



**A4/A5  
DUNGANNON TO BALLYGAWLEY  
DUAL CARRIAGEWAY**

**ENVIRONMENTAL STATEMENT**

**VOLUME 1: MAIN TEXT**

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## PREFACE

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DRD Roads Service is promoting the upgrading of sections of the A4 and A5 corridors as part of a programme of major improvements to the key transport corridors identified in the Regional Transportation Strategy (RTS) for Northern Ireland 2002-2012.

The upgrading comprises three schemes:

**Realignment and upgrading to dual carriageway of the A4 between Dungannon and Ballygawley including upgrading of existing junctions**

**Realignment of the A4 at Annaghilla**

**Realignment of the A5 at Tullyvar including climbing lanes**

The intention is that subject to statutory procedures and approvals the upgrading schemes would be implemented as part of a single Design, Build, Fund and Operate (DBFO) contract, a form of procurement that involves a partnership between public authorities/agencies and private construction, management and financing consortia.

All three schemes have been subject to a process of Environmental Impact Assessment (EIA) in accordance with European Union regulations.

This Environmental Statement reports the findings of the EIA for the proposals relating to the A4 between Dungannon and Ballygawley. Similar EIAs have been undertaken for the other two schemes under the project, the findings of which are reported in Environmental Statements specific to those schemes.

## NON-TECHNICAL SUMMARY

### Introduction

This is a non-technical summary of the Environmental Statement for the proposed A4 dual carriageway that draws attention to the most important issues and provides information on other significant topics. Any topic, which causes concern, can be followed in greater detail in the ES.

### Project Description

Between October 2003 and November 2004, route options for the A4 upgrading scheme were developed and assessed jointly by Mouchel Parkman and RPS Planning & Environment. Following on from the initial Constraints Study of the area, five route corridors were initially developed for the proposed A4 dual carriageway. The Constraints Report completed in May 2004, concluded that at that time it was not possible to identify one preferred route corridor for the proposed A4 dualling. This resulted from a number of factors including:-

- The proliferation of numerous and similar constraints throughout the study area;
- The undulating drumlin topography across the study area imposing a major constraint on the development of route corridor and route options; and
- The close proximity of the corridors identified allowing the possibility of the final preferred route using a composite of elements of two or more corridors.

After an initial review of the corridors contained in the Constraints Report, it was apparent that progressing an online option for the length of the A4 from Dungannon to Ballygawley, was not viable. Reasons for this included:-

- The existing road has poor horizontal and vertical alignments. Widening on-line would not raise the forward visibility distances to modern design standards.
- At the western end there are a significant number of properties immediately adjacent to the A4 that would be significantly affected by any widening.
- Maintenance of the existing traffic flows during construction of road widening would cause severe congestion and significantly extend the construction programme.
- Major public utilities are laid beside/under the existing A4. Protection and/or diversion of these services during construction would impose significant financial costs.
- Provision of direct access from individual properties and minor roads to a major dual carriageway would conflict with the improved safety objectives of the project.

The study considered six alternative routes and was based on three principle issues:-

- Engineering (such as road design and construction);
- Traffic and Economics (such as predicted traffic and project costing); and
- Environmental (such as impact on land, air, water environment).

The proposed scheme comprises the construction of 20 km of an all-purpose 2-lane dual carriageway road between Ballygawley Roundabout and the M1 at Dungannon as shown in Figure 1.4.01-1.4.11.

11 grade separated junctions will be constructed at the following locations:-

- Ballygawley
- Cabragh
- Quinns Corner
- Reaskmore
- Killyliss
- Granville

- Killybracken
- Eglish
- Old Eglish
- Mullybrannon (Southern Arm)
- Mullybrannon (Northern Arm)

A total of 16 bridges and 5 accommodation bridges will be provided.

It is anticipated that the construction period will last for approximately 30-36 months and the contractor will be contractually bound by the mitigation measures set out in the Environmental Statement and by the assessment decision of the Planning Appeals Commission.

## **Pedestrians, Cyclists, Equestrians and Community Effects**

In terms of severance and journey length the proposed alignment aims to keep as many of the existing local roads open by the use of over or underpasses.

The following roads have been stopped up:-

- Lisbeg Road
- Tullyallen Road (Junction of Tullyallen Road and existing A4)

The impact of severance has been predicted for these closed roads and described as severe.

The existing A4 not utilised by the proposed alignment will experience the greatest reduction in severance. The local roads within the study area will also experience a relief from existing severance.

Cyclist and pedestrians can be subject to nuisances due to construction activities and the presence of works vehicles. Noise, mud and dust may also be a cause for annoyance.

## **Land Use**

This chapter considers the impact of the proposed scheme in terms of land use throughout the study area. The chapter focuses upon the impact upon private property (in terms of utilities), agricultural land and practice and the use of natural resources. Consideration of aspects such as impact upon residential and commercial property, road users and effects on development land is given in Section 3.0 Human Environment.

### *Utilities*

This section outlines the impact upon the major utilities within the study area such as electricity, water, and telecommunications. Such services are present throughout the study area and the proposed route crosses numerous utilities. Construction will take place only after consultation with the relevant utility bodies in order to confirm location of utilities.

### *Natural Resources*

The prime impact upon natural resources in relation to the proposed development is in terms of material produced/utilised during the construction process. The proposed works upon the A4 will result in a cut/fill surplus of 900,000m<sup>3</sup> (rounded to the nearest 100,000m<sup>3</sup>).

There are no designations which would restrict the excavation and/or removal of mineral materials from the study area as a result of construction.

If material is to be disposed of outside of the land take boundary, this will be done in accordance with the Waste and Contaminated Land Order (Northern Ireland) 1997.

### *Agricultural Land Classification*

The section assesses the potential impact of the proposed alignment of the A4/ A5 on agricultural land quality. A detailed Agricultural Land Classification survey has therefore been undertaken along the proposed route alignment, using a dutch combination hand auger to examine soil profiles at regular intervals along the route corridor. This soil survey information is then combined with other site and climatic factors in order to determine detailed ALC grading of the route corridor.

The following guidelines applied to determine the detailed ALC of the route include;

- MAFF Agricultural Land Classification of England and Wales *Revised guidelines and criteria for grading the quality of agricultural land*, Published in October 1988.
- Soils and Environment Northern Ireland 1997 JG Cruickshank.

DARDI have been consulted throughout the process of the ALC survey and detailed grading to ensure that the ALC guidelines used in Northern Ireland have been correctly applied to this route corridor.

### *Farm Holdings*

This section outlines the impact of the proposals on agricultural businesses within the study area. The proposals will have numerous impacts upon farm holdings including land take, severance, crop loss, disruption to water supplies etc. The section outlines the impacts upon each affected farm holding with a total of 103 holdings suffering a direct permanent impact at local level.

### *Existing Development, Community Land and Proposed Development Land*

The study area is crossed by three class A roads, the Dungannon to Enniskillen Road; the A45 Granville to Dungannon Road; and the A5 Aughnacloy to Omagh Road. There are also three Class B roads that cross the study area. These include the B130 (Benburb-Dungannon); the B45 (Caledon-Dungannon); and the B35 (Aughnacloy-Dungannon).

The study area includes the communities of Dungannon, Granville, Aghaginduff/Cabragh, Castlecaulfield, Eglis Ballygawley and Moycashel.

The proposed route will result in the demolition of 3 residential properties with a further 13 residential properties within 50 m of the centreline of the proposed route. In total 197 residential properties are located within 300 m of the proposed route. All steps will be taken to attempt to retain as many of these properties as possible, as well as reduce the impact on remaining properties.

There will be no commercial demolitions, however 4 commercial properties will be located within 50 m of the proposed route. In total 13 commercial properties will be located within 300 m of the centreline of the proposed route.

## **Ecology**

The study area exists within a drumlin landscape of largely arable and improved grassland habitat. Drumlin valleys are marshy and seasonally inundated. Fields are predominantly pasture and are of irregular shapes and sizes, becoming smaller and more angular on steep slopes. Dense hedgerows enclose most fields. Throughout the area there are small conifer plantations and a scattering of small broadleaf woodlands and copses, although hedgerow trees are the predominant influence.

There are no sites designated as being of conservation importance at a national level or higher being directly impacted by the proposed route.

Sites of Local Nature Conservation Importance (SLNCI) are local designations within Northern Ireland, and derive from the Regional Development Strategy for Northern Ireland 2025 under SPG-Env 1.2. There are 18 SLNCIs that have a nature conservation interest within 5km of the route of the proposed road.

The most important watercourses with the study area are the Oona Water and Ballygawley Water. The Oona Water is a tributary of the Blackwater River. The Oona Water at the Oona Bridge is designated as a Salmonid River under the EC Freshwater Fish Directive (78/659/EEC).

The study area is enclosed largely within four 10km grid squares, namely H65, H66, H75 and H76. The Protected and Priority Plant database of the Ulster Museum was examined to identify any plants possibly present in the study area afforded protection under the Wildlife (Northern Ireland) Order 1985. There are five records of protected plant species from the 10 km grid squares within the study area. These are bee orchid, bird's-nest orchid, cowslip, holly fern and primrose. Only primrose and cowslip occur within the study area.

The study area is characterised by its rural nature and so contains many species including badgers, otters, Irish hare and a number of bat species. The proposed route predominantly crosses improved and semi-improved grassland, which are of low ecological value. The areas of ecological constraint (AECs) in the locality may suffer negative impacts in a local context. Secondary ecological impacts arising from the road scheme could potentially have moderate-substantial negative impacts on features of high local (otter and badger) importance. There will be no direct impacts on any designated areas.

Habitat disturbance in areas of ecological constraint will be strictly confined to within the direct land-take of the proposed route during construction work. Underpasses / tunnels installed to allow continued safe mammal passage across the road also ameliorates the risk of wildlife road casualties. Landscape planting will reduce the loss of hedgerow and woodland/scrub transition habitat. The use of fencing to protect badgers and otters from the road will be incorporated. Any bridges and culverts will be designed with the latest design guidelines so that their impact to otters is minimised. Johnston's Glen and Killymoyle have been identified as experiencing the highest impact rating, due to the disturbing effects on protected species, and consequently will require specific mitigation measures in order to minimise the impact of the road on the fauna of these areas.

## **Geology and Soils**

The geology and soils overlain by the proposed route include solid geology and drift deposits. The solid geology belongs to the Clogher Valley, Ballyness, Benbulbin and Carrickaness Formations and the Sherwood Sandstone Group. The drift deposits along the route are predominantly glacial and late glacial Boulder Clay (Till).

The proposed scheme travels over areas of variable quality land ranging from Very Good Quality Land (Grade 2A) to areas of Poor Quality Disturbed Soils (Grade 5D). The soil types are also variable with the occurrence of different types of Surface Water Gleys, Brown Earths, Alluvium, and Peat.

Hydrogeology of the area is classified in terms of flow, productivity of aquifers and geology. The most frequently occurring type of flow is over areas of limited potential in regions without significant groundwater. Along the proposed route, areas of highly productive aquifers are crossed. The route also crosses areas of locally important aquifers and areas with aquifers with limited or local potential.

Along the proposed realigned route, groundwater vulnerability is generally Type B which indicates that aquifers in the area are moderately permeable. In addition, most of the overlying soils have a low leaching potential. Towards Dungannon the route overlies areas of highly permeable formations.

The impacts of the proposed scheme on geology within the study area are indirect due to changes in hydrogeology. Soils within the study area will be directly affected due to

excavation, removal of vegetation, and the use of heavy machinery. These can affect the properties of the soil including structure, texture, drainage, pH, organic content, and soil quality. The hydrogeology of the area could be impacted upon due to changes in water quality or pollution from human sources.

The mitigation measures recommend the need to vegetate bare soils and rocks, install appropriate drainage systems, and use specialist machinery to minimise damage to the soil.

## **Water Quality, Drainage and Fisheries**

The hydrology of the study area is dominated by four main catchments which in turn feed into the Blackwater catchment. The Blackwater catchment is a constituent of the much larger Lough Neagh south catchment which drains 2027 km<sup>2</sup> (EHS, 1995) of land. The Blackwater rises near Fivemiltown, and flows in an easterly direction. Its main tributaries are the River Torrent, Callen River, River Rhone, River Tall, Fury River and Ballygawley Water. The A4 scheme crosses the Oona Water, moves towards the Ballygawley Water and traverses minor tributary streams draining into the Oona Water, Ballygawley Water, Rhone River and the River Torrent. The groundwater vulnerability of the proposed route is predominantly composed of geology with moderate permeability. Although these aquifers will seldom produce large quantities of water for abstraction, they are important both for local supplies and in supplying base flows to rivers.

The River Blackwater catchment is monitored by the EHS in various locations recording chemical class biological class or both. There are 34 active stations recording chemical class along various reaches of main watercourses and tributaries within the catchment area. Biological monitoring occurs at 42 locations throughout the catchment. The Blackwater catchment is the largest of the Lough Neagh sub-catchments. It was in the past renowned as a salmon and trout river of high quality but has declined in the past due to a major drainage scheme in the late 1980's and also through pollution from sewage, industrial and agricultural sources (Brady Shipman Martin *et al*, 1997). Before its pollution and drainage problems, it was regarded as one of the most productive trout rivers in the island of Ireland (O'Reilly, 2002).

Major construction projects such as roadway construction can lead to pollution of receiving waters. The main cause of contamination tends to be from solids but can also include pollution episodes from liquid cement and oil (diesel and lubricating oil for heavy vehicles).

The Scottish Environmental Protection Agency (SEPA, 1996) list the main sources of pollution from construction sites as follows:

- The discharge or entry into waters of contaminated site run-off or pumped contaminated surface/ground waters.
- Direct disturbance of the beds of rivers and streams by excavation or fording.
- Loss of oil from machinery or storage areas.
- Cement and cement wash from batching plants, storage areas and other areas where cement grout or concrete is being applied.
- Silty water can arise from de-watering excavations, exposed ground, stockpiles of soil, plant and wheel washing, site roads and disturbance of stream beds.

Mitigation at this stage will be directed at avoiding and minimising escape of sediment and soil into watercourses, regardless of their size as well as the prevention of oil or liquid cement spills from construction areas to waterways. The guideline limit value for suspended solids is usually 25 mg/l, which may inevitably be exceeded at times if mitigation is not in place. All oils and fuels will be stored in secure bunded areas and refuelling will not be carried out near watercourses. If the site works involve the discharge of drainage water to the river, temporary oil interceptor facilities should be installed and maintained.

The design construction and maintenance of the road drainage systems will follow the best practice guidelines described in SEPA (Scottish Environmental Protection Agency) Pollution Prevention Guidelines. The mitigation measures and the management of the site in accordance with the requirements of the relevant authorities will ensure that there are no significant impacts on surface waters in the vicinity of the proposed A4 Dualling.

## **Air Quality and Climate**

A study of existing air quality data, focussing on traffic and heating derived pollutants, was undertaken for the area of the proposed scheme. The results of this survey indicate that the air quality in the vicinity of the development is typical of rural air quality. There are no reported exceedences in EU air quality limit values at the Department of Environment air quality monitoring stations in the vicinity of the proposed scheme.

The potential impacts of the proposed development on local air quality during the construction phase and operational phase were identified and appropriate mitigation measures suggested.

Computer modelling of predicted pollutant dispersion was performed with and without the scheme in place. The model predicts that there will be no exceedence of EU air quality limit values with or without the scheme in place in future years.

Providing recommended mitigation measures are undertaken, it is thought that the proposed scheme will have no significant negative impact on air quality in the area.

## **Noise Impact Assessment**

The traffic noise effects of the proposed realignment of the A4 between Ballygawley and Dungannon have been assessed in accordance with the guidance given in the Design Manual for Roads and Bridges Volume 11, and the Calculation of Road Traffic Noise.

Road traffic noise predictions were undertaken to assess whether the re-distribution of traffic as a result of the proposed bypass would have a significant effect on traffic noise levels at nearby properties.

The predictions showed that traffic noise levels are predicted to decrease at properties in proximity to the A4, this is due to the significant diversion of traffic flows from the existing route through Ballygawley and Dungannon onto the proposed bypass to the north of the existing A4. This would result in a significant benefit to properties along the existing route.

Where feasible the design of the route of the proposed bypass has incorporated traffic noise reduction measures such as earth mounding or cuttings, however there are a small number of isolated properties along the route alignment of the proposed bypass, where traffic noise levels are predicted to increase. Although generally traffic noise levels at these properties are predicted to remain below the threshold noise level of 68 dB(A). It is recommended that where properties would be exposed to traffic noise levels of above 68 dB(A), the use of low noise road surfacing and/or the construction of noise barriers should be implemented.

## **Landscape and Visual**

The existing landscape character of the study area has evolved as a result of previous glacial, geological and human impacts. The study area extends from west to east from Ballygawley to Dungannon. The southern edge of the Sperrins forms the northern boundary to the landscape above Ballygawley where hills rise to form uplands such as Slievemore. The small town of Ballygawley is located at the western limit of the study area. Several, formerly more extensive, estate and parkland landscapes are found within the study area at Parkanaur, Whinney Hill and Martray. The eastern part of the study area is dominated by urban influences associated with Dungannon, Moygashel and Granville. This eastern portion of the study area from Cabragh to Dungannon is generally low lying, consisting of low rounded drumlins with watercourses, loughs and wetlands in the hollows between drumlins. Gradually, to the west the drumlins increase in size to form higher hills such as Ivy Hill. Throughout the study area scattered residential development is visible in the landscape particularly around Ballygawley, Cabragh, Quinns Corner, Granville, Moycashel and Dungannon.



The prediction of impacts is in two parts. First the impact on the surrounding landscape is assessed and then the visual impact for sensitive viewpoints is completed.

The distinctiveness of the landscape in the study area can be sub-divided into landscape character areas. The impact of the proposed road scheme on the landscape character areas has been predicted. A small area of estate and parkland landscape will be significantly affected. As landscape planting along the road matures with time the road will become an integral landscape feature and only with a slight reduction in impact on the landscape.

There are a number of properties that will be impacted in terms of visual aspects. Due to the enclosed and undulating nature of the landscape within the study area, the views of the road from properties are relatively restricted to a number of key locations along the route. This is as a result of the route requiring long cuttings through drumlins, which results in restriction of visual impact. Where embankments occur it is possible that the route may be more visible from residential properties in close proximity.

Mitigation of these impacts will involve the physical and visual integration of the proposed road scheme and associated features into the surrounding landscape. Screening will be used to minimise visual intrusion and to reduce any negative aspects regarding the visual impact of the road, road structures and traffic.

The proposed extensive woodland planting will conceal the majority of views within the agricultural landscape. Proposed woodland planting will integrate the road scheme into the existing patterns of the landscape. Loss of existing views will remain a significant impact to a number of properties that are located near to the proposed road. In general the visual impacts will be slightly reduced as the landscape planting matures.

## **Archaeology**

This section provides an assessment of the potential impact of the proposed A4 Ballygawley – Dungannon Road Realignment (including the proposed new roundabout) on features of cultural heritage significance along or adjacent to the proposed route corridor.

The methodology used for this study includes a comprehensive desktop review of all available data concerning the recorded cultural heritage of the area (including cartography) and an assessment of aerial photography of the route corridor. A walkover survey of the entire route was undertaken by two archaeologists and the area assessed in terms of landscape, land use, vegetation cover, presence or lack of archaeological sites and potential for further undetected archaeological sites/features.

In total, twenty-three recorded cultural heritage sites were identified within or adjacent to the proposed route corridor. These sites include those listed in the Sites and Monuments Record (archaeological); Historic Buildings; Industrial Heritage Sites; Historic Parks, Gardens and Demesnes and Heritage Gardens. A number of built features and potential archaeological sites identified during field survey and cartography searches are also located within the environs of the proposed route corridor.

Direct impacts on features of cultural heritage significance were graded in terms of physical destruction (total/partial and potential for total/partial destruction). Indirect impacts constitute those that may potentially affect the context or setting of a particular cultural heritage site.

Best available techniques/methodologies are outlined for geophysical prospecting which can be applied to the existing environment. For areas of archaeological potential, a programme of centre line archaeological test trenching with 45° offsets every 10 m-20 m is proposed as a mitigation measure whilst archaeological test pits are also recommended for investigation purposes into any potential archaeological/built heritage features noted during field survey. An extensive programme of archaeological monitoring should take place during all ground disturbance associated with the proposed development along the entire route. This should be carried out by a suitably qualified archaeologist under licence from the Environment and

Heritage Service of the Department of Environment (Northern Ireland) to record any archaeological deposits and to recover any artefacts.

The main impact findings of this study that require careful mitigation measures include:

- Formalise the newly created entrance at Lisbeg House (a historic building) in a similar fashion to what currently exists and although a cut is being proposed at this location an embankment/buffer should also be considered to act as a view block of proposed road to/from the house
- Re-route the proposed road at ch. 1180.00 to avoid the ringfort (site 60:39; a recorded archaeological site) or reduce the extent of cut proposed at this location. If this is not possible, partial or full archaeological excavation of the site will be required
- Aghnahoe cottage (of good architectural merit) at ch. 4350.00 will require a full written, drawn and photographic survey for archival purposes before demolition
- A cut is proposed at ch. 4500.00 – 4650.00. An associated embankment to create a visual and noise barrier to/from Aghnahoe house and buildings (a listed Heritage Garden) should be ensured
- The townland boundary at approx ch. 5250.00 – 5450.00 (possibly dating to late medieval period) should be avoided and retained by re-directing the route southwards at this location. If this is not feasible, careful archaeological monitoring should take place and a written, drawn and photographic survey taken of a cross-section of the ditch and bank for archival reference
- Sympathetic incorporation of existing Farriter's bridge (site 5284; a recorded industrial heritage site) at ch. 8500.00 into road design or full drawn, written and photographic survey for archival reference

## Vehicle Travellers

Under this heading the impacts on vehicle travellers were assessed, including impacts arising from the proposed scheme in terms of the view from the road and driver stress.

“View from the road” is defined in the DMRB as “the extent to which travellers, including drivers, are exposed to the different types of scenery through which a route passes”. The four categories considered whilst assessing travellers’ ability to see the surrounding landscape are:-

- (a) No view;
- (b) Restricted view;
- (c) Intermittent view;
- (d) Open view.

The findings were that in both the existing situation and for the proposed scheme drivers will experience a mix of restricted, intermittent and open views that do not adversely impact on the driving experience.

Driver stress is defined in the DMRB for environmental assessment purposes as the “adverse mental and physiological effects experienced by a driver traversing a road network”. Factors that influence stress levels include:-

- Road layout;
- Geometry;
- Surface riding characteristics;
- Junction frequency;
- Speed and flow per lane.

For drivers, these factors can cause a feeling of discomfort, annoyance, frustration or fear, resulting in physical and emotional tension. Frustration is caused on the A4 at present by a driver’s inability to travel at a constant speed as a result of road alignment, the number of turning movements on and off the single carriageway, volume of traffic, and slow moving vehicles, which in turn leads to unreliable journey times which further increases stress.

The results of the assessment found that while drivers will experience a moderate level of stress on the existing road for the baseline assessment year of 2010, drivers will experience only low levels of stress in the Design Year 2025 (fifteen years after the year of opening) for the proposed dual carriageway.

## Disruption due to Construction

A major source of potential disruption due to construction will be traffic movements generated by the proposed scheme. These movements will arise from the transfer of personnel, plant and equipment to and from site; the undertaking of construction activities particularly the earthworks required for this scheme; and, the importation and disposal of construction and waste materials respectively. There will be traffic disruption on the A4 and on the adjacent local road network, resulting from construction activities undertaken at different stages throughout the construction works. There will also be disruption to the movements of pedestrians, cyclists and the local communities in the vicinity of the proposed scheme.

However, while these impacts cannot be avoided, they can be minimised through the development and implementation of an effective Traffic Management Plan, which will be an obligation on the contractor responsible for the works and subject to the approval of authorities including Roads Service and the PSNI. The Plan will have to take account of the A4’s status as a Key Transport Corridor, and, as such, reasonable measures will be required to be included to minimise the impact on traffic that wishes to utilise the existing route during the construction period.

An initial assessment has been made regarding access to the section of the proposed scheme at the western end, which will be accessed from the local, minor road network. This assessment will be used to develop contractual working restraints that will become an obligation on the contractor. The conclusions from the initial assessment are that, in general, Armalughey Road, Dergenagh Road, the eastern end of Killeeshil Road, Killymoyle Road and Mullaghbane Road are suitable for site access. However, minor improvements may be required at locations, for example, removal of vegetation from site lines, construction of passing places, culvert strengthening works, etc. Other roads, for example the western end of Killeeshil Road are identified as requiring significant remedial works to make them suitable for construction traffic. In some circumstances access is considered to be unsuitable, for example, access to Craveny Road should only be from the southern end as access for traffic travelling from the existing A4 south to the site is considered impractical and too onerous to improve to a satisfactory standard.

Similarly, the Contractor will be obliged to consider the impact on access to adjacent properties during the course of the works and ongoing farming activities as part of a traffic management plan within the site.

Likewise, the Contractor will be obliged to adhere to other contractual working restraints, be they those included within the specific contract documentation, or complying with mandatory legislation. Before undertaking works in sensitive areas, for example, close to occupied properties, the contractor will have to develop method statements and undertake risk assessments, to evaluate the potential impacts and mitigate against them. For example, noise and vibration effects resulting from construction activities should be considered and either approved by the appropriate authority and/or checked against current legislation prior to commencing works.

## **Policies and Plans**

The proposed road alignment does not impact on any areas of planning zonings within the Dungannon and South Tyrone Area Plan 2010 or the Regional Development Strategy for Northern Ireland 2025. Nor is there any impact on development plan policy.

## **NON-TECHNICAL SUMMARY**

### **Introduction**

This is a non-technical summary of the Environmental Statement for the proposed realignment of the A4 at Annaghilla and draws attention to the most important issues and provides information on other significant topics. Any topic, which causes concern, can be followed in greater detail in the ES.

### **Project Description**

Between October 2003 and November 2004, route options for the A4 Annaghilla upgrading scheme elements were developed and assessed jointly by Mouchel Parkman and RPS Planning & Environment.

Six route options were identified for the Annaghilla scheme. These included an option for on-line improvements and five off-line options, each adopting cross-country routes to the south of the existing road alignment. The differences in the five off-line options lay in the location of the western tie-in point to the existing road, and how far to the south each option ran.

The study considered six alternative routes and was based on three principle issues:-

- Engineering (such as road design and construction);
- Traffic and Economics (such as predicted traffic and project costing); and
- Environmental (such as impact on land, air, water environment).

The proposed scheme comprises the construction of 3.8 km of single carriageway road as shown in Figure 1.4.01-1.4.03.

Five at-grade priority junctions are included in the main link road, and one at-grade priority junction between side roads.

Only one bridge is required to cross the Halftown Road.

It is anticipated that the construction period will last for approximately 6 months and the contractor will be contractually bound by the mitigation measures set out in the Environmental Statement and by the assessment decision of the Planning Appeals Commission.

### **Pedestrians, Cyclists, Equestrians and Community Effects**

In terms of severance and journey length the proposed alignment aims to keep as many of the existing local roads open through the use of over bridges and local realignments. The proposed alignment will result in little or no impacts as a result of the rural nature of the landscape the route passes through.

The existing A4 not utilised by the proposed alignment will experience the greatest reduction in severance.

Cyclist and pedestrians can be subject to nuisances due to construction activities and the presence of works vehicles. Noise, mud and dust may also be a cause for annoyance.

### **Land Use**

This chapter considers the impact of the proposed scheme in terms of land use throughout the study area. The chapter focuses upon the impact upon private property (in terms of utilities), agricultural land and practice and the use of natural resources.

The study area is crossed by one Class A road, the A4 Dungannon to Enniskillen Road. In addition numerous Class B and unclassified roads cross the study area linking the small hamlets and settlements throughout the study area.

The proposed route will not result in the demolition of any residential properties, with only 1 residential property within 50m of the proposed route. All steps will be taken to ensure that the impact on residential property is kept to a minimum.

The proposed route does not impact on any commercial properties within 300m of the proposed road centreline.

## Utilities

This section outlines the impact upon the major utilities within the study area such as electricity, water, and telecommunications. Such services are present throughout the study area and the proposed route crosses numerous utilities. Construction will take place only after consultation with the relevant utility bodies in order to confirm location of utilities.

## Natural Resources

The prime impact upon natural resources in relation to the proposed development is in terms of material produced/utilised during the construction process. The proposed works upon the A4 will result in a cut/fill a surplus 170,000m<sup>3</sup> (rounded to the nearest 10,000m<sup>3</sup>).

There are no designations which would restrict the excavation and/or removal of mineral materials from the study area as a result of construction.

If material is to be disposed of outside of the land take boundary, this will be done in accordance with the Waste and Contaminated Land Order (Northern Ireland) 1997.

## Agricultural Land Classification

The section assesses the potential impact of the proposed alignment of the A4 Annaghilla, on agricultural land quality. A detailed Agricultural Land Classification survey has therefore been undertaken along the proposed route alignment, using a dutch combination hand auger to examine soil profiles at regular intervals along the route corridor. This soil survey information is then combined with other site and climatic factors in order to determine detailed ALC grading of the route corridor.

The following guidelines applied to determine the detailed ALC of the route include;

- MAFF Agricultural Land Classification of England and Wales *Revised guidelines and criteria for grading the quality of agricultural land*, Published in October 1988.
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DARDI have been consulted throughout the process of the ALC survey and detailed grading to ensure that the ALC guidelines used in Northern Ireland have been correctly applied to this route corridor.

### *Farm Holdings*

This section outlines the impact of the proposals on agricultural businesses within the study area. The proposals will have numerous impacts upon farm holdings including land take, severance, crop loss, disruption to water supplies etc. The section outlines the impacts upon each affected farm holding with a total of 20 holdings suffering a direct permanent impact at local level.

## Ecology

The study area exists within a drumlin landscape of largely arable and improved grassland habitat. Drumlin valleys are marshy and seasonally inundated. Fields are predominantly pasture and are of irregular shapes and sizes, becoming smaller and more angular on steep slopes. Dense hedgerows enclose most fields. Throughout the area there are small conifer plantations and a small semi natural willow dominated woodland, although hedgerow trees are the predominant influence.

There are no sites designated as being of conservation importance at a national level or higher being directly impacted by the proposed route.

Sites of Local Nature Conservation Importance (SLNCI) are local designations within Northern Ireland, and derive from the Regional Development Strategy for Northern Ireland 2025 under SPG-Env 1.2. There are 5 SLNCIs which have a nature conservation interest within 5 km of the route of the proposed road. These sites are listed in the Dungannon and South Tyrone Area Plan 2010.

The most important watercourses with the study area are the Annaghilla Drain and the Roughan Drain, both of which feed into the River Blackwater via the Caldram Drain.

The areas of ecological value in the area may suffer negative impacts in a local context. There will be no direct impacts on any designated areas.

Habitat disturbance in areas of ecological constraint will be strictly confined to within the direct land-take of the proposed route during construction work. Underpasses / tunnels installed to allow continued safe mammal passage across the road also ameliorates the risk of wildlife road casualties. Landscape planting will reduce the loss of hedgerow and woodland/scrub transition habitat. The use of fencing to protect badgers and otters from the road will be incorporated. Any bridges and culverts will be designed with the latest design guidelines so that their impact to otters is minimised. It is also recommended that no removal of vegetation will occur within the bird breeding season (April-August).

## Geology and Soils

The geology and soils overlain by the proposed route include solid geology and drift deposits. The solid geology belongs to the Clogher Valley and Carnteel Formations. The drift deposits along the route are predominantly glacial and late glacial Boulder Clay (Till).

The proposed scheme predominantly travels over areas of Good Quality Land (Grade 3A), although areas of Poor Quality (Grade 4B) and Very Poor Quality (5U) will also be crossed. The soil types traversed by the proposed route include Brown Podzolic Gravel, Undifferentiated Organic Alluvium, Surface Water Gley Class 1 Carboniferous Sandstone Till and Peat.

Hydrogeology of the area is classified in terms of flow, productivity of aquifers and geology. The most frequently occurring type of flow is over areas of limited potential in regions without significant groundwater. Along the proposed route, areas of locally important aquifers and areas with aquifers of limited or local potential.

Along the proposed realigned route, groundwater vulnerability is moderately permeable. The potential for leaching of soils is generally low, although soils with a high leaching potential are also present.

The impacts of the proposed scheme on geology within the study area are indirect due to changes in hydrogeology. Soils within the study area will be directly affected due to excavation, removal of vegetation, and the use of heavy machinery. These can affect the properties of the soil including structure, texture, drainage, pH, organic content, and soil quality. The hydrogeology of the area could be impacted upon due to changes in water quality or pollution from human sources.

The mitigation measures recommend the need to vegetate bare soils and rocks, install appropriate drainage systems, and use specialist machinery to minimise damage to the soil.

## **Water Quality and Drainage**

Numerous subsidiary watercourses drain land belonging to the river Blackwater drainage basin in the vicinity of the Annaghilla realignment. The minor streams and drainage ditches at the western section of the proposed Annaghilla scheme drain land in the vicinity of Annaloughan Hill to the north. A second River Blackwater tributary originates in the Ballysaggart area, approximately 2.4 km from the stream crossing point at Roughan's Bridge. The proposed new alignment navigates an area, which crosses an existing watercourse located approximately at chainage 2900 m. This watercourse originates in an area called Sess located to the north of the study area and travels underneath Annaghilla Bridge before meeting with the realigned road. A tributary crossing from the south to the north at chainage 3300 m connects with the stream that originates in Sess. There are no lakes or loughs within the immediate vicinity of the study area.

Major construction projects such as roadway construction can lead to pollution of receiving waters. The main cause of contamination tends to be from solids but can also include pollution episodes from liquid cement and oil (diesel and lubricating oil for heavy vehicles).

The Scottish Environmental Protection Agency (SEPA, 1996) list the main sources of pollution from construction sites as follows:

- The discharge or entry into waters of contaminated site run-off or pumped contaminated surface/ground waters.
- Direct disturbance of the beds of rivers and streams by excavation or fording.
- Loss of oil from machinery or storage areas.
- Cement and cement wash from batching plants, storage areas and other areas where cement grout or concrete is being applied.
- Silty water can arise from de-watering excavations, exposed ground, stockpiles of soil, plant and wheel washing, site roads and disturbance of stream beds.

Mitigation at this stage will be directed at avoiding and minimising escape of sediment and soil into watercourses, regardless of their size as well as the prevention of oil or liquid cement spills from construction areas to waterways. The guideline limit value for suspended solids is usually 25 mg/l, which may inevitably be exceeded at times if mitigation is not in place. All oils and fuels will be stored in secure bunded areas and refuelling will not be carried out near watercourses. If the site works involve the discharge of drainage water to the river, temporary oil interceptor facilities should be installed and maintained.

The design construction and maintenance of the road drainage systems will follow the best practice guidelines described in SEPA (Scottish Environmental Protection Agency) Pollution Prevention Guidelines. The mitigation measures and the management of the site in accordance with the requirements of the relevant authorities will ensure that there are no significant impacts on surface waters in the vicinity of the proposed A4 Dualling.

## **Air Quality and Climate**

A study of existing air quality data, focussing on traffic and heating derived pollutants, was undertaken for the area of the proposed scheme. The results of this survey indicate that the air quality in the vicinity of the development is typical of rural air quality. There are no reported exceedences in EU air quality limit values at the Department of Environment air quality monitoring stations in the vicinity of the proposed scheme.

The potential impacts of the proposed development on local air quality during the construction phase and operational phase were identified and appropriate mitigation measures suggested.



Computer modelling of predicted pollutant dispersion was performed with and without the scheme in place. The model predicts that there will be no exceedence of EU air quality limit values with or without the scheme in place in future years.

Providing recommended mitigation measures are undertaken, it is thought that the proposed scheme will have no significant negative impact on air quality in the area.

## **Noise Impact Assessment**

The traffic noise effects of the proposed route along Annaghilla have been assessed in accordance with the guidance given in the Design Manual for Roads and Bridges Volume 11, and the Calculation of Road Traffic Noise.

Road traffic noise predictions were undertaken to assess whether the re-distribution of traffic as a result of the proposed route would have a significant effect on traffic noise levels at nearby properties.

The predictions showed that traffic noise levels are predicted to decrease at properties in proximity to the existing Annaghilla Road, this is due to the significant diversion of traffic flows from the existing route through Annaghilla onto the proposed route. This would result in a significant benefit to properties along the existing route.

Where feasible the design of the route of the proposed bypass has incorporated traffic noise reduction measures such as earth mounding or cuttings, however there are a small number of isolated properties along the route alignment of the proposed route, where traffic noise levels are predicted to increase. Although generally traffic noise levels at these properties are predicted to remain below the threshold noise level of 68 dB(A). It is recommended that where properties would be exposed to traffic noise levels of above 68 dB(A), low noise road surfacing and/or the construction of noise barriers should be considered.

## **Landscape and Visual**

The existing landscape character of the study area has evolved as a result of previous glacial, geological and human impacts. The study area lies in a broad lowland valley with small rounded hills and long ridges. Higher ground in the form of upland hills and mountains lie to the north and south at Slievemore (314 m ASL) and Slieve Beagh (380 m ASL). Pastoral agricultural landscapes dominate with occasional distinctive estate landscapes. The valley contains the meandering Blackwater River. In addition, numerous winding streams cross this landscape between the drumlins and ridges. Ballygawley lies to the east and Augher lies to the west. Throughout the study area scattered residential development is visible in the landscape.

The prediction of impacts is in two parts. Firstly the impact on the surrounding landscape is assessed and then the visual impact for sensitive viewpoints is completed.

The distinctiveness of the landscape in the study area can be described using landscape character areas. The study area has been identified as Lowland Drumlin Agricultural Landscape. The impact of the proposed road scheme on this landscape character area has been predicted as moderate negative. As landscape planting along the road matures with time the road will become an integral landscape feature with slight reduction in impact on the landscape.

There are a number of properties that will be impacted in terms of visual aspects. Due to the enclosed and undulating nature of the landscape within the study area, the views of the road from properties are relatively restricted to a number of key locations along the route. The visual impact of the proposed scheme on all affected properties has been predicted.

Mitigation of these impacts will involve the physical and visual integration of the proposed road scheme and associated features into surrounding landscape and screening to minimise visual intrusion and to reduce any negative aspects regarding the visual impact of the road, road structures and traffic.

The proposed extensive woodland planting will conceal the majority of views within the agricultural landscape. Proposed hedgerow planting will integrate the road scheme into the existing patterns of the landscape. Loss of existing views will remain a significant impact to a few properties that are located near to the proposed road. In general the visual impacts will be reduced as the landscape planting matures.

## Archaeology

This section assesses the likely significant impacts of the proposed development on cultural heritage resources in the environs adjacent to the proposed route realignment for the area of Annaghilla located along and adjacent to the existing A4.

The methodology used for this study includes a comprehensive desktop review of all available data concerning the recorded cultural heritage of the area (including cartography) and an assessment of aerial photography of the route corridor. A walkover survey of the entire route was undertaken by two archaeologists and the area assessed in terms of landscape, land use, vegetation cover, presence or lack of archaeological sites and potential for further undetected archaeological sites/features.

In total, thirteen recorded cultural heritage sites were identified within or adjacent to the proposed route corridor. These sites include those listed in the Sites and Monuments Record (archaeological) and Industrial Heritage Sites. A number of built features and potential archaeological sites identified during field survey and cartography searches are also located within the environs of the proposed route corridor.

Direct impacts on features of cultural heritage significance were graded in terms of physical destruction (total/partial and potential for total/partial destruction). Indirect impacts constitute those that may potentially affect the context or setting of a particular cultural heritage site.

Best available techniques/methodologies are outlined for geophysical prospecting which can be applied to the existing environment. For areas of archaeological potential, a programme of centre line archaeological test trenching with 45° offsets every 10 m-20 m is proposed as a mitigation measure whilst archaeological test pits are also recommended for investigation purposes into any potential archaeological/built heritage features noted during field survey. An extensive programme of archaeological monitoring should take place during all ground disturbance associated with the proposed development along the entire route. This should be carried out by a suitably qualified archaeologist under licence from the Environment and Heritage Service of the Department of Environment (Northern Ireland) to record any archaeological deposits and to recover any artefacts.

The main impact findings of this study that require careful mitigation measures include:

- Care needed at ch. 330.00 to observe whether milepost still extant at this location. If it is discovered, it will require relocation nearby in a safe position.
- Extra vigilance required during archaeological monitoring phase at ch. 820.00 for any sub-surface remains associated with the railway station site
- If Roughan Bridge at ch. 900.00 is still intact, a full written, drawn and photographic survey will be required whether the bridge is to be partially or fully removed
- The school house at ch. 1300.00 is removed and will not require mitigation since its original site is located at a sufficient distance from the proposed road-take
- Orange Dale farmstead at ch. 1300.00 does not require mitigation since it is located at a sufficient distance from the proposed road-take and a cut is proposed at this point which will also act as a visual buffer to remedy views/noise of the proposed road to/from the house
- Re-route the proposed road at ch. 2430.00 to avoid enclosure site 59:21. If this is not possible, full archaeological excavation of the site will be required.

## Vehicle Travellers

Under this heading the impacts on vehicle travellers were assessed, including impacts arising from the proposed scheme in terms of the view from the road and driver stress.

“View from the road” is defined in the DMRB as “the extent to which travellers, including drivers, are exposed to the different types of scenery through which a route passes”. The four categories considered whilst assessing travellers’ ability to see the surrounding landscape are:-

- (a) No view;
- (b) Restricted view;
- (c) Intermittent view;
- (d) Open view.

The findings were that in both the existing situation and for the proposed scheme drivers will experience a mix of restricted, intermittent and open views that do not adversely impact on the driving experience.

Driver stress is defined in the DMRB for environmental assessment purposes as the “adverse mental and physiological effects experienced by a driver traversing a road network”. Factors that influence stress levels include:-

- Road layout;
- Geometry;
- Surface riding characteristics;
- Junction frequency;
- Speed and flow per lane.

For drivers, these factors can cause a feeling of discomfort, annoyance, frustration or fear, resulting in physical and emotional tension. Frustration is caused on the A4 Annaghilla at present by a driver’s inability to travel at a constant speed as a result of road alignment, the volume of traffic, and slow moving vehicles, which in turn leads to unreliable journey times which further increases stress.

The results of the assessment found that drivers will experience a low level of stress on the existing road for the baseline assessment year of 2010, and low levels of stress in the Design Year 2025 (fifteen years after the year of opening) for the proposed road realignment.

## Disruption due to Construction

A major source of potential disruption due to construction will be traffic movements generated by the proposed scheme. These movements will arise from the transfer of personnel, plant and equipment to and from site; the undertaking of construction activities particularly the earthworks required for this scheme; and, the importation and disposal of construction and waste materials respectively. There will be traffic disruption on the A4 and on the adjacent local road network, resulting from construction activities undertaken at different stages throughout the construction works. There will also be disruption to the movements of pedestrians, cyclists and the local communities in the vicinity of the proposed scheme.

However, while these impacts cannot be avoided, they can be minimised through the development and implementation of an effective Traffic Management Plan, which will be an obligation on the contractor responsible for the works and subject to the approval of authorities including Roads Service and the PSNI. The Plan will have to take account of the A4’s status as a Key Transport Corridor, and, as such, reasonable measures will be required to be included to minimise the impact on traffic that wishes to utilise the existing route during the construction period.

Similarly, the Contractor will be obliged to consider the impact on access to adjacent properties during the course of the works and ongoing farming activities as part of a traffic management plan within the site.

Likewise, the Contractor will be obliged to adhere to other contractual working restraints, be they those included within the specific contract documentation, or complying with mandatory legislation. Before undertaking works in sensitive areas, for example, close to occupied properties, the contractor will have to develop method statements and undertake risk assessments, to evaluate the potential impacts and mitigate against them. For example, noise and vibration effects resulting from construction activities should be considered and either approved by the appropriate authority and/or checked against current legislation prior to commencing works.

### **Policies and Plans**

The proposed road alignment does not impact on any areas of planning zonings within the Dungannon and South Tyrone Area Plan 2010 or the Regional Development Strategy for Northern Ireland 2025. Nor is there any impact on development plan policy.

## **NON-TECHNICAL SUMMARY**

### **Introduction**

This is a non-technical summary of the Environmental Statement for the proposed realignment of the A5 at Tullyvar and draws attention to the most important issues and provides information on other significant topics. Any topic, which causes concern, can be followed in greater detail in the ES.

### **Project Description**

Between October 2003 and November 2004, route options for the A5 Tullyvar scheme were developed and assessed jointly by Mouchel Parkman and RPS Planning & Environment.

Two route options were identified for the Tullyvar scheme. Option 1 was essentially a straight line between the two bends in the road, on the north and south side of Tullyvar Hill. Option 2 also provided a straighter alignment but with took a more westerly route between the tie-in points to the existing road. Improvements on the line of the existing road were ruled out as being impractical to significantly improve the standard of the road.

The study considered two alternative routes and was based on three principle issues:-

- Engineering (such as road design and construction);
- Traffic and Economics (such as predicted traffic and project costing); and
- Environmental (such as impact on land, air, water environment).

The proposed scheme comprises the construction of 2.7 km of single carriageway road as shown in Figure 1.4.01-1.4.04.

Five at-grade priority junctions are included in the main link road, and one at-grade priority junction between side roads.

No bridges are required to carry the new road and realigned minor roads under and over significant existing features and infrastructure.

It is anticipated that the construction period will last for approximately 6 months and the contractor will be contractually bound by the mitigation measures set out in the Environmental Statement and by the assessment decision of the Planning Appeals Commission.

### **Pedestrians, Cyclists, Equestrians and Community Effects**

In terms of severance and journey length the proposed alignment aims to keep as many of the existing local roads open. The proposed alignment will result in little or no impact as a result of the rural landscape the route passes through and as the majority of existing roads will remain open.

The existing A5 not utilised by the proposed alignment will experience the greatest reduction in severance.

Cyclist and pedestrians can be subject to nuisances due to construction activities and the presence of works vehicles. Noise, mud and dust may also be a cause for annoyance.

## Land Use

This chapter considers the impact of the proposed scheme in terms of land use throughout the study area. The chapter focuses upon the impact upon private property (in terms of utilities), agricultural land and practice and the use of natural resources.

The study area is crossed by two Class A roads, the A4 Dungannon to Enniskillen Road and the A5 Omagh to Armagh Road. A disused railway line runs adjacent to the A5 Tullyvar Road.

The proposed route will not result in the demolition of any residential properties with 8 residential properties located within 50m of the proposed route. All steps will be taken to ensure that the impact on residential property is kept to a minimum.

The proposed route does not result in the demolition of any commercial property, nor are there any commercial properties located within 50m of the centreline of the proposed route.

### *Utilities*

This section outlines the impact upon the major utilities within the study area such as electricity, water, and telecommunications. Such services are present throughout the study area and the proposed route crosses numerous utilities. Construction will take place only after consultation with the relevant utility bodies in order to confirm location of utilities.

### *Natural Resources*

The prime impact upon natural resources in relation to the proposed development is in terms of material produced/utilised during the construction process. The proposed works upon the A4 will result in a cut/fill a deficit of 80,000m<sup>3</sup> (rounded to the nearest 10,000m<sup>3</sup>).

There are no designations which would restrict the excavation and/or removal of mineral materials from the study area as a result of construction.

If material is to be disposed of outside of the land take boundary, this will be done in accordance with the Waste and Contaminated Land Order (Northern Ireland) 1997.

### *Agricultural Land Classification*

The section assesses the potential impact of the proposed alignment of the A5 Tullyvar, on agricultural land quality. A detailed Agricultural Land Classification survey has therefore been undertaken along the proposed route alignment, using a Dutch combination hand auger to examine soil profiles at regular intervals along the route corridor. This soil survey information is then combined with other site and climatic factors in order to determine detailed ALC grading of the route corridor.

The following guidelines applied to determine the detailed ALC of the route include;

- MAFF Agricultural Land Classification of England and Wales *Revised guidelines and criteria for grading the quality of agricultural land*, Published in October 1988.
- Soils and Environment Northern Ireland 1997 JG Cruickshank.

Department of Agriculture and Rural Development has been consulted throughout the process of the ALC survey and detailed grading to ensure that the ALC guidelines used in Northern Ireland have been correctly applied to this route corridor.

### *Farm Holdings*

This section outlines the impact of the proposals on agricultural businesses within the study area. The proposals will have numerous impacts upon farm holdings including land take, severance, crop loss, disruption to water supplies etc. The section outlines the impacts upon

each affected farm holding with a total of 16 holdings suffering a direct permanent impact at local level.

## Ecology

The study area exists within a drumlin landscape of largely arable and improved grassland habitat. Drumlin valleys are marshy and seasonally inundated. Fields are predominantly pasture and are of irregular shapes and sizes, becoming smaller and more angular on steep slopes. Dense hedgerows enclose most fields. Throughout the area there are small conifer plantations and a small semi natural willow dominated woodland, although hedgerow trees are the predominant influence.

There is one designated ecological site within 5 km of the proposed route of the road; Glenmore Wood ASSI. No NATURA sites (Special Areas of Conservation–SACs, or Special Protection Area–SPAs) occur within 5 km of the proposed route of the road.

Sites of Local Nature Conservation Importance (SLNCI) are local designations within Northern Ireland, and derive from the Regional Development Strategy for Northern Ireland 2025 under SPG-Env 1.2. There are 4 SLNCIs which have a nature conservation interest within 5km of the route of the proposed road. These sites are listed in the Dungannon and South Tyrone Area Plan 2010.

There are no significant watercourses within the study area. The Tullyvar Drain feeds into the Ballygawley Water and eventually the River Blackwater.

The areas of ecological value may suffer negative impacts in a local context. There will be no direct impacts on any designated areas, and no impacts are significant.

Habitat disturbance in areas of ecological constraint will be strictly confined to within the direct land-take of the proposed route during construction work. New or replacement culverts will be installed to accommodate the passage of mammals (particularly otter) even during spate flow. It is also recommended that no removal of trees or hedgerows will occur within the bird breeding season (April-August inclusive).

## Geology and Soils

In Northern Ireland, geological and geomorphological features of national importance are designated as Areas of Special Scientific Interest. There are no such designations within the study area. The Earth Science Conservation Review (ESCR) is the means whereby geological sites in Northern Ireland are assessed to determine their importance to science and earth science conservation. There are no sites within the study area mentioned in the Earth Science Conservation Review.

The proposed realignment overlies the Clogher Valley, Ballyness and Carnteel Formations which date from the Carboniferous period 360-286 million years ago. The drift deposits along the route are predominantly bedrock deposits.

The proposed scheme predominantly travels over areas of Good Quality Land (Grade 3A), although areas of Very Good Quality (Grade 2) and Poor Quality (4B) will also be crossed. The soil types traversed by the proposed route include Brown Earths, Undifferentiated Organic Alluvium and Surface Water Gley Class 1.

Hydrogeology of the area is classified in terms of flow, productivity of aquifers and geology. The most frequently occurring type of flow is aquifers in which flow is dominantly fissures and other discontinuities. Furthermore, Aquifers are generally locally important aquifers in areas of Visean and Tournaisian Limestones and Shales. There are also vast areas of aquifers with limited potential or regions without significant groundwater in areas of Carboniferous Basal Clastics. Along the proposed realigned route, groundwater vulnerability is moderately permeable overlain by soils with low leaching potential.

The impacts of the proposed scheme on geology within the study area are indirect due to changes in hydrogeology. Soils within the study area will be directly affected due to excavation, removal of vegetation, and the use of heavy machinery. These can affect the properties of the soil including structure, texture, drainage, pH, organic content, and soil quality. The hydrogeology of the area could be impacted upon due to changes in water quality or pollution from human sources.

The mitigation measures recommend the need to vegetate bare soils and rocks, install appropriate drainage systems, and use specialist machinery to minimise damage to the soil.

## **Water Quality and Drainage**

There are six drainage ditches that meet with the existing road network, two of which cross under the existing road. There are several private water wells within the Tullyvar area. The wells may be bored wells, dug wells or surface springs. The wells can be further classified based on their depth, i.e. shallow and deep wells. The quantities extracted from wells are often small for private houses and somewhat more for agricultural holdings. There are two spring wells within 100m of the existing route.

The main surface water feature in the vicinity of the proposed Tullyvar realignment is a single unnamed stream north west of the study area. This first order stream flows north westerly where it enters the Ballygawley Water, a tributary of the River Blackwater. There are no small loughs located in the vicinity of this scheme.

Major construction projects such as roadway construction can lead to pollution of receiving waters. The main cause of contamination tends to be from solids but can also include pollution episodes from liquid cement and oil (diesel and lubricating oil for heavy vehicles).

The Scottish Environmental Protection Agency (SEPA, 1996) list the main sources of pollution from construction sites as follows:

- The discharge or entry into waters of contaminated site run-off or pumped contaminated surface/ground waters.
- Direct disturbance of the beds of rivers and streams by excavation or fording.
- Loss of oil from machinery or storage areas.
- Cement and cement wash from batching plants, storage areas and other areas where cement grout or concrete is being applied.
- Silty water can arise from de-watering excavations, exposed ground, stockpiles of soil, plant and wheel washing, site roads and disturbance of stream beds.

Mitigation at this stage will be directed at avoiding and minimising escape of sediment and soil into watercourses, regardless of their size as well as the prevention of oil or liquid cement spills from construction areas to waterways. The guideline limit value for suspended solids is usually 25 mg/l, which may inevitably be exceeded at times if mitigation is not in place. All oils and fuels will be stored in secure bunded areas and refuelling will not be carried out near watercourses. If the site works involve the discharge of drainage water to the river, temporary oil interceptor facilities should be installed and maintained.

The design construction and maintenance of the road drainage systems will follow the best practice guidelines described in SEPA (Scottish Environmental Protection Agency) Pollution Prevention Guidelines. The mitigation measures and the management of the site in accordance with the requirements of the relevant authorities will ensure that there are no significant impacts on surface waters in the vicinity of the proposed A4 Dualling.

## **Air Quality and Climate**

A study of existing air quality data, focussing on traffic and heating derived pollutants, was undertaken for the area of the proposed scheme. The results of this survey indicate that the air quality in the vicinity of the development is typical of rural air quality. There are no reported



exceedences in EU air quality limit values at the Department of Environment air quality monitoring stations in the vicinity of the proposed scheme.

The potential impacts of the proposed development on local air quality during the construction phase and operational phase were identified and appropriate mitigation measures suggested.

Computer modelling of predicted pollutant dispersion was performed with and without the scheme in place. The model predicts that there will be no exceedence of EU air quality limit values with or without the scheme in place in future years.

Providing recommended mitigation measures are undertaken, it is thought that the proposed scheme will have no significant negative impact on air quality in the area.

## **Noise Impact Assessment**

The traffic noise effects of the proposed route along Tullyvar have been assessed in accordance with the guidance given in the Design Manual for Roads and Bridges Volume 11, and the Calculation of Road Traffic Noise.

Road traffic noise predictions were undertaken to assess whether the re-distribution of traffic as a result of the proposed route would have a significant effect on traffic noise levels at nearby properties.

The predictions showed that traffic noise levels are predicted to decrease at properties in proximity to the existing Tullyvar Road, this is due to the significant diversion of traffic flows from the existing route through Tullyvar onto the proposed route. This would result in a significant benefit to properties along the existing route.

Where feasible the design of the route of the proposed bypass has incorporated traffic noise reduction measures such as earth mounding or cuttings, however there are a small number of isolated properties along the route alignment of the proposed route, where traffic noise levels are predicted to increase. Although generally traffic noise levels at these properties are predicted to remain below the threshold noise level of 68 dB(A). It is recommended that where properties would be exposed to traffic noise levels of above 68 dB(A), low noise road surfacing and/or the construction of noise barriers should be considered.

## **Landscape and Visual**

The existing landscape character of the study area has evolved as a result of previous glacial, geological and human impacts. This drumlin landscape is extensive and rises to high drumlins to the east such as Ivy Hill and Burnt Hill which offer long distance views over the lower lying ground below. The gently rolling landscape has a mixed agricultural use, generally dominated by pasture. Fields are surrounded by strong hedgerows and trees with occasional small blocks of woodland. Narrow winding lanes cross this landscape between the drumlins. Throughout the study area scattered residential development is visible in the landscape.

The prediction of impacts is in two parts. Firstly the impact on the surrounding landscape is assessed and then the visual impact for sensitive viewpoints is completed.

The distinctiveness of the landscape in the study area can be described using landscape character areas. The study area has been identified as containing both Lowland Drumlin Agricultural Landscape and Estate and Parkland Landscape. The impact of the proposed road scheme on the Lowland Drumlin Agricultural Landscape has been predicted as moderate negative. There will be no impact on the Estate and Parkland Landscape. As landscape planting along the road matures with time the road will become an integral landscape feature with a slight reduction in impact on the landscape.

There are a number of properties that will be impacted in terms of visual aspects. Due to the enclosed and undulating nature of the landscape within the study area, the views of the road from

properties are relatively restricted to a number of key locations along the route. The visual impact of the proposed scheme on all affected properties has been predicted.

Mitigation of these impacts will involve the physical and visual integration of the proposed road scheme and associated features into surrounding landscape and screening to minimise visual intrusion and to reduce any negative aspects regarding the visual impact of the road, road structures and traffic.

The proposed extensive woodland planting will conceal the majority of views within the agricultural landscape. Proposed hedgerow planting will integrate the road scheme into the existing patterns of the landscape. Loss of existing views will remain a significant impact to a few properties that are located near to the proposed road. In general the visual impacts will be reduced as the landscape planting matures.

## Archaeology

This section assesses the likely significant impacts of the proposed development on cultural heritage resources in the environs adjacent to the proposed route realignments for the area of Tullyvar located along and adjacent to the existing A5.

The methodology used for this study includes a comprehensive desktop review of all available data concerning the recorded cultural heritage of the area (including cartography) and an assessment of aerial photography of the route corridor. A walkover survey of the entire route was undertaken by two archaeologists and the area assessed in terms of landscape, land use, vegetation cover, presence or lack of archaeological sites and potential for further undetected archaeological sites/features.

In total, twelve recorded cultural heritage sites were identified within or adjacent to the proposed route corridor. These sites include those listed in the Sites and Monuments Record (archaeological); Historic Buildings and Industrial Heritage Sites. A number of built features and potential archaeological sites identified during field survey and cartography searches are also located within the environs of the proposed route corridor.

Direct impacts on features of cultural heritage significance were graded in terms of physical destruction (total/partial and potential for total/partial destruction). Indirect impacts constitute those that may potentially affect the context or setting of a particular cultural heritage site.

Best available techniques/methodologies are outlined for geophysical prospecting which can be applied to the existing environment. For areas of archaeological potential noted during field survey, a programme of centre line archaeological test trenching with 45° offsets every 20 m is proposed as a mitigation measure. An extensive programme of archaeological monitoring should take place during all ground disturbance associated with the proposed development along the entire route. This should be carried out by a suitably qualified archaeologist under licence from the Environment and Heritage Service of the Department of Environment (Northern Ireland) to record any archaeological deposits and to recover any artefacts.

The main impact findings of this study that require careful mitigation measures include:

- Care needed at ch. 1000.00 to observe whether milepost still extant at this location. If it is discovered, it will require relocation nearby in a safe position
- Careful routing of machinery during construction phase to avoid damage to recorded industrial sites
- Re-create stone gate piers at proposed new entrance gate to farmstead. Ensure buffer/embankment at this location to block views to/from the farmstead
- The level crossing (17447) was not located during field survey, however archaeological monitoring and recording at this location for any associated features/finds should be undertaken

## Vehicle Travellers

Under this heading the impacts on vehicle travellers were assessed, including impacts arising from the proposed scheme in terms of the view from the road and driver stress.

“View from the road” is defined in the DMRB as “the extent to which travellers, including drivers, are exposed to the different types of scenery through which a route passes”. The four categories considered whilst assessing travellers’ ability to see the surrounding landscape are:-

- (a) No view;
- (b) Restricted view;
- (c) Intermittent view;
- (d) Open view.

The findings were that in both the existing situation and for the proposed scheme drivers will experience a mix of restricted, intermittent and open views that do not adversely impact on the driving experience.

Driver stress is defined in the DMRB for environmental assessment purposes as the “adverse mental and physiological effects experienced by a driver traversing a road network”. Factors that influence stress levels include:-

- Road layout;
- Geometry;
- Surface riding characteristics;
- Junction frequency;
- Speed and flow per lane.

For drivers, these factors can cause a feeling of discomfort, annoyance, frustration or fear, resulting in physical and emotional tension. Frustration is caused on the A5 Tullyvar at present by a driver’s inability to travel at a constant speed as a result of road alignment, the volume of traffic, and slow moving vehicles, which in turn leads to unreliable journey times which further increases stress.

The results of the assessment found that while drivers will experience a moderate level of stress on the existing road for the baseline assessment year of 2010, drivers will experience only low levels of stress in the Design Year 2025 (fifteen years after the year of opening) for the proposed road realignment.

## Disruption due to Construction

A major source of potential disruption due to construction will be traffic movements generated by the proposed scheme. These movements will arise from the transfer of personnel, plant and equipment to and from site; the undertaking of construction activities particularly the earthworks required for this scheme; and, the importation and disposal of construction and waste materials respectively. There will be traffic disruption on the A5 and on the adjacent local road network, resulting from construction activities undertaken at different stages throughout the construction works. There will also be disruption to the movements of pedestrians, cyclists and the local communities in the vicinity of the proposed scheme.

However, while these impacts cannot be avoided, they can be minimised through the development and implementation of an effective Traffic Management Plan, which will be an obligation on the contractor responsible for the works and subject to the approval of authorities including Roads Service and the PSNI. The Plan will have to take account of the A5’s status as a Key Transport Corridor, and, as such, reasonable measures will be required to be included to minimise the impact on traffic that wishes to utilise the existing route during the construction period.

Similarly, the Contractor will be obliged to consider the impact on access to adjacent properties during the course of the works and ongoing farming activities as part of a traffic management plan within the site.

Likewise, the Contractor will be obliged to adhere to other contractual working restraints, be they those included within the specific contract documentation, or complying with mandatory legislation. Before undertaking works in sensitive areas, for example, close to occupied properties, the contractor will have to develop method statements and undertake risk assessments, to evaluate the potential impacts and mitigate against them. For example, noise and vibration effects resulting from construction activities should be considered and either approved by the appropriate authority and/or checked against current legislation prior to commencing works.

### **Policies and Plans**

The proposed road alignment does not impact on any areas of planning zonings within the Dungannon and South Tyrone Area Plan 2010 or the Regional Development Strategy for Northern Ireland 2025. Nor is there any impact on development plan policy.