 6.4 Ranking - Ecology

6.7 Soils and Geology

6.7.1 Corridor Assessment Summary

This section should be read in conjunction with the detailed Soils and Geology Report included in full in Appendix 3E.

Each of the route corridor options impinge on a potential site of Geological Heritage. Consultation with the Geological Survey of Ireland has determined that none of the corridors will have a detrimental effect on the site assessment process or on the potential site.

This section of the Route Corridor Report seeks to assess and evaluate the route corridor options in relation to soils and geology. Considering the environmental aspects summarised in the previous section, the main criteria that have been used are:

- Percentage of each route corridor underlain by peat, moderated by the depth of peat;
- Percentage of each route corridor underlain by subsoil unlikely to be suitable for re-use as engineering fill, primarily gley soils;
- Earthworks analysis for each route corridor;
- Impact on designated sites – considering the geological characteristics of each site within the study area and proximity to the individual route corridors; and
- General impact implications road schemes have on the geological environment.

The report has been prepared by expanding the desk study work carried out for the Constraints Study to look at all available data specifically relating to the selected route corridor options. It includes an assessment of aerial photography reviewing possible ground surface karst features. The desk study details have been verified on the ground by a drive-by survey along each route corridor.

Any areas that have been highlighted as being of potential geological significance were targeted for walkover surveys in order to assess the significance of any likely environmental impacts on them.

Summary of key geological attributes

Various data sources were and maps were consulted during the study.

A review of the existing environment with regards to geology has been made to select a preferable order of route selection that will minimise the impact on the environment as well as reducing the likely cost implications from mitigation requirements.

Table 6.5 indicates the order of preference for each order based on the most significant geological categories.

Geological Attribute Category	**Route Corridor Preference**						
	1	**1A**	**2**	**2A**	**2B**	**3**	**4**
% of peat	7th	2nd	6th	5th	4th	1st	3rd
% of unsuitable material for reuse	1st	3rd	5th	6th	4th	2nd	7th
Earthworks analysis	7th	1st	6th	4th	3rd	2nd	5th
Proximity to Designated Sites	2nd	1st	5th	4th	3rd	6th	7th
Abundance of Known Karst Features	1st	4th	6th	7th	5th	3rd	2nd
Total Score	18	11	28	26	19	14	24
Order of Preference	3rd	1st	7th	6th	4th	2nd	5th

Table 6.5 Route Corridor Preferences relevant to geological attributes

Summary of geological impacts

As outlined in Section 8.3 Appendix 3E an assessment has been made of the likely impact each route will have on the various key geological attribute categories. Table 6.6 gives an order of preference based on the number of occurrences of impact level.

Impact Level	Route Corridors						
	1	1A	2	2A	2B	3	4
Profound	1	0	0	0	0	0	0
Significant	0	0	0	0	0	0	1
Moderate	1	2	1	1	1	1	0
Slight	0	0	1	1	1	1	1
Imperceptible	2	2	2	2	2	2	2
Order of Preference	7th	5th	1st	1st	1st	1st	6th

Table 6.6 Route Corridor Preferences relevant to geological attributes

There is no difference between corridors 2, 2A, 2B and 3. Options 1A and 4 also have a similar impact rating. Options 1 is the least favourable as it traverses part of Cloonshanville Bog.

6.7.2 Ranking – Soils and Geology

Having regard to the above and the detailed Soils and Geology Report, Table 6.5 below gives the relative ranking of each route corridor option.

Corridor	1	1A	2	2A	2B	3	4
Ranking	7	2	5	4	3	1	6

Table 6.7 Ranking – Soils and Geology

6.8 Hydrogeology and Hydrology

6.8.1 Corridor Assessment Summary

This section should be read in conjunction with the detailed Hydrology and Hydrogeology Report included in full in Appendix 3F.

In relation to **Hydrogeology**, each of the seven route corridor options was assessed based on the following attributes and impacts:

- High yielding water supply springs and wells along each route corridor and increased risk presented by the road scheme;
- The classification (regionally important, locally important, poor) and extent of aquifers underlying each route corridor and increased risks presented to them by the road scheme (associated with aspects such as removal of subsoil cover, removal of aquifer (in whole or part), drawdown in water levels, alteration in established flow regimes, change in groundwater quality);
- Natural hydrogeological / karst features along each route corridor and the increased risk presented by the road scheme, and
- Groundwater fed ecosystems and the increased risk presented by the road scheme.

In relation to holy wells and large springs within the corridors, only one holy well was identified on the OS Discovery Series mapping, located in Option 1A in Gortlustia on the eastern edge of

the corridor. It was considered that a comparative rating of preference between the corridors would be over biased in that all other corridors would have a 1st preference with a 7th preference for Option 1A, and this category was omitted. It is also noted that as the well is located close to the existing N5, all other options would actually be passing it. An investigation into the well and its protection could be carried out once the final alignment is known.

Likewise for major water supply schemes the category was omitted in that no corridor impeded on any inner or outer protection area, apart from the proximity of Option 4 to the Castlerea RWSS, which is outside of the study area. If Option 4 were to be selected as the preferential route then appropriate investigation and mitigation measures would be used to reduce any associated impacts that the scheme would have on the inner protection area.

The Ardkeenagh group water scheme located at Castleland and within Options 2 and 2A was not considered for comparison as should one of these options were chosen as the preferential route then it would be possible to apply appropriate mitigation measures to ensure the protection of the spring and surrounding area during the construction and operation phases.

The approach taken for private water sources is that a well / spring audit should be carried out as part of the EIS phase to collate baseline information on all supplies and their usage within the corridor. Once the alignment is known indicating cut and fill sections and distance upgradient or downgradient from the section then an impact assessment can be made for each location potentially at risk. Mitigation measures for either deepening the well, re-drilling in another location or connecting to a group scheme along with general water quality protection in the surrounding area would be carried out.

Attributes with a high quality or value on an international scale such as SACs and SPAs are given priority in respect to impact rating, and any corridor options that infringe on part of one of these sites having a profound impact have been automatically assigned as being least preferable.

Option 4 is the least preferable in that it is located close to the most number of designated sites and cuts through a portion of a cSAC and SPA. It also has the highest proportion of extreme groundwater vulnerability rating along its length.

The next least preferable option is 1 as it also cuts thorough a portion of a cSAC at Cloonshanville Bog and crosses close to and up stream of Annaghmore Lough where it has a potential to interfere with groundwater Baseflow.

Options 2 and 2A have the next highest degree of impacts including the partial loss of ground within the pNHA designated Corbally Lough. As option 2A has the higher number of hydrogeological attributes it is the least preferable of the two options.

Option 3 is third in the order of preference as it follows the existing route with only a single profound impact as it cuts through a portion of the pNHA designated Corbally Lough.

Options 1A and 2B are relatively similar with neither options directly intersecting an SAC or a NHA area. The main impact difference between them is that 1A passes close to and upstream of Annaghmore Lough SAC and NHA and has the potential to interfere with groundwater baseflow to the Lough should the groundwater table or a preferential groundwater route be intercepted. The likelihood of this will depend on the location of the route and the vertical alignment within the corridor. Any potential permanent impact to an SAC however small is registered in the NRA route selection guidelines as a profound impact. In respect to 2B this corridor passes close to and slightly up-gradient of Ardakilin Lough NHA which is of national significance but not an SAC giving it a very high attribute rating as opposed to extremely high rating. Similarly there is a potential to intercept groundwater flow to the Lough should the road be constructed in cutting that intercepts the water table or subterranean flow paths. Such a potential impact on the Lough given the regional nature of the groundwater table is likely to be

small but based on the NRA guidelines is classified as a significant impact. Overall Route 2B represents the preferred route option with 1A second.

Selection of either 2b or 1A will require mitigation so as to avoid any significant or profound impact on the integrity of the SAC or NHA. In this respect the SAC impact
Sympathetic road design in terms of fine tuning horizontal and vertical alignments so as to minimise the depth and extent of cutting and avoidance of cutting beneath regional water table or interception of karst conduit flow routes should ensure in both cases that the groundwater regime is fully protected and that no change to the hydrological regime of the Loughs occur.

In relation to **Hydrology**, each of the seven route corridor options was assessed based on the following attributes and impacts:

The attributes and impacts that are assessed for each route corridor include the following:

- Interference with river, streams and flood plains at road crossing points, requirement for correct sizing of bridges and culverts.
- Removal of flood storage as a result of the Roadway footprint.
- Diversion of water between drainage basins.
- Interference with local drainage, relocation, discontinuation and combination of existing land drains.
- Increase in runoff characteristics (due to impervious road pavement area and increased transmission time and point loading) resulting in a possible increase in the overall flood peak magnitude and flooding frequency in the receiving stream.
- Water quality impact on receiving streams from routine carriageway runoff (heavy metals, organics, nutrients, hydrocarbons, suspended solids, coliforms, etc) and from accidental spillages (agricultural, oil/chemical spillages, bulk liquid cement).

As only very limited engineering design details and site specific data is available at this stage, much of the preliminary impact assessment is of a qualitative rather than a quantitative nature. A significant degree of professional judgement has therefore been used in identifying and rating the likely impacts.

6.8.2 Ranking – Hydrogeology and Hydrology

Having regard to the above and the detailed Hydrology and Hydrogeology Report, Table 6.6 below gives the relative ranking of each route corridor option in relation to Hydrogeology and Table 6.7 gives the relative ranking in relation to Hydrology.

Corridor	1	1A	2	2A	2B	3	4
Ranking	6	2	4	5	2	3	7

Table 6.8 Ranking - Hydrogeology

Corridor	1	1A	2	2A	2B	3	4
Ranking	3	1	6	4	7	2	5

Table 6.9 Ranking - Hydrology

6.9 Air Quality

6.9.1 Corridor Assessment Summary

This section should be read in conjunction with the detailed Air Quality Report included in full in Appendix 3B.

The Air Quality assessment was carried out in accordance with the NRA Guidelines[15] and focuses on Nitrogen Oxides (NO_x) and Particulate Matter (PM_{10}) because these are the principal traffic-derived pollutants. Background levels for each pollutant was established through a survey of 30 locations for NO_x and 2 locations for PM_{10} (See Drawing No. RN04250-12-367). In each case the background level was well below the limit values set in the relevant legislation.

The "Index of Change in Exposure" to NO_x and PM_{10} was calculated in accordance with the UK DMRB for all sensitive receptors along road links where the predicted change in traffic flows exceeds 10%. This was carried out for each of the route corridor options and the results are summarised in Table 6.8 below.

Corridor	1	1A	2	2A	2B	3	4
NO_x Score	-520,369	-538,245	-483,297	-530,878	-512,142	0	-359,397
PM_{10} Score	-9,955	-10,361	-9,516	-10,084	-10,002	0	-8,061

Table 6.10 Index of Change in Exposure – Summary

Source: RPS Consulting Engineers Air Quality Report

Negative figures mean a reduction in exposure

In addition, the impact on Sensitive Ecosystems was assessed with reference to Bellanagare Bog – being the closest ecosystem to the majority of options. The results indicate that the NO_x concentration at the nearest boundary of Bellanagare Bog (pNHA/ cSAC/ SPA) will be well below the limit value of 30 $\mu g/m^3$ at the design year traffic flow.

6.9.2 Ranking – Air Quality

Having regard to the above and the detailed Air Quality Report, Table 6.9 below gives the relative ranking of each route corridor option.

Corridor	1	1A	2	2A	2B	3	4
Ranking	3	1	5	2	4	7	6

Table 6.11 Ranking – Air Quality

6.10 Noise and Vibration

6.10.1 Corridor Assessment Summary

This section should be read in conjunction with the detailed Noise and Vibration Report included in full in Appendix 3G.

The assessment of route corridor options in relation to noise and vibration was carried out in accordance with NRA Guidelines[16]. It depends primarily on the number of receptors potentially affected (PIR) but this is moderated by the change in traffic flow pattern and the likely need for mitigation measures.

Option 1A has the lowest PIR (665) and passes to the south of Frenchpark in an area with a relatively low density of receptors. Option 1 has the second lowest PIR (742), it passes close to the northern part of Frenchpark where there is an increased density of receptors and mitigation measures would be more difficult to provide. Option 3 has by far the highest PIR(4195).

[15] Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes, National Roads Authority, 2007.

[16] Guidelines for the Treatment of Noise and Vibration in National Road Schemes (Revision 1, 25th October, 2004), National Roads Authority.

The results of the traffic model indicate that there will be little difference in traffic levels on roads other than the new and existing N5.

Mitigation potential for options 1A, 2, 2A, 2B and 4 would be considered approximately equal. In the case of option 1, mitigation in the vicinity of Frenchpark would be more difficult due to the proximity of developments as a result of urban sprawl. Mitigation along option 3 (online) would be impossible for the majority of receptors in urban areas and even in the majority of rural areas it would be difficult.

6.10.2 Ranking – Noise and Vibration

Having regard to the above and the detailed Noise and Vibration Report including the PIRs, the potential to mitigate and the implication from predicted traffic flow changes, Table 6.8 below gives the relative ranking of each route corridor option.

Corridor	1	1A	2	2A	2B	3	4
Ranking	6	1	3	2	5	7	4

Table 6.12 Ranking – Noise and Vibration

6.11 Landscape and Visual

6.11.1 Corridor Assessment Summary

This section should be read in conjunction with the detailed Landscape and Visual Impact Report included in full in Appendix 3G. Each of the route corridors was assessed having regard to visual impact and landscape impact.

In relation to **Visual Impact**, the number of local receptors within various distance bands of the centre of each corridor was considered. The lower the number of receptors and the further from the centre of the corridor the lesser the potential impact.

In relation to **landscape assessment**, two principal criteria were assessed:

- Structures – based on the length of each option,
- Impact upon specific landscape features:
    - Rathcroghan Conservation Area,
    - Designated Ecological Sites, and
    - Lakelands.

In addition, a significant amount of fieldwork, concentrated over extended tie-in areas, informed much of the qualitative assessment of the route corridor options.

The overall character of the landscape is gently undulating and relatively low lying with the highest ground found at Rathcroghan, Mullaghnashee and a series of small hills northwest of Strokestown. The landscape comprises of a mix of land-cover types, including lakes and turloughs, marginal farmland, boglands and large commercial conifer forests. The Constraints Report highlighted sensitive areas at Fairymount Hill, Rathcroghan Plateau, the bog areas at Bellangare and Frenchpark as well as the lakes and turloughs located southwest and northeast of Strokestown. The recently drafted Landscape Character Assessment of County Roscommon has highlighted the Rathcroghan Plateau as being of Exceptional value and Castlerea Bogland Basin as of High value.

6.11.2 Ranking – Landscape and Visual

Having regard to the above and the detailed Landscape and Visual Impact Report, Table 6.11 below gives the relative ranking of each route corridor option.

Corridor	1	1A	2	2A	2B	3	4
Ranking	2	1	6	4	5	7	3

Table 6.13 Ranking – Landscape and Visual

6.12 Archaeology, Architecture and Cultural Heritage

6.12.1 Introduction

This section should be read in conjunction with the Archaeological, Architectural & Cultural Heritage Report in Appendix 3C compiled by Archaeological Development Services Ltd, Dublin.

Building on from the preceding Phase 2 Constraints Study Report, the Phase 3 report acknowledges the significant level of archaeological monuments in the general area of North Roscommon through which the route option corridors run. This density of settlement mostly reflects a high level of activity during the medieval period, though monuments from all periods are present. Central to the area between Strokestown and Ballaghaderreen are the archaeological areas known as Rathcroghan and Carnfree. These areas are associated with the ancient royal settlement and inauguration sites of the Kings of Connacht and are of national archaeological significance.

The Phase 3 reports acknowledges the significance of Rathcroghan, Carnfree and a number of other areas/archaeological sites termed within the report as Key Constraints (see Section below). Identification of these Key Constraints and a greater understanding of the overall archaeological picture of the region has been obtained throughout Phase 2 and 3 by ongoing consultations with the Archaeology Department of the National University of Ireland, Galway and staff of the Discovery Programme, both of which institutions have research interests in the area and both of which have been able to provide significant knowledge on the archaeology of the region, which has in turn assisted in the development of route option corridors and the identification of the emerging preferred corridor.

In developing route option corridors all efforts were made to avoid the Key Constraints identified in the Phase 2 report and to reduce any impact on the architectural and archaeological resource bearing in mind other constraints. In relation to archaeological monuments and architectural heritage avoidance of the Key Constraints was the priority and overall this was achieved with the route option corridors, though some of necessity do impinge on the margins of some Key Constraint areas.

In assessing the comparative merits of each route corridor option, both a qualitative and quantitative approach was employed. A quantification of the number of recorded archaeological monuments and architectural heritage constraints within each corridor was carried out and measured against an assessment of the relative potential impact of each route option corridor on the Key Constraints. Weightings were assigned to the heritage constraints based on their relative distance from a notional centreline (50m bands out from the centreline), allowing for a comparable assessment of any potential impact on them- though of course allowing for any necessary future change to the centreline.

6.12.2 Key Constraints

As stated above, during the Phase 2 Constraints Study a number of archaeological sites within the area of the proposed project were identified as Key Constraints, acknowledging their significance. Identification of these was assisted through consultation with NUI, Galway

Archaeology Department and the Discovery Programme, staff of both institutions having a particular knowledge in the archaeology of the region. The identification of these Key Constraints and the spatial definition of them, including the definition of clear core areas of the Key Constraints was crucial to allowing route corridors to be developed.

Full details of the Key Constraints are contained within the report. They are-

- Rathcroghan royal settlement / inauguration site and associated sites
- Cloonfree moated site
- Carnfree royal settlement / inauguration site and associated sites
- Cloonfinlough ecclesiastical site
- Ardakillen complex of archaeological sites
- Tulsk medieval settlement
- Strokestown House

6.12.3 Corridor Assessment Summary

Full details of the potential impact of each corridor option are contained within the report as Appendix 3C.

Route Corridor 1 is the most northerly route. It passes through parts of the historic demesnes of Frenchpark, Strokestown Park and Mantua, as shown on 19th Century OS mapping. The corridor impinges on the ruins of the Kennels at Strokestown Park House, some distance to the rear of the House itself, however it does not pass between the House and ruined church and full assessment of any impact on these grounds will have to be assessed as detailed design progresses and effective mitigation measures be developed, if necessary. There are some 42 recorded monuments located within the corridor footprint, as well as 21 architectural constraints and 9 Areas of Archaeological Potential. The corridor also passes through the grounds of a number of 18th century demesnes.

Route Corridor 1A emerges as the preferred route option corridor from a built heritage perspective. As with Route 1, most importantly this option avoids the royal sites of Rathcroghan and Carnfree, and is, along with Option 1, the option that passes furthest to the North from them. It avoids the other Key Constraints to the South East of the area. Like Corridor 1 this corridor impinges on the ruins of the Kennels at Strokestown Park House, some distance to the rear of the House itself, however it does not pass between the House and ruined church. There are some 42 recorded monuments located within the corridor footprint, as well as 19 architectural constraints and 12 Areas of Archaeological Potential. The corridor impinges on the once-attendant grounds of Mantua House, The Hermitage and Strokestown House and full assessment of any impact on these grounds will have to be assessed as detailed design progresses and effective mitigation measures be developed, if necessary.

The Rathcroghan ‘archaeological complex’ lies partly within Route Option 2. The key Constraints of Rathcroghan identified in the Phase 2 Constraints Study through consultation with NUI Galway is encroached upon by this Corridor, however the Proposed Rathcroghan Conservation Area (DoEHLG) lies outside it. There are some 69 recorded monuments located within the corridor footprint, as well as 22 architectural constraints and 17 Areas of Archaeological Potential. Route Option 2 passes through parts of the historic demesnes of Frenchpark, Strokestown Park, Hermitage, Cloonyquin and Mantua. The Key Constraints of Tulsk lies partly within this Corridor.

Route Corridor 2A impinges on the RMP area of the Key Constraint of Rathcroghan and the core area identified through Phase 2 consultation as well as the core area identified around the medieval key constraint settlement of Tulsk, similar to Route 2. There are some 70 recorded monuments located within the corridor footprint, as well as 22 architectural constraints and 17 Areas of Archaeological Potential. Option 2A passes through parts of the historic demesnes of Strokestown Park, Hermitage, Cloonyquin and Mantua.

Route Corridor 2B impinges on the RMP area of the Key Constraint of Rathcroghan and the Rathcroghan 'archaeological complex' identified through Phase 2 consultation but lies outside the proposed Rathcroghan Conservation Area (DoEHLG).The Corridor passes through the historic demesnes of Frenchpark, Strokestown Park, Hermitage, Cloonyquin and Mantua. There are some 59 recorded monuments located within the corridor footprint, as well as 23 architectural constraints and 17 Areas of Archaeological Potential.

Route Corridor 3 differs from all other options in that this is an upgrade of the existing N5. The existing N5 runs through the heart of the Rathcroghan 'archaeological complex'. The corridor also passes through the Key Constraints of Rathcroghan as identified through consultation with NUI Galway as well as the proposed Rathcroghan Conservation Area (DoEHLG), the Key Constraints of Tulsk and Strokestown. The Corridor passes through parts of the historic demesnes of Frenchpark, Strokestown Park and Mount Druid. It passes through the villages of Frenchpark, Bellanagare, Tulsk and the estate town of Strokestown. There are some 55 recorded monuments located within the corridor footprint, as well as 30 architectural constraints and 3 Areas of Archaeological Potential.

Route Corridor 4 is the most southerly of the route options. There are some 66 recorded monuments located within the corridor footprint, as well as 21 architectural constraints and 8 Areas of Archaeological Potential. Being to the south, it passes through the south western edge of the Key Constraints of Rathcroghan and Carnfree. The Carnfree archaeological complex lies partly within this corridor. This corridor passes through parts of the historic demesnes of Frenchpark, Strokestown Park, Rathmoyle and Mount Druid.

6.12.4 Ranking – Archaeology, Architecture and Cultural Heritage

Having regard to the above and the detailed Archaeology, Architecture and Cultural Heritage Report, Table 6.12 below gives the relative ranking of each route corridor option.

Corridor	1	1A	2	2A	2B	3	4
Ranking	2	1	5	4	3	7	6

Table 6.14 Ranking – Archaeology, Architecture and Cultural Heritage

6.13 Socio-Economic

6.13.1 Corridor Assessment Summary

This section should be read in conjunction with the detailed Socio Economic Report included in full in Appendix 3G.

The assessment and evaluation was based on four principal criteria:

- Journey Characteristics,
- Community Severance,
- Amenity, and
- Economic impacts.

The Do-minimum Route Option 3 has significant relative disadvantages in terms of economic opportunity, in particular it does not meet the scheme objectives of upgrading the N5 National

Primary Route to provide for Strategic national route traffic and has adverse impacts on journey characteristics and severance.

Of Route Options 1 and 2, there is very little in the way of relative advantages or disadvantages so long as due consideration is ultimately given to journey and severance issues arising from junction location and road closure. Without this information, no meaningful absolute quantification can be made at this stage. Some improvement could be provided to Route 1 through reconsideration of the corridor routing in the vicinity of the R368 that would reduce landscape amenity impacts and encourage easier access to Strokestown. On the other hand, some further advantage could be given to Route 2 by a junction between Bellanagare and Frenchpark.

Route 4 has relative disadvantages in terms of landscape amenity and economic opportunity.

6.13.2 Ranking – Socio-Economic

Having regard to the above and the detailed Socio-Economic Report, Table 6.13 below gives the relative ranking of each route corridor option.

Corridor	1	1A	2	2A	2B	3	4
Ranking	1	1	1	1	5	7	6

Table 6.15 Ranking – Socio-Economic

6.14 Overall Assessment – Environmental

The ranking of each of the route corridor options in relation to each of the environmental topics has been outlined above. These have been collated and presented in Table 6.14 below.

An indication of the strength of preferences is given in the detailed reports included in full in the relevant appendices 3A to 3I.

Corridor / Topic	1	1A	2	2A	2B	3	4
Agriculture	2	1	3	4	5	7	6
Ecology	4	1	6	5	2	3	7
Soils-Geology	7	2	5	4	3	1	6
Hydrogeology	6	1	4	5	2	3	7
Hydrology	3	1	6	4	7	2	5
Air Quality	3	1	5	2	4	7	6
Noise-Vibration	6	1	3	2	5	7	4
Landscape	2	1	6	4	5	7	3
Archaeology	2	1	5	4	3	7	6
Socio-Economic	1	1	1	1	5	7	6
TOTAL	36	11	44	35	41	51	56
Overall Preference	**3**	**1**	**5**	**2**	**4**	**6**	**7**

Table 6.16 Overall Preference - Environmental

7 ECONOMIC

7.1 Introduction

The Cost/ Benefit Analysis (CBA) has been prepared for the N5 Scramoge to Ballaghaderreen Road Scheme (N5 Strategic Corridor) in accordance with the NRA Project Appraisal Guidelines (March 2008).

This CBA is for the Route Corridor Selection Stage (Phase 3 of the Project Management Guidelines) and includes all seven route corridor options that were considered as part of the overall scheme assessment process.

The Cost Benefit Analysis (CBA) report provides an economic assessment of the costs and benefits of the scheme in order to determine if the scheme is economically worthwhile. In particular, it presents the economic efficiency of the various scheme options based upon Option Comparison Cost estimates. All of the impacts of the scheme which can be given a monetary value are included in this assessment. The traffic flow and assignments have been based on the Traffic Modelling Report.

CBA serves a number of functions including:

- At the Individual Project Level –
    - Indicates whether a scheme is economically viable;
    - Provides an economic comparison of alternative options within a project;
- At the National (Government) Level –
    - The outputs from CBA allow different schemes to be compared and enable the schemes that provide best economic value to be identified.

The principle of an economic appraisal is that the costs and benefits of providing a particular scheme (the “Do-Something” scenario) are compared with the costs and benefits of a baseline scheme (the “Do-Minimum” scenario). The "Do-Minimum" scenario represents the existing route and traffic network but includes planned improvements. The "Do-Something" scenario has been carried out for each of the route corridor options and their associated predicted traffic network.

Monetary values are not given to environmental impacts in the CBA process.

The principal costs and benefits used in the CBA include:

- Travel time;
- Operating costs;
- Accident costs;
- Emissions Costs;
- Capital costs, and
- Capital costs of maintenance of the network.

7.2 Scheme Capital Cost Estimate

Roscommon National Roads Design Office prepared the Options Comparison Estimate (OCE) for each of the route corridor options in accordance with the NRA Cost Management Manual[17]. Allowances for Project Risk, Inflation and Programme Risk were provided by the NRA Cost Management Units and included in these estimates.

The estimates consist of seven components (see Table 7.1 below) that are factored to derive the Net Present Value of the scheme cost with a 2002 base year.

Component	Comment
Scheme Construction Costs	Quantities were derived based on the rudimentary design alignments based on limited site investigation and the application of engineering experience (see Soils and Geology Report). National Rates provided by the NRA[18] were then applied to these having regard to rates obtained in recent local contracts.
Advance Works	This heading should be read with Scheme Construction Costs because works that are carried out by advance contract would not normally be included in Construction, and vice-versa. Generally, Advance Works consists principally of advance utilities diversions to allow construction to proceed unhindered.
Residual Network	Residual Network costs are a provision for carrying out works to the residua road network following completion of the new road. This cost has been estimated on a percentage basis using similar road schemes as a basis.
Land and Property	Land and property costs were estimated based on a per Km rate from other recently completed schemes
Supervision	Supervision costs were added on a percentage basis using similar road schemes as a guide.
Design Costs	Design costs were included based on the work completed and a percentage of the construction costs based on other recently completed road schemes.
Archaeology	An estimate for archaeological testing and an allowance for site resolution have been included based on other recently completed road schemes.

Table 7.1 Scheme Cost Preparation

[17] Cost Management Manual, Consultation Version 1, October 2007, National Roads Authority
[18] Roadworks Unit Rate Database, Version 1, Base Date June 06, National Roads Authority

7.3 Cost Benefit Analysis

7.3.1 Introduction

The CBA for the N5 Scramoge to Ballaghaderreen Road Project, Phase 3 – Route Corridor Selection, was carried out using TRL Limited's COBA 11 Release 8 (Irish Version) computer program in accordance with the National Roads Authority publication, Project Appraisal Guidelines, March 2008.

The key parameters used are shown in Table 7.2 below

Parameter	Value
Present Value Year	2002
Discount Rate	4%
Appraisal Period	30 years

Table 7.2 Key NRA National COBA Parameters

7.3.2 COBA Inputs

The main inputs required by the COBA program include the following:

- A description of the "Do-Minimum" scenario and "Do-Something" scenario road networks, for each of the route corridor options, in the form of nodes and links (See Drawing RN04250-12-369);
- An assignment of the existing and predicted traffic flows on the described road networks as indicated in Section 4 of this report and the Traffic Report included in Appendix 1, and
- The total estimated capital costs of the scheme prepared as outlined in section 7.2 above.

7.3.3 COBA Outputs

COBA compares the User Costs on the existing network with the User Costs on the improved network and determines the User Benefits. These are derived from savings in travel time, operating costs and accident costs. The User Benefits are expressed in 2002 prices and are described as Present Value of Benefits (PVB).

The Construction Costs of the "Do-Minimum" scenario and "Do-Something" scenario are then used to derive the Present Value of Costs (PVC)

The criteria for project appraisal are the Benefit to Cost Ratio (BCR) and the Net Present Value (NPV).

NPV = the difference between the Net Present Benefits (PVB) and the Net Present Costs (PVC).

BCR = PVB/PVC and is an indication of the return on investment from the scheme over its lifetime.

The COBA results for each of the route corridor options are summarised in Table 7.3 below. These show that all of the options, with the exception of option 3, produce an acceptable economic return. Since each of the options is of a similar scale, the preferred option from an economic standpoint is that with the highest Benefit to Cost Ratio.

Therefore Route Corridor Option 1A is the preferred option on economic grounds.

Parameter	Corr. 1	Corr. 1A	Corr. 2	Corr. 2A	Corr. 2B	Corr. 3	Corr. 4
Present Value of Costs (PVC) €million	117.918	113.210	114.022	114.022	116.076	125.000	119.534
Present Value of Benefits (PVB) €million	139.522	158.408	152.729	158.620	156.875	0	95.07
Net Present Value (NPV) €million	21.604	44.898	38.707	33.634	40.799	-125.00	-24.464
Benefit to Cost Ratio (BCR)	1.183	1.400	1.340	1.269	1.351	0.000	0.795

Table 7.3 Summary of COBA Results

7.4 Overall Assessment – Economic

Having regard to the above and the detailed Cost Benefit Analysis Report, Table 7.4 below gives the overall relative ranking of each route corridor option.

Corridor	1	1A	2	2A	2B	3	4
Ranking	5	1	4	2	3	7	6

Table 7.4 Overall Preferences - Economic

8 CONSULTATION

8.1 Introduction

Consultation is part of the development of all road schemes. It is carried out in accordance with the requirements of the National Roads Authority (NRA) Project Management Guidelines. Some of the consultations are statutory requirements such as the planning, land acquisition and EIS stages. However, other consultations are voluntary and are carried out with the dual purpose of:

- Keeping the public and others informed of the progress of the proposed road scheme,
- Tapping in to the information and opinion of the public, elected representatives, statutory and non-statutory bodies and other intended parties.

8.2 Public Consultation – Constraints Stage

As part of the Constraints Study, a Public Consultation was held in two locations, the Border Midlands and West Region Assembly Headquarters, Ballaghaderreen and the Percy French Hotel, Strokestown on the 6th July 2005 between the hours of 10.00am and 20.00pm. The main purpose of this consultation was to:

- inform the public that the N5 Strategic Corridor Scheme was being advanced by Roscommon County Council and the NRA,
- tap into local knowledge and opinions that may help in the identification of possible constraints.

Notices were published in the local and national press (Roscommon Champion, Roscommon Herald, Irish Independent, Shannonside Radio and North West Radio).

Details of the Constraints Study Area and of the information collected at that stage were on display and members of the Design Team were available to interact with and answer queries from attendees.

8.2.1 Presentation to Elected Representatives

Prior to the Public Consultation, details of the scheme were presented to the Elected Representatives of Roscommon County Council. The Councillors expressed satisfaction that the scheme was being progressed but sounded concerns in relation to the timescale for implementation of the scheme and difficulties with establishing route corridors given the extent of the archaeological constraint. All present agreed that the existing road was unsatisfactory for modern traffic.

8.2.2 Public Display

The public display consisted of four large (A0) drawings highlighting the area of interest and showing the constraints already identified. These were presented with Ordnance Survey Discovery Series and ortho-photo mapping backgrounds. In addition to the public display, a brochure was prepared for the scheme. This contained a map indicating the extents of the study area on ordnance survey discovery series background mapping, a description of the scheme, and other general information regarding the purpose of the public consultation and a questionnaire inviting the public to submit their views in writing.

8.2.3 Attendance and Information gathered

The attendance at the public consultation is based on the attendance register and is therefore likely to underestimate the actual attendance since signing the register was not obligatory. 106 people signed the register on the day of the public display. Examination of the attendance record indicates that most of the attendees reside adjacent to the route of the existing N5 National Primary Route.

8.2.4 General Comments Received

Approximately two thirds of questionnaires returned had comments attached. A significant proportion of the comments relate to road safety and concerns about the sub standard condition of the road and the growing level of traffic. Many of the comments related to a perceived elevation of environmental considerations such as archaeology and ecology over human beings. It should be noted that the vast majority of respondents to the questionnaire confirmed their support for the development of a scheme to upgrade the N5 route.

8.3 Consultation with Elected Representatives – Emerging Preferred Route Corridor

8.3.1 Ongoing Dialogue

The Design Team have engaged with the elected representatives on an ongoing basis and have taken all consultations/ representation into account during the development of the N5 Strategic Corridor Scheme.

8.3.2 Information Meeting

Prior to the Emerging Preferred Route Corridor Public Consultation, details of each of the feasible route corridors and the emerging preferred route corridor were presented to:

- Elected Representatives of Roscommon County Council,
- Members of Dáil Eireann, Roscommon constituency,
- Members of Seanad Eireann, from Roscommon County.

Subsequently, information packs were issued to all present.

8.4 Public Consultation – Emerging Preferred Route Corridor

8.4.1 Introduction

The second Public Consultation (emerging preferred route corridor) took place at the Community Hall in Bellanagare on the 31st May 2007 between the hours of 11.00 and 21.00. Design team members were in attendance to provide information and assistance

The public consultation consisted of:

- Drawing (A1) highlighting the emerging preferred route corridor within the study area on an OS Discovery Series Mapping background. ,
- Drawings (A0), on OS 6 inch mapping background, highlighting the seven feasible corridors and showing all constraints identified,
- Set of five drawings (A1), highlighting the emerging preferred route corridor. These were displayed with Ordnance Survey, ortho-photo and vector background mapping.

Design team members were in attendance to provide information and assistance to all attendees.

8.4.2 Notification

The following were the principal methods of public notification of the Public Information day:

- The Local Press - adverts were placed in The Roscommon Champion and The Roscommon Herald for two weeks and The Roscommon People for 1 week,
- Local Radio - Shannonside radio and Midwest radio aired an advertisement up to three times a day in the two weeks prior to the Public Consultation,
- Community - Announcements made at mass in eleven churches in the area during the week prior to the Information Day.

8.4.3 Brochure

An Emerging Preferred Route Corridor Brochure was prepared (see Appendix 4A) providing information on the Emerging Preferred Route Corridor, on the route corridor development process, and on the remaining steps involved for the scheme. The brochure included a Questionnaire inviting written responses from the public.

8.4.4 Attendance

The attendance at the public consultation is based on the attendance register and is therefore likely to underestimate the actual attendance as signing the register was not obligatory. 124 people signed the attendance register and a further 102 people filled in details of their landholding within the emerging preferred route corridor, on the sheets supplied.

8.4.5 Principal Views Expressed and Submissions

The questionnaire for this stage was designed to gain information on the people affected by the emerging preferred route corridor and also to give the public a chance to express their overall views on the route. A total of 135 completed questionnaires and letters/submissions were received (See Appendix 4B for list names of those that made submissions). All of the submissions have been reviewed by the design team and have been used to inform the scheme development process.

The majority of the questionnaires received were from people residing within the emerging preferred route corridor. The general consensus is one of concern particularly in relation to severance of farmland, loss of property, noise and spoiled views. Requests were made for access to severed farmland by means of an underpass or overpass. Noise barriers were also requested by a small number of people.

8.5 Consultation with Statutory Bodies and Other Organisations

8.5.1 Introduction

It is an objective of the design team to carry out extensive consultation with statutory and other bodies during the development of all road schemes and to use the results of such consultation to inform the development of the scheme having regard to engineering, environmental and economic grounds.

Consultation with public and private organisations has been ongoing throughout the development of the N5 Strategic Corridor. Consultation during the constraints stage was described in the Constraints Study Report.

During the Route Corridor Selection stage, approx. 60 organisations (A full list of Consultees is included in Appendix 4C) were consulted at two separate stages:

- Route Corridor Options
- Emerging Preferred Route Corridor

The feedback from each of the consultations informed firstly the development of route corridor options and subsequently the development of the emerging preferred route.

During the consultation process, scheme maps were issued to relevant statutory and non-statutory bodies. These bodies were asked to comment on the route corridor options in November and December 2006 and to comment on the emerging preferred route corridor in July 2007. A copy of all submissions is included in Appendix 4D and 4E.

8.5.2 Summary of Main Submissions – Route Corridors

Table 8.1 below summarises the main points of the submissions received during the Route Corridor development and assessment phase. Full copies of the submissions are included in Appendix 4D.

Organisation	Comment (summary)
Minister for Agriculture and Food	Acknowledgement
OPW – Hydrometric Section	Referred to OPW Drainage Management Section and gave web address for OPW Hydrometric Data
ESB International	Providing information regarding the ESB Very High Voltage Transmission Lines
Roscommon Co Co – Housing Section	Indicating that with the exception of Option 3, none of the corridors impact on Housing stock or development plans
Irish Peatland Conservation Council	Highlighting the principal ecology sites and expressing concern that they should not be adversely impacted. Would prefer option 3.
Bord na Mona	No comment at this time
Fáilte Ireland	Recommends that the proposed route does not result in any direct or indirect impact on Strokestown House and that high quality access from the new route to tourist attractions be provided
OPW Engineering Services	Providing information on Drainage Schemes and Drainage Districts within the study area. Also provided general OPW requirements
Shannon Regional Fisheries Board	Outlines main requirements. Is concerned about crossings of the Scramoge River and proximity to Cloonfree Lough (both Trout locations). Overall, Option 1A is preferred
An Garda Síochána	Considers Option 2 to be the most appropriate.
An Taisce	Concerned about impact on “Rathcroghan Archaeological Complex”
Three Ireland	Corridors do not impact on Three Infrastructure
Roscommon Co Co – Heritage Officer	Refers to NRA Guidelines on Ecology, Architecture, Bats and Archaeology. Has expressed concerns about Option 2, 2A, 2B and 4.
Dept. of the Environment, Heritage and Local Government	Architecture: - Consult with NRA Architecture Guidelines NPWS: - Corridor 1 will impact on Cloonshanville Bog (cSAC). Corridor 2 will impact on Corbally Turlough (pNHA). Corridor 4 will impact on Briersfield Turlough (pNHA) and on Bellanagare Bog (pNHA, cSAC, SPA). Consider the impact of corridor 1,2and 4 on the lake clusters N and NW of Strokestown
Eircom	Submitted maps showing their plant in the area
Health Services Executive	Prepare a Rodent Control Plan for the Scheme
Bord Gáis Networks	There are no Gas mains in the study area and none planned in the short term
Department of Transport	No Comment
Córas Iompair Éireann	There are no railways within the study area and therefore have no further comment

Table 8.1 Route Corridors – Summary of Organisation Submissions

8.5.3 Summary of Main Submissions – Emerging Preferred Route Corridor

Table 8.1 below summarises the main points of the submissions received during the Route Corridor development and assessment phase. Full copies of the submissions are included in Appendix 4E.

Organisation	Comment (summary)
Waterways Ireland	No comment
An Bord Gáis	Re-confirmed that there were no gas lines in the area
Department of Transport	No Comment
Coillte Teoranta	
Ireland West Airport	State that the scheme "is in full accordance with plans of Ireland West Airport Knock".
Dept. of Agriculture and Food	Acknowledgement
Health Services Executive	Rodent Control Plan and highlighted meat burial ground at Cregga Townland
Forest Service	Requirements in relation to grants and licences. Also consult to Coillte
Roscommon Co Co – Water Services Department	No objection. Referred to Water Services Database
Irish Peatland Conservation Council	Provided information on the designated ecology sites within the study area and expressed concern about part of Corridor 1A being within Bellanagare Bog cSAC (note that this is incorrect – it is over 150m away from cSAC boundary)
Dept. of the Environment, Heritage and Local Government	NPWS:- Confirms that the emerging preferred route corridor is not within Bellanagare Bog but is close to it and to Annaghmore Lough. It recommends that the route be positioned as far north as possible within the corridor. Additional requirements relate to vegetation removal, impact of drainage on cSAC hydrology and assessments for Otter, Badger and Bats. Archaeology:- "it is noted that the proposed preferred route does avoid the main concentration of monuments around Rathcroghan". It goes on to state that the scheme traverses an archaeologically rich area and there is a strong likelihood of impact of previously unknown archaeology. It recommends a thorough archaeological assessment as part of the EIA process and in accordance with the NRA guidelines and Code of Practice. In addition, the project Archaeologist to keep the Dept. informed of all findings and progress.
An Garda Síochána	No objection
OPW Engineering Services	Providing information on Drainage Schemes and Drainage Districts within the study area. Also provided general OPW requirements
Roscommon Co Co – Environment Section	Requirements in relation to water licensing, water services, meat burial at Cregga, polluting material control and noise and dust requirements.
Geological Survey of Ireland	Information in relation to the Geological Heritage Site at Tulsk. OPW consider that a road development would have no adverse impact on this site.
Coillte Teoranta	Concerns regarding access to cut-off planted areas.
RSK Environment Ltd.	Confirming that a gas pipeline should not be considered as a constraint

Table 8.2 Emerging Preferred Route Corridor – Summary of Organisation Submissions

9 SAFETY

9.1 Introduction

All National Road Schemes are subject to the requirements of Road Safety Audits at various stages of their development - in accordance with the DMRB NRA HD 19 Road Safety Audits - to ensure that the road safety implications of the scheme are fully considered for all users of the road and others affected by the scheme.

There are four safety audit stages as follows:

(a) Stage F – Feasibility/ Route Selection Stage, prior to route choice,

   a. Stage F1 – Carried out as part of the assessment of all route corridors during the Route Corridor Selection Phase

   b. Stage F2 – Carried out on the Preferred Route Corridor

(b) Stage 1 – Completion of preliminary design prior to land acquisition procedures,

(c) Stage 2 – Completion of detailed design prior to tender of construction contract and

(d) Stage 3 – Completion of construction, prior to opening to traffic if possible.

A Road Safety Audit Team (see Table 9.1 below) was appointed, by Roscommon County Council, to carry out the Stage F (Parts 1 and 2) for the N5 Strategic Corridor Road Scheme.

Team Member	Position	Company
Mr. Stephen Lambert	Team Leader	Donegal National Road Design Office
Mr. Stephen McCrory	Team Member	Donegal County Council, Road Design Office

Table 9.1 Road Safety Audit Team

9.2 Stage F Safety Audit

9.2.1 Stage F Part 1

The Stage F Part 1 Safety Audit of all route options was carried out on 16th February 2007. It was based on the Safety Audit Brief, Scheme Drawings, traffic data, accident data and geometric data supplied to the Audit Team by the National Roads Design Office (the Design Team) and on a site visit by members of the Audit Team on 1st February 2007.

The subsequent Audit Report was submitted to the National Roads Design Office and outlined a preference for route Option 1, 1A, 2B, 2, 2A, 4 and 3 respectively, however, the report went on to confirm that there were “very small” differences between each of the options and that those differences could be designed out in subsequent design stages. The full report and the Audit Response is included at Appendix 2.

9.2.2 Stage F Part 2

The Stage F Part 2 Safety Audit was carried out on the emerging preferred route corridor on 17th September 2007 and was based on the Scheme Drawings and data supplied to the Audit Team by the National Roads Design Office (the Design Team) and on a site visit by members of the Audit Team on the same date.

The subsequent Audit Report was submitted to the National Roads Design Office and one issue in relation to junction strategy at the western tie-in was raised. The Design Team Response to this issue was accepted and no further problems remain. These and other engineering, environmental and economic factors have been considered during the iterative design process. The full report and the Audit Response is included at Appendix 2.

9.3 Remaining Safety Audit Stages

There are three remaining Safety Audit Stages, 1, 2 and 3, and these will be carried out at the appropriate stages with the problems and recommendations identified, considered during the design and construction phases of the scheme's development.

10 PREFERRED ROUTE CORRIDOR

10.1 Introduction

The development of the N5 Strategic Corridor Road Scheme is been carried out generally in accordance with the NRA National Roads Project Management Guidelines as outlined in Chapter 2. The Phase 2 Constraints Study was approved by the NRA in March 2006 and informed the development of the route corridor options.

Seven route corridor options were developed by the design team in conjunction with its technical and environmental sub consultants, through an iterative process, based on engineering, environmental and economic factors. Extensive consultations with the following main participants formed a significant input into this process (as detailed in Chapter 8):

- Over 60 statutory and non-statutory organisations, and
- Public consultation and submissions.

The seven route corridor options, as described in Chapter 3 of this report, were assessed and evaluated based on engineering, environmental and economic criteria.

10.2 The Preferred Route Corridor

10.2.1 Engineering

The assessment and evaluation of each of the route corridor options on engineering grounds was based on six overarching sub-criteria (see Table 10.1 below) as detailed in Chapters 3, 4, 5 and 9 and the associated appendices. It should be noted that each of the overarching sub-criteria has several components.

Corridor\ Topic	1	1A	2	2A	2B	3	4
Traffic	4	1	3	5	5	7	1
Road Geometry	1	1	1	1	1	7	1
Structures	1	1	4	5	6	3	6
Utilities	1	2	4	5	3	7	6
Soils and Geology	4	2	7	4	3	1	4
Road Safety Audit	1	2	4	5	3	7	6
TOTAL	12	9	23	25	21	32	24
Overall Preference	**2**	**1**	**4**	**6**	**3**	**7**	**5**

Table 10.1 Emerging Preferred Corridor – Engineering Criteria

10.2.2 Environmental

The assessment and evaluation of each of the route corridor options on environmental grounds was based on ten overarching sub-criteria (see Table 10.2 below) as detailed in Chapters 3 and 6 and the associated appendices. It should be noted that each of the overarching sub-criteria has several components.

Corridor\ Topic	1	1A	2	2A	2B	3	4
Agriculture	2	1	3	4	5	7	6
Ecology	4	1	6	5	2	3	7
Soils-Geology	7	2	5	4	3	1	6
Hydrogeology	6	1	4	5	2	3	7
Hydrology	3	1	6	4	7	2	5
Air Quality	3	1	5	2	4	7	6
Noise-Vibration	6	1	3	2	5	7	4
Landscape	2	1	6	4	5	7	3
Archaeology	2	1	5	4	3	7	6
Socio-Economic	1	1	1	1	5	7	6
TOTAL	36	11	44	35	41	51	56
Overall Preference	**3**	**1**	**5**	**2**	**4**	**6**	**7**

Table 10.2 Emerging Preferred Corridor – Environmental Criteria

10.2.3 Economic

The assessment and evaluation of each of the route corridor options on economic grounds was based primarily on the Cost-Benefit Analysis undertaken for the for each of the route corridor options (see Table 10.2 below) as detailed in Chapter 7 and the associated appendix.

Corridor\ Topic	1	1A	2	2A	2B	3	4
CBA	5	1	4	2	3	7	6
TOTAL	5	1	4	2	3	7	6
Overall Preference	**4**	**1**	**4**	**2**	**3**	**7**	**6**

Table 10.3 Emerging Preferred Corridor – Economic Criteria

10.2.4 The Preferred Route Corridor

The determination of the emerging preferred route corridor, as outlined earlier, is an iterative process that builds on the Constraints Report through the identification of route corridor options and proceeds to assess and evaluate each option based on engineering, environmental and economic criteria. The Route Corridor Selection Process undertaken in relation to the N5 Strategic Corridor is detailed in this report.

The amalgamation of these three criteria (Engineering, Environmental and Economic) leads to the identification of the optimum route corridor option as being Option 1A (See Table 10.4 below). This is the Preferred Route Corridor for the N5 Strategic Corridor Road Scheme.

Corridor\ Criteria	1	1A	2	2A	2B	3	4
Engineering	2	1	4	6	3	7	5
Environmental	3	1	5	2	4	6	7
Economic	5	1	4	2	3	7	6
TOTAL	10	3	13	10	9	20	18
Overall Preference	3	1	5	3	2	7	6

Table 10.4 Preferred Corridor

10.3 Conclusions and Recommendations

The Preferred Route Corridor for the N5 Strategic Corridor is Route Corridor Option 1A as shown on Drawing No. RN04250-12-371 (Layouts 1 to 6).

It is recommended that this route corridor be adopted by Roscommon County Council and included in the Roscommon County Development Plan and all associated sub-plans as appropriate.

In addition, it is recommended that this Route Corridor Option form the basis of and inform the development of the Preliminary Design Stage of the N5 Strategic Corridor Scheme.

11 REQUIREMENT FOR AN ENVIRONMENTAL IMPACT STATEMENT

11.1 Introduction

11.1.1 Preferred Route Corridor

This section is based on Route Corridor Option 1A – the Preferred Route Corridor.

11.1.2 Legislative Overview

Section 50 of the Roads Act 1993, as amended by European Communities (Environmental Impact Assessment) Regulations, 1989 to 2001 and the Planning and Development Acts, 2000 to 2007, establishes the statutory basis outlining the requirement to prepare an Environmental Impact Statement for any proposed road development consisting of the following:

i. the construction of a motorway,

ii. the construction of a busway,

iii. any prescribed type of proposed road development consisting of the construction of a proposed public road or the improvement of an existing public road.

Article 8 of the Roads Regulations, 1994 prescribes the types of proposed road development in the form of thresholds above which Section 50 of the Roads Act 1993, requiring the preparation of an Environmental Impact Statement (EIS), applies:

(a) the construction of a new road of four or more lanes, or the realignment or widening of an existing road so as to provide for four or more lanes, where such new, realigned or widened road would be eight kilometres or more in length in a rural area, or 500 metres or more in an urban area;

(b) the construction of a new bridge or tunnel which would be 100 metres or more in length

Additionally, Section 50 of the Roads Act 1993, as amended, requires a Local Authority to:

1. inform An Bord Pleanála if it considers that any road scheme is likely to have significant effects on the environment and if the Board concur they must instruct the Local Authority to prepare an EIS

2. decide whether a road scheme that is located on:

    a. a special area of conservation,

    b. a site notified in accordance with the European Communities (Natural Habitats) Regulations, 1997,

    c. an area classified pursuant to the Council Directive on the conservation of wild birds, 1979,

    d. a site where consultation has been initiated in accordance with the Council Directive on the conservation of natural habitats and wild fauns and flora, 1992,

    e. land established or recognised as a nature reserve within the meaning of the Wildlife Act 1976,

    f. land designated as a refuge for fauna under the Wildlife Act 1976,

would or would be likely to have significant effects on the environment and where the decision is that it would then the Authority must apply to An Bord Pleanála to carry out an EIS.

11.2 Requirement for an EIA

11.2.1 Screening Report

Screening is the term used to describe the process of ascertaining whether a road scheme requires an EIA and is determined by reference to the mandatory and discretionary provisions set out in the Roads Act, 1993, as amended by the EIA Regulations 1999 – to implement the EU Directive 97/11/EC – and the Planning and Development Act, 2000 and the Roads Regulations, 1994.

The overriding consideration in determining whether a road scheme should be subject to EIA is the likelihood of significant environmental effects. Significant effects may arise by virtue of the type of road scheme, the scale or extent of the road scheme and the location of the road scheme in relation to sensitive environments.

Where a decision is being made on whether a proposed road development would or would not be likely to have significant effects on the environment, regard must be given to the criteria specified for the purposes of Article 27 of the European Communities (Environmental Impact Assessment) Regulations, 1989.

The Article 27 screening criteria are grouped into three categories:

i. Characteristics of the Proposed Development,

ii. Location of the Proposed Development,

iii. Characteristics of potential Impacts.

The information requirement for the screening process is partially fulfilled by this Route Corridor Selection Report; however the bulk of the detailed information will be gathered during the next stage in the development of this road scheme – Phase 4 Preliminary Design.

11.2.2 Requirement for an EIS

A decision on whether the proposed N5 Scramoge to Ballaghaderreen Road Scheme is or is not likely to have significant effects on the environment will be made following completion of the Screening Report which will inform that decision and which will be completed during the next development stage of the scheme – Phase 4 – Preliminary Design.