



GALWAY COUNTY COUNCIL



Environmental Impact Statement

Volume 1

Non Technical Summary

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1 INTRODUCTION

This is the non technical summary of the information contained within the environmental impact statement (EIS) for the proposed N18 Oranmore to Gort scheme. The proposed N18 Oranmore to Gort scheme will form part of a new north/south national route in the West of Ireland. The route lies entirely in County Galway and extends from the townland of Rathmorrissety, approximately 8 km east of Oranmore, to the townland of Glenbrack, on the northern outskirts of Gort (See Figure 1.1).

This non technical summary is divided into the following three sections:

1. Introduction
2. Scheme description
3. Impacts of scheme & mitigation

The EIS has been prepared by McCarthy Hyder Tobin (MHT), on behalf of Galway County Council (GCC).

The EIS discusses in detail the existing environment, the environmental impacts arising from the proposed road development; and measures to mitigate adverse impact on each of the following topics:

- Human Beings (Socio Economics)
- Agriculture
- Ecology (Flora & Fauna)
- Soils (Geology & Hydrogeology)
- Water (Hydrology & Drainage)
- Air: Noise & Vibration
- Air Quality
- Climatic Factors
- Landscape
- Archaeological Heritage
- Architectural Heritage
- Cultural Heritage
- The Inter-Relationship Between the Above Factors

The assessment of impacts, the prediction of environmental effects and the proposed mitigation measures are based on preliminary (or specimen) design of the scheme as detailed in this Environmental Impact Statement (EIS). The preliminary design and the environmental mitigation measures will be refined and developed during the detailed design stage before construction (see Section 1.6 for details). This may result in some changes to the preliminary design as published in this EIS.

Generally, the detailed design will seek to develop the preliminary design in a manner such that it has no material change on environmental impacts of the scheme. Indeed, opportunities may be identified that may reduce the schemes impact. Stringent contract requirements and close supervision will ensure that the detailed design, including environmental mitigation measures will be of the required quality and that through the construction process this design will be translated into the final product.

1.1 REQUIREMENTS FOR AN EIS

The EIS has been prepared in accordance with the relevant National and European legislation relating both to roads and the need for the assessment of the effects of certain public and private projects on the environment. Relevant guidelines including the NRA Project Management Guidelines and the Environmental Protection Agency (EPA) Guidelines on Current Practice (in the preparation of environmental impact statements) have also been taken into consideration during the preparation of this EIS.

1.2 PUBLIC CONSULTATION

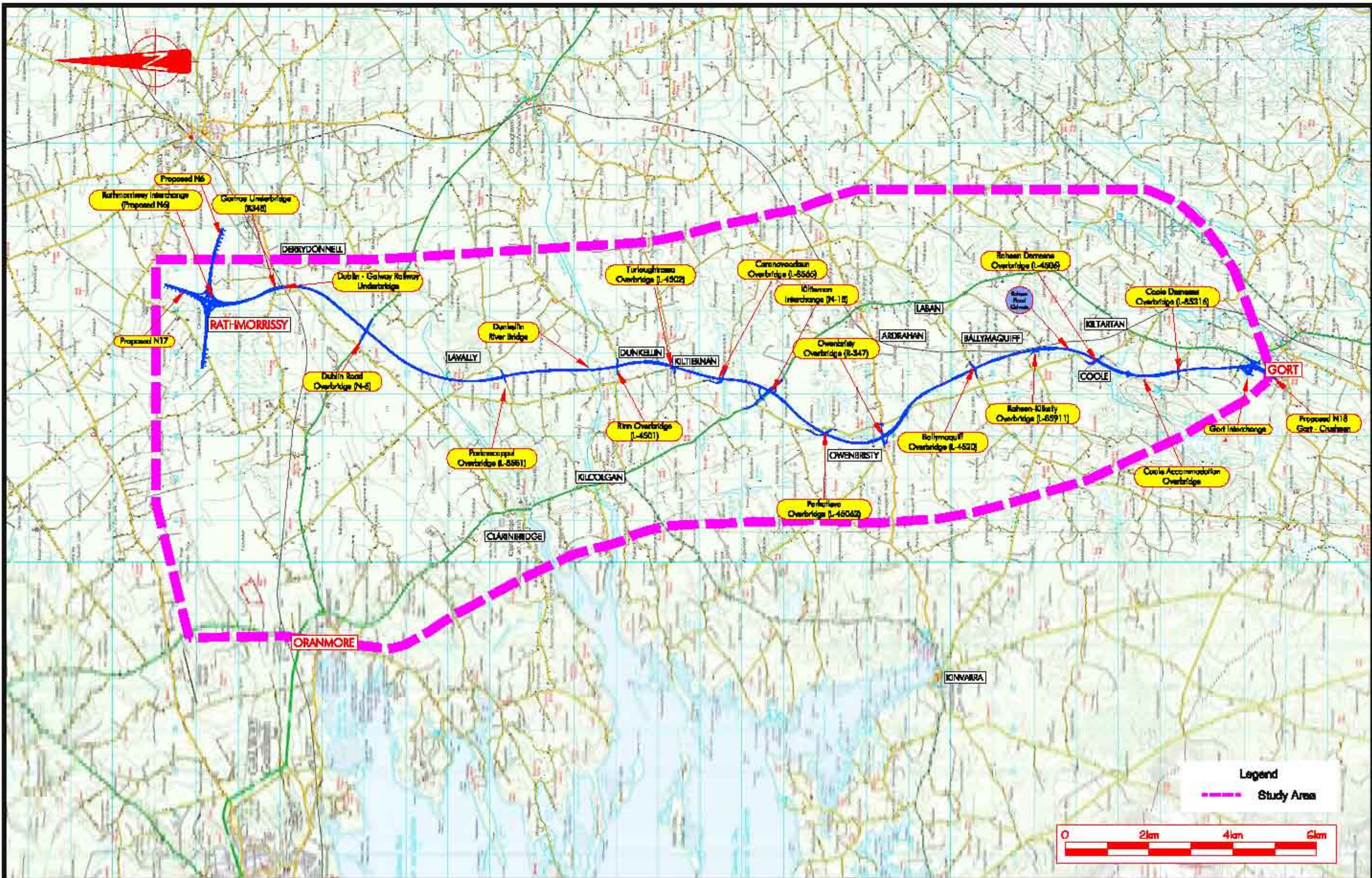
The EIS has been prepared following consultation with statutory and non-statutory bodies, as well as local interest groups and the public. Consultation has been conducted throughout all stages of the scheme, from the identification of environmental and engineering constraints to the selection of the preferred route option and the development of a specimen design (or preliminary design) of the proposed road.

1.3 NEED FOR UPGRADING

Improvement of the N18 between Galway and Gort to dual carriageway standard is recommended in the National Development Plan (2000 – 2006) and the National Road Authority's National Road Needs Study (1998). The scheme forms part of the Transport21 new north-south infrastructure improvements known nationally as the "Atlantic Corridor", which will stretch from Letterkenny/Lifford to Waterford via Sligo, Galway, Limerick and Cork.

The N18 Oranmore to Gort improvement will connect to the following national road improvement schemes:

- To the north, the N17 between Tuam and Galway, and the N6 between Galway and East Ballinasloe; and,



N18 ORANMORE TO GORT

Layout of
 Proposed Route

- To the south the N18 between Gort and Crusheen.

1.3.1 BACKGROUND TO ROAD SAFETY- TRAFFIC ACCIDENTS

Accident data for the N18 was obtained and analysed for the five years 2000 - 2004 inclusive to establish the safety record of the existing road. The analysis shows that the accidents were distributed along the entire length of the N18 with clusters located in villages and close to junctions.

From a total of 70 accidents that were fatal, serious and minor injury from 2000 – 2004:

- 2 were fatalities (3% of total);
- 17 were serious (24% of total); and,
- 51 were minor injury (73% of total).

1.3.2 ROAD NETWORK AND TRAFFIC FLOWS

In the design year 2030, the existing N18 north of Kilcolgan is expected to carry 21,400 vehicles per day without the proposed road in place, this will reduce to 3,900 if the road is constructed. Similarly, the traffic on the existing N18 from Kilcolgan to Ardrahan will reduce from 15,100 to less than 1500 vehicles per day, and the traffic on the existing N18 north of Gort will reduce from 21,700 to less than 1500 vehicles per day. The only traffic that is expected to continue to use the existing N18 will be traffic making local journeys. Forecast traffic flows, in average number of vehicles per day (AADT), are summarised in Table 1.1.

Table 1.1 Traffic flow rates Annual Average Daily Traffic (AADT).

Location	Average number of vehicles per day (AADT)			
	2010 (opening year) – Existing Conditions	2010 (opening year) – New Road Constructed	2030 (Design year) – Existing Conditions	2030 (Design year) – New Road Constructed
Existing N18: Oranmore to Kilcolgan	15,700	3,300	21,400	3,900
Existing N18: Kilcolgan to Kiltiernan	11,100	<1500	15,100	<1500
Existing N18: Kiltiernan to Ardrahan	11,100	<1500	15,100	<1500
Existing N18: Ardrahan to Gort	15,900	<1500	21,700	<1500
Proposed N18: Rathmorrissey to Kiltiernan	-	19,600	-	26,800
Proposed N18: Kiltiernan to Gort	-	16,800	-	22,900

1.4 PLANNING

The proposed N18 scheme is in accordance with the relevant national and local planning strategies. This includes the National Development Plan; National Spatial Strategy; Department of Transport – Statement of Strategy, 2003 – 2005; The National Sustainable Development Policy; Border, Midland and Western Region (Development Strategy 2000 – 2006); and Galway County Council County Development Plan.

1.5 PRE-EIS ENVIRONMENTAL STUDIES

Environmental and Engineering studies for the proposed N18 have been on-going since April 2000. The Constraints Report (issued in June 2001) documented the main restrictions and limitations within a broad study area between Oranmore and Gort.

Following completion of the Constraints Report, six route corridors were ultimately chosen so as to avoid these main constraints. The Route Selection Report assessed these six route corridors in detail (in terms of environmental and engineering considerations) and chose the Preferred Route. The Preferred Route was modified to incorporate: a) comments following the September 2001 public consultation and b) improvements resulting from the ongoing assessment of local severance and accommodation-work issues.

1.6 SPECIMEN DESIGN AND DETAIL DESIGN

The detail design for the N18 scheme will be completed during the next stage of the project. The final design may vary from the proposals set out in the EIS. The design presented in the EIS is therefore referred to as the Specimen Design. The Specimen Design forms the basis for the statutory procedures for the scheme including identification of land requirements and production of an EIS. Findings from environmental specialists reports will be incorporated, as will any commitments agreed at a possible future oral hearing, and the specimen design will form the basis for the Galway County Council's requirements for the detail design and ultimately construction stages of the project.

Generally, the detailed design will seek to develop the specimen design in a manner such that it has no material change on environmental impacts of the scheme. Indeed, opportunities may be identified that may reduce the schemes impact. Stringent contract requirements and close supervision will ensure that the detailed design, including environmental mitigation measures will be of the required quality and that through the construction process this design will be translated into the final product.

Locations along the specimen design are referred to as Chainage points (Ch) and refer to the measured distance in metres from the start of the scheme. For the N18 Oranmore to Gort scheme,

the start of the scheme (Ch 0) is located at the proposed Rathmorrissey Interchange and the chainage increases southwards down the scheme. For example – Ch 2500 refers to a point 2500 metres along the proposed road, south of the starting point at the proposed Rathmorrissey Interchange.

2 SCHEME DESCRIPTION

The N18 has been designed for the years 2010 to 2030. The proposed N18 road improvement scheme is a 27.7 km long by 26 metre wide route which stretches from Rathmorrissey (approximately 8 km east of Oranmore) to the townland of Glenbrack (on the northern outskirts of Gort). The proposed N18 specimen design is for a standard dual carriageway with interchanges proposed at: Rathmorrissey, Kiltiernan and Gort. Three road closures are proposed (with alternative access provided). The N18 road project will require a total of approximately 240 hectares of land. The scheme includes:

- Three interchanges (Rathmorrissey, Kiltiernan, Gort)
- Nineteen road bridges
- Two river bridges (over the Clarinbridge and Dunkellin Rivers)
- One railway bridge
- Four accommodation bridges
- Four accommodation underpasses

In order to construct the road, four residential properties will need to be acquired and demolished.

Road Type

The proposed route for the N18 Oranmore to Gort Road scheme is 27.7 km long standard dual carriageway with a typical total width (verge to verge) of 26 metres. The speed limit for the proposed road will be 100 kilometres per hour although the Design Speed will be 120 kilometres per hour and the design standards will be those described in the DMRB (see Figure 2.1 below.)

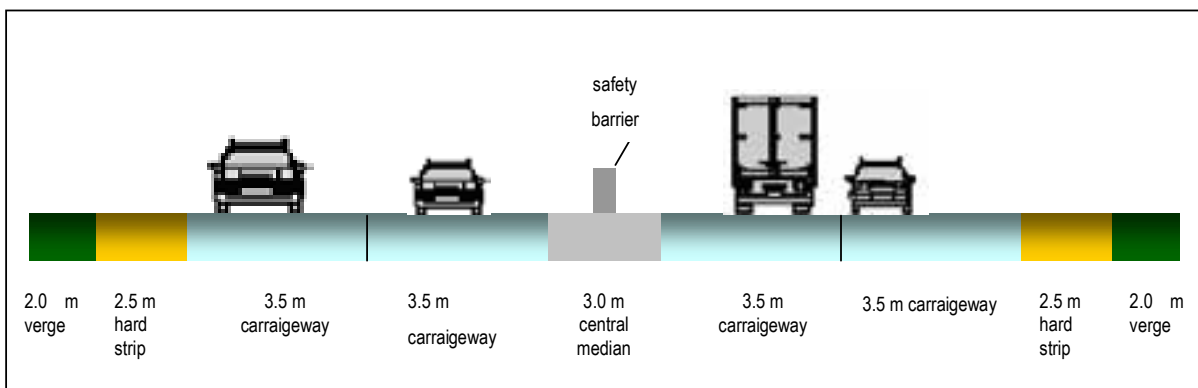


Figure 2.1: Standard Dual carriageway design in accordance with NRA (NRA TD27/00 DMRB)

2.1 JUNCTIONS

The interchange at Rathmorrissety provides (ultimately) for movement between the three proposed N6, N17 & N18. Therefore the Rathmorrissety interchange will not include a direct link to the local road network (i.e. the existing N6 and R348 etc). The nearest link between this proposed scheme and the existing local road network, at this location, will be via the proposed N6 and its proposed interchange at Athenry.

There are two further interchanges proposed (at Kiltiernan and Gort) where access can be obtained between the proposed N18 road and the local road network.

There are no other proposed junctions on along this scheme, in order to maximise road safety, capacity and free flow of traffic along the proposed road.

2.2 ROAD CLOSURES

The scheme crosses 16 no. public roads. To minimise community severance, road closures have been kept to a minimum. In most cases, the existing road will be brought on a bridge over the proposed dual carriageway. Two public road closures are proposed however alternative access will be provided via diversions as follows:

- The local tertiary road (L8572) at Lavally at Ch 6950. Alternative access can be gained via the Local tertiary road (L8581) at Parknacappul at Ch 8000 and;
- The local tertiary road (L-85311), the N18 to Glenbrack Road, at Ch 26,850 is proposed to be closed. Traffic travelling to and from Glenbrack and Gort will be diverted onto the Gort interchange.

2.3 DRAINAGE

The objectives of the road drainage system are the:

- speedy removal of surface water from running carriageway areas
- minimisation of the risks of pollution and flooding of receiving watercourses
- removal of sub-surface water to protect pavements and associated earthworks.

Surface water runoff from the highway will discharge both into existing watercourses or to ground.

Sustainable Drainage Systems (SuDS) will be used wherever possible to minimise the environmental impact of the highway drainage system. SuDS mimic the processes that occur in nature and help to both minimise pollution and attenuate stormwater runoff. The road will be drained using “swales” (which are grassed lined channels designed to drain water from an area and control the flow and quality of the surface water) which channel the surface runoff to attenuation ponds which then discharge to surface water.

2.4 ALIGNMENT

The proposed development is for a 27.7km long road stretching between the townland of Rathmorrissey in the north to Glenbrack, near Gort, in the south. There are three interchanges proposed along the project road at the northern and southern ends at Rathmorrissey and Gort and approximately half way along the proposed road at Kiltiernan. The proposed road comprises a standard dual carriageway cross section and will have an overall width including earthworks of approximately 40-50m. Four properties are to be acquired as part of this development: at Ch 10,700; Ch 14,400; Ch 15,900 Ch 23,350.

2.4.1 HORIZONTAL ALIGNMENT

The route starts, at the northern end, at the proposed N6/N17/N18 interchange location at Rathmorrissey, approximately 4km west of Athenry. Following a south easterly alignment, it crosses the regional road to Athenry (the R348) at Ch1800 and the Dublin to Galway railway line at Ch 2,000. After Ch 2,000 the road gently changes to a southwestern direction and crosses the existing Dublin-Galway road (the N6) at Ch 4,300. The road continues in a south westerly direction before crosses the Clarinbridge river at Ch 6,500 before turning to follow a southerly alignment.

At Ch 7,000, the proposed road intersects the L8572 local road at Lavally resulting in the first of two road closures along the proposed road. Approximately 1km further south, the proposed road intersects the L8581 local road at Parknacappul. Here, the L8581 is accommodated on an Overbridge over the proposed road, providing an alternative access for the closed L8572 at Lavally.

The route continues to follow southerly alignment passing 3-4km east of the villages of Clarinbridge and Kilcolgan before crossing the Dunkellin River (at Ch 10,000), the L4501 at Rinn (at Ch 10,650), the L4502 at Turloughtrassa (at Ch 12,100) and the L8565 at Caranavoodaun (at Ch 13,200); all three of which are accommodated by overbridges.

The proposed road then continues in a south westerly direction before crossing the N18 (at Ch 14,400) approximately 4km south of Kilcolgan. Close to the crossing point of the existing N18, it is

proposed to locate the second junction on the proposed road, a compact grade separated junction at Kiltiernan.

South of the proposed Kiltiernan Interchange, the proposed road crosses the L45062 at Parkatleva (at Ch 15,900) before turning to the east at Owenbristy to follow an alignment to the south-east. The existing L45062 is accommodated on an Overbridge at Ch 16,100. The road crosses the R347 Ardrahan – Kinvara road (at Ch 17,500), approximately 6km west of Kinvara, before continuing to the south east crossing the L45062 for a second time at Ch 18,250. Here the R347 is accommodated on an Overbridge while the L45062 is diverted on a re-alignment to meet the R347 at a priority junction west of the proposed Overbridge.

At Ch 20,300, the proposed road crosses the L4520 at Ballymaquiff (accommodated by an Overbridge) before turning to the south to follow an alignment parallel and approximately 30m to the west of the Galway to Limerick railway line for a distance of 700m between Ch 21,400 to 22,100. At Ch 21,800 the proposed road intersects the L85911 at Raheen Kilkelly, the side road being accommodated on an Overbridge.

Now turning away from the railway line and heading in a south westerly direction, the proposed road crosses the L4506 at Raheen Demesne at Ch 23,300 before heading south to follow an alignment parallel to the eastern boundary of Coole Park.

The road is closest to Coole Park at Ch 24,320 where it is within 50m from the park boundary, but then moves away from the park as it changes direction to the south-east. The road will be 250 m from the entrance to Coole Park as it crosses Coole Avenue (L85316) which is accommodated by an Overbridge at Ch 25,400. By Ch 26,800, the proposed road is over 1km east of the closest point of Coole Park.

The second and final road closure is located at Glenbrack where the existing L85311 is severed and closed at Ch 26850.

The road terminates at the proposed interchange location immediately north of Gort, at Ch 27,700.

2.4.2 VERTICAL ALIGNMENT

In order to ensure the natural conduits and aquifers within the karst system are impacted as little as possible, there is a general requirement for the proposed road to be at grade or on embankment with very little opportunity to place the road in cutting.

The highest embankment on the entire length of the road is at Ch 0 where the route ties in with the proposed new N6 at the N6/N18 interchange. Here, the mainline for the N18/N17 is on an embankment up to 12.5m high where it “flies over” the intersection.

The embankment height quickly reduces as the road heads south of the interchange until by Ch 900 where it is at grade or in shallow cutting from Ch 950 to Ch 1,400. From Ch 1,400 to Ch 2,500, the road rises again on embankment to pass over the R348 and the Galway-Dublin railway.

South of the railway crossing, the road is either at grade / on low embankment up to Ch 6,500 where it crosses the Clarinbridge River. South of the river the road remains on low embankment up to Ch 7,250 where the road enters the first significant cut (up to 5m depth) at Parknacappul.

The road emerges from the cutting at Ch. 8,100 and returns again to a low embankment between Ch 8,100 – 8,650 where it again goes into a cut up to 5m deep at Roevehagh. At Ch 9,250 the road emerges from the cut and remains on embankment as it crosses the Dunkellin River and flood plain as far as Ch 10,350. The road passes into a shallow cutting between Ch 10,350 – 10,900 before returning on embankment between Ch 10,900 – 11,300.

At Ch 11,300, the road enters the deepest cutting along its entire length of up to 10m depth. Emerging at Ch 12,000 at Turloughtrassa, the road then remains roughly at grade, in shallow cutting or low embankment for a distance of nearly 5km passing through the townlands of Caranavoodaun, Kiltiernan East, Kiltiernan, Parkatleva.

At Ch 16,900, the road goes onto an embankment for 700m until Ch 17,600 then into a shallow cutting until Ch 17,950 until once again returning to being at grade or on a low embankment or shallow cutting through the townlands of Owenbristy, Cullenagh More East, Drumharsna South and Ballyglass West until Ch 20,700 at Ballymaquiff. Here the road goes onto an embankment up to 8m high as it passes over a local depression until Ch 21,200 where it returns to being at grade.

At Raheen Kilkelly, the road passes into a cutting for a distance of 0.7km until returning to a low embankment over a local area prone to flooding at Raheen Demesne between Ch 22,500 and 22,900. South of Ch 22,900 the road enters a cutting along a ridge adjacent and to the east of Coole Park for a distance of 3km before emerging at grade north of the proposed Gort Interchange. On the approach to Gort Interchange, the road passes through several areas of low depressions where the road is on embankment until Ch 27,700 where it ties in with the proposed N18 Gort to Crusheen Scheme.

3 IMPACTS OF SCHEME & MITIGATION

3.1 HUMAN BEINGS (SOCIO ECONOMICS)

Do Nothing scenario

With a Do Nothing scenario, it is envisaged that the community will continue to experience a lessening of residential amenity with increasing traffic volumes. Employment potential in the study area and environs will be threatened and the tourism and amenity potential will similarly be compromised. Consequently the likely impact of a Do Nothing scenario will be **significant and negative**.

Construction phase impacts

Construction phase impacts on residences will vary according to their proximity to the proposed N18 and associated works. Impacts resulting from associated works such as the construction of under and over-bridges, interchanges and adjacent works will likely be greater than elsewhere along the route. Impacts will range from slight to significant, according to the proximity of the dwelling house to the development.

Additionally there will be an impact on those residences in close proximity to proposed upgrades of existing National, Regional and County roads that will cross or be crossed by the proposed N18, as well as those in proximity to proposed interchanges. The impact on these residences will generally be slight to significant where the residences are less than 200m from the proposed development.

Overall, as the construction phase will be relatively short-term it is anticipated that in general there will be a slight to moderate negative impact on dwelling houses less than 200m from the proposed road.

Operational Phase Impacts

The impact of the Operational Phase on Human Beings has been examined in terms of Access. There will be **significant positive impact** on the residential amenity of the majority of the dwelling houses within the Study Area located adjacent to the existing N18 as a result of traffic displacement from this road to the proposed N18 once the development is operational. This will result mainly from reduced traffic flows, consequent reduced noise levels and increased road safety along this road.

There will be **slight and negative impacts** during the operational phase, on a number of residences within 200m of crossing points of existing roads on the proposed N18, as well as proposed accommodation roads and the 3 no. interchanges.

Overall it is envisaged that there will be a **significant positive impact** on the visitor numbers to Coole Park as a result of better infrastructure to and within the West Region and the shorter journey times from the Region to Shannon Airport which will attract more tourists to the Region in general.

Mitigation

Directional signs at the proposed Gort and Kiltiernan Interchanges shall include signage to ensure that the correct route is taken by visitors and locals alike onto the existing N18 so that the tourist attractions (Coole Park, Thoor-Ballylee and Kiltartan Museum) can then be accessed easily. It is proposed that this signage should be supplemented by additional signage along the existing N18 close to the said attractions. It is considered that there should be more effective grouped signage leading to all three attractions to attract more visitors to all three, rather than to any one tourist attraction in isolation.

Effective signage on the Kiltiernan and Gort Interchanges is required to alert passing motorists to the exit for the towns and villages of Gort, Laban, Ardrahan, Kilcolgan and Clarinbridge and their associated services and facilities which can be accessed via the existing N18.

The erection of Site Hoardings is required at certain sensitive locations to minimise visual impact and disturbance from construction work. The construction phase will be programmed and set within specific working time. The flow of traffic will be maintained to avoid congestion along existing routes in the construction of overbridges, underbridges, interchanges and upgrading of existing national, regional and county roads.

3.2 AGRICULTURE

Philip Farrelly & Company carried out an agricultural impact assessment on the construction of the N18 Oranmore to Gort route, during October to November 2003 and February to March 2006. The proposed route will affect a total of 113 farms.

The preferred route is approximately 27.6km in length and the area to be removed from agricultural production is approximately 225Ha. The topography is generally flat to undulating lowland with mainly dry mineral soils, which have a limited use range. Grassland is the primary landuse in the area through which the proposed route passes.

Of the 113 farms assessed, there are 3 farms on which the overall impact would be described as severe. On 37 farms, the overall impact would be major. On 44 farms, the impact would be described as moderate. The impact on 24 farms would be described as minor. On 5 farms, the impact would be described as not significant. Dairy farms and other livestock farms where stock

have to be moved on a daily basis will be most severely affected by developments that sever the farm. Farms where equine stock are present are also of concern. Dry-stock enterprises (e.g. beef, sheep) are less severely impacted than dairy farms. Tillage farms are less severely impacted than dairy or beef farms. In all cases mitigation measures are possible, which will reduce the impact.

A total of 51 out of the 140 land parcels assessed will require access to severed areas. The extent and complexity of such facilities varies with each farm depending on the nature of the impact and the type of enterprise being carried out. There are also 53 land parcels on which affected access points or gates will have to be replaced. The main impacts on agricultural activity during the construction phase of the new road will be:

- Disturbance
- Temporary Diversions
- Restricted access to severed land portions
- Noise and Dust

In all cases mitigation measures are possible, which will reduce the impact of the above. Following recommended mitigation works the residual impact of the proposed road resulted in 2 farms with a severe impact, 5 farms with a major impact, 71 farms with a moderate impact, 24 farms with a minor impact and 11 farms where there would not be a significant impact.

The impacts of this scheme upon agriculture, while significant to individual farmers, are not significant on a county or national level.

3.3 ECOLOGY (FLORA & FAUNA)

Impacts

Impacts of the scheme on the surrounding ecological environment is presented as a) direct impacts which are measured in terms of area of habitat lost and b) indirect impacts which are impacts on the scheme such as alteration of groundwater flow, which may have a knock-on effect on habitats such as turloughs or species such as barriers to mammal passage. There will be no direct impacts on any designated conservation areas. There will be direct impacts on eleven ecological areas, of which three are severe negative impacts and eight are major. The total area of semi-natural habitat removed along the scheme is 29.4 hectares; of this 11.6ha are considered habitat of high ecological value. In total, 13.2km of hedgerow will be removed, 3.6km of treeline and 6.5km of stone wall. One area where a rare plant has been found will be affected. Impacts on fauna are more difficult to quantify. There will be some impacts on birds, which are of minor to moderate significance. Moderate to major impacts are predicted on bats through the loss of roost sites, feeding areas and

flight paths. The road will have a potential barrier effect on other mammals such as otter, pine marten and badgers, as well as fragmentation of their territories and loss of breeding sites.

Impacts on watercourses will be mainly temporary, during the construction of clear span bridges over the two main rivers. These impacts will be minor provided mitigation is put in place to minimise siltation and habitat loss. Impacts on groundwater are dealt with in the Hydrogeology Section (chapter 7), based on this chapter there will be no significant impact on groundwater regimes that could have indirect impacts on wetlands such as turloughs.

Construction impacts will include mainly siltation and other forms of pollution, which could potentially impact on surface or groundwater, Habitat loss within the construction site compounds will be temporary and of minor significance. The locations of these compounds have been subject to an ecological assessment to ensure minimal impact on semi-natural habitats. The overall construction impacts will be minor to moderate, provided mitigation is put in place.

Mitigation

Mitigation by avoidance,

During the EIS process, sections of the route were realigned to avoid sensitive areas, notably Roevagh limestone pavement. Seasonal restrictions will avoid impacts on certain species of birds, fish and all bats and badgers during the breeding season. Licenses will be required for the exclusion of certain species.

Mitigation by reduction

A detailed method statement outlining measures to control siltation and pollution will be drawn up by contractor in consultation with statutory bodies in advance of construction works. Habitat loss will be reduced by delimiting the limit of site works. Where impacts on certain fauna are unavoidable, a series of measures will be required to minimise the damage, such as exclusion procedures and the installation of alternative bat roosts prior to any works. Of particular note is the construction of a 'green bridge' to provide an alternative commuting route for the lesser horseshoe bat from a roosting site in Kiltartan Cave to feeding grounds in Coole Park.

Mitigation by remedy

There will be no compensation for the loss of some sensitive habitats such as turloughs and limestone pavement as it is not possible to recreate these habitats. Some portions of land will be acquired and used as compensatory habitat to accommodate specific plant species translocated from other affected areas. Native species will be used. Where species-rich grassland is to be removed, soils and sods will be salvaged and reinstated along road embankments if appropriate.

Conclusion and Residual Impacts

The proposed N18 road will traverse an ecologically very sensitive area that includes habitats of international importance, such as limestone pavement and turloughs. There will be no direct or indirect impacts on designated conservation areas. The construction methodology will ensure there is no significant alteration to the groundwater flow. There will be a residual impact due to the loss of 11.6ha of high value habitats within the CPO line, however acquisition of severed land parcels will help to offset this impact.

3.4 SOILS (GEOLOGY & HYDROGEOLOGY)

Introduction

Chapter 7 of the EIS assesses the possible mechanisms and subsequent impacts of the proposed road scheme on the geological and hydrogeological environment of the area. The proposed route of the Gort and Oranmore N18 passes over limestone rocks that contain significant quantities of water. This groundwater is important as it supports ecological sites and water supplies in the area.

Methodology

Due to the sensitive nature of the area, a series of investigations and surveys have been undertaken to understand the importance of groundwater and to identify groundwater features that may be affected by the road. This work has involved desk studies, reviews of published data, and a series of extensive ground investigations. Potential impacts have been identified and the severity of likely impacts assessed.

Description of the Existing Environment

The geology in the area generally consists of the following sequence of strata:

Variable thickness of Glacial Till exist at the surface, ranging from 0 to over 12m in thickness. The Glacial Till is comprised of silty, sandy and gravelly clay and does not contain significant quantities of groundwater.

The Glacial Till is underlain by variable thicknesses of heavily Weathered Limestone. This can vary in thickness from less than 1m to over 20m and is capable of holding significant quantities of groundwater.

Beneath the Weathered Limestone are significant thicknesses (over 20m) of Competent Limestone. The Competent Limestone is not capable of holding large quantities of groundwater except where conduits exist.

The limestone in the area is characterised by karstic features. The features consist of variably sized caves, conduits, springs and swallow holes. Groundwater typically moves very rapidly through such features. Groundwater within karstic limestone is vulnerable to contamination from surface activities due to the rapid flow rates. Karstification is more prevalent in certain parts of the route. This is believed to be due to the nature of the different limestone formations.

Groundwater movement is through both relatively shallow, heavily Weathered Limestone and deeper discrete conduits within the Competent Limestone. The Glacial Till does not contain significant quantities of water.

Description of Impacts

Indirect and Operational impacts have been assessed on the basis that they present the most significant long term environmental risk. Where necessary, direct impacts have also been considered. The assessment indicates that there will be no significant indirect impacts on designated ecological sites. However, the water levels in one 'Key' ecological area may be affected. Nine groundwater supplies have been identified as being at risk of reduced water level or possible contamination. Where necessary these supplies will be monitored during construction and operation and if necessary new supplies sourced. Direct impacts on ecological areas have been assessed in Chapter 6.

Road runoff can contain contaminants derived from vehicles using the road or accidental spills. These could adversely affect groundwater quality and groundwater supported features. Where possible, run off from the road will be discharged to surface watercourses. However, due to the karstic nature of the limestone, surface watercourses are scarce and seventeen attenuation ponds along the route will be used to discharge water to ground. Such drainage systems will be designed to reduce contamination levels prior to discharge to ground through the use of swales, attenuation ponds and interceptors. The drainage will be appropriately designed to contain spillages so that remediation can be undertaken before the contaminants enter the wider environment.

Conclusions and Residual Impacts

The route of the N18 passes over Major Aquifers that are extremely vulnerable to adverse impacts on both the quality and quantity of water they contain. The groundwater in turn supports a number of receptors including designated and non - designated ecological sites and groundwater supplies.

The route of the road has been carefully selected to minimise as far as possible direct impacts on any of the above receptors. In fact, no water supplies or designated ecological areas will be directly affected by the proposals. However, there is a risk a number of receptors could be indirectly affected.

In spite of mitigation measures the following residual impacts are possible: reduction of water level within Key Ecological Area 4 and possible adverse effects on nine domestic groundwater supplies. In addition, three areas of limestone pavement will be directly impacted by the road.

3.5 WATER (HYDROLOGY & DRAINAGE)

Road drainage discharges: Impacts and Mitigation

The impacts of 16 proposed drainage outfalls have been assessed with respect to their effect on the receiving watercourses and groundwater. Attenuation will be provided for all of these outfalls to mitigate against water level and flow increases. Therefore, no appreciable impacts on peak flood levels within the Dunkellin or Clarinbridge Rivers are anticipated as a result of the proposed road discharges.

In order to minimise pollution, runoff from the road would be drained to attenuation ponds before discharging into receiving waterbodies. The primary function of these attenuation ponds is to detain road runoff and to facilitate pollutant-removal through settling and biological uptake. If accidental spillage were to occur on the road, isolation of the relevant attenuation pond could be effected by manually shutting off the outfall. Operations Staff would empty the polluted drainage system by tankering away and suitably disposing of its contents.

The ponds will also provide attenuation, thus minimising flooding. The use of oil/petrol interceptors and swales will also help to minimise the effects of road runoff on water quality.

Surface Water Hydrology: Impacts and Mitigation

The Clarinbridge River crossing will have a single span crossing the river and proposed accommodation roads on both sides of the river. The river itself is an artificially created drainage channel that takes the form of a 4m – 5m deep ditch at the crossing point location. During the summer months, the river channel is often completely dry. The Clarinbridge River crossing is not expected to have any adverse impacts on the hydrology of the Clarinbridge River.

The Dunkellin River crossing is to have a central span which will cross the entire channel with clearance for channel maintenance on each bank between the channel and the bridge piers. There

will be a further side span on each side of the main span to facilitate the passage of flood flows. The crossing is expected to cause an increase in upstream water levels of approximately 10mm at the 100 year flow. This is expected to decrease to nothing within 500m upstream and will not affect the Rahasane Turlough. This is considered to be a minimal impact.

3.6 AIR: NOISE & VIBRATION

Impacts

A variety of items of plant will be in use, such as excavators, lifting equipment, dumper trucks, compressors and generators. It is also possible that rock breaking may be required on occasions and there will be vehicular movements to and from the site that will make use of existing roads.

Due to the nature of the activities undertaken on a large construction site, there is potential for temporary generation of significant levels of noise. This is particularly relevant in the case of the proposed N18 Oranmore to Gort scheme since the significant volume of imported material required to construct the road will itself temporarily generate high volumes of traffic during the construction period. The flow of vehicular traffic to and from a construction site is also a potential source of relatively high noise levels.

Due to the fact that the construction programme has been established in outline form only, it is not possible to calculate the actual magnitude of noise emissions to the local environment. However, the impact due to construction activities will be transient in nature.

Mitigation

The NRA guidance document specifies noise levels that it typically deems acceptable in terms of construction noise. These limits are set out in Table 1.2. Note that these values are indicative only; it may be appropriate to apply more stringent limits in areas where pre-existing noise levels are low.

Table 1.2 Maximum Permissible Noise Levels at the Façade of Nearby Dwellings During Construction

Days & Times	$L_{Aeq(1hr)}$ dB	L_{Amax} dB(A)
Monday to Friday 07:00 to 19:00hrs	70	80
Monday to Friday 19:00 to 22:00hrs	60	65
Saturday 08:00 to 16:30hrs	65	75
Sundays and Bank Holidays 08:00 to 16:30hrs	60	65

- The Contractor undertaking the construction of the works will take specific noise abatement measures and comply with the recommendations of BS 5228: Part 1 and the *European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001*.

Normal working times will be 07:00 to 19:00hrs Monday to Saturday. Works, other than the pumping out of excavations, security and emergency works, will not be undertaken at night and on Sundays without the written permission of the Contracting Authority. Night is defined as 19:00 to 07:00hrs.

The NRA Guidelines recommend that in order to ensure that there is no potential for vibration damage during construction, vibration from construction activities be limited to the values set out in Table 1.3.

Table 1.3 Allowable Vibration Levels During Construction Phase

Allowable vibration velocity (Peak Particle Velocity) at the closest part of any sensitive property to the source of vibration, at a frequency of		
Less than 10Hz	10 to 50Hz	50 to 100Hz (and above)
8 mm/s	12.5 mm/s	20 mm/s

Mitigation measures are not required in respect of the operational phase.

3.7 AIR QUALITY

Impacts and Mitigation

Dust arising from construction activities without mitigation measures in place was initially determined to have a major impact on one local property within 50m of the proposed scheme. However, the limited duration at any one location and with the implementation of suitable mitigation measures, the impact of construction dust will be reduced to minor or negligible.

The air quality of the existing N18 and surrounding road network (2005) has been assessed, as well as the Do Nothing and Do Something scenarios for the proposed scheme in the opening year (2010).

Current local air quality along the existing N18 for the baseline year (2005) is predicted not to exceed any of the Limit Values defined in the Air Quality Standard Regulations (AQSR) at 23 selected individual receptor locations. The Limit Value for PM10 in the base year is 40µg/m³; this decreases in the opening year (2010) to 20µg/m³. As a result nearly all receptors in the opening year (Do Nothing and Do Something) scenarios have PM10 levels that will exceed the Limit Values, although overall PM10 concentrations will improve from the base year.

The local air quality assessment demonstrates that predicted concentrations for the Do Nothing and Do Something for the opening year (2010) do not exceed their AQSR Limit Values for all pollutants except PM10 at 23 individual receptor locations. The dominant source of PM10 concentrations predicted for both the Do Nothing and Do Something scenarios in 2010 is from background sources, rather than the road contributions.

For key traffic related pollutant, NO₂, predicted concentrations are well below their annual average AQSR Limit Values for the baseline, Do Nothing and Do Something scenarios. Comparative to the base year, concentrations are predicted to decrease in the opening year for the Do Nothing and Do Something scenarios.

Conclusions

The generalised air quality assessment indicates that there will be an overall improvement in air quality following the development of the scheme. There will be 1,348 properties which experience an improvement in air quality with the operation of the scheme, while a much lower number (113) will experience a deterioration of air quality with the scheme. The generalised assessment for the scheme therefore indicates an overall improvement in air quality.

The regional air quality assessment indicates that the development of the scheme will result in an increase in all emissions. The vast majority of the CO₂ emissions arise from the N6 with approximately 83% of the total increase compared to 16% from just the proposed N18. However, the operation of the N18 allows for the substantial increase in traffic flows along the N6. No mitigation is required, due to the larger scale consideration of climate change. Any mechanism for reducing emissions will be as part of a national policy.

The nutrient nitrogen assessment indicates that the NO_x concentration of 30µg/m³ for the protection of vegetation will be achieved for the four SACs along the new N18. None of the critical load values are predicted to be exceeded at any of the SACs.

3.8 CLIMATE

Impacts and Mitigation

The prediction is that the proposed new road development will have no significant impact on the climate of the surrounding area and therefore no mitigation will be required. Localised changes in microclimate may occur where new raised embankments shelter the lee side of the road from prevailing winds or where the removal of hedges may reduce existing localised shelter.

3.9 LANDSCAPE

Impacts

Overall, the development will have moderate, permanent, negative impact on the landscape character due to the contrast of the proposed roadway with the existing rural landscape. The construction of the roadway will involve the removal of trees, scrub and hedgerows along its length. However, the effect on landscape vegetation will be positive overall as the amount of hedgerows, trees, shrubs and woodlands planted will exceed or equal the amount removed. Specific planting of native trees and shrubs will mitigate against the loss of native vegetation from the sensitive landscapes. Other planting will create new landscape features, particularly at interchanges or the entrance to the towns.

In terms of visual impacts, the affected views are those from existing houses across the rural landscape which will be altered by the presence of the new road and bridge structures. Several houses will be negatively affected by the proposed route, particularly those near the proposed Gort Interchange where distant views of the Burren would be blocked or partially blocked. Dwellings along the access road to Coole Park from the existing N18 would also be negatively affected as a proposed overbridge would block views of the woods of Coole. One view from Drumharsna Castle (in ruins) in Drumharsna South townland across existing rural landscape will be significantly

affected. Two adjacent houses would be similarly impacted upon. It is proposed to plant large areas of indigenous woodland scrub and screening woodland to augment the screening effect of the existing hedgerows and woodland and specific proposals are included to minimise the visual impact on the most heavily affected dwellings. However, most of the dwellings in the site of the proposed route will receive no impact or slight negative impact. It should also be noted that the proposed route will be generally further from existing dwellings on the existing N18, resulting in improved visual amenity due to a reduced volume of traffic in proximity to dwellings.

Mitigation

The proposed landscape development works in the form of regrading, seeding, shrub and tree planting will form the reinstatement of the site following the completion of the main construction works. These works will be carried out by a landscape contractor and will be supervised by the appointed landscape architect.

3.10 ARCHAEOLOGICAL HERITAGE

Impacts and Mitigation

The assessment of the scheme impacts on elements of the archaeological heritage was conducted in accordance with published national policies and guidances and evolving good practice. The methods used included a) consultations with national bodies, local organisations, local heritage professionals, landowners and other individuals; b) a review of relevant archives, publications and early maps; c) a walkover inspection of the scheme corridor; and d) an archaeological geophysical survey that sought buried evidence of ancient human activity using magnetic detecting equipment. Arising from all of this some archaeological sites & monuments have been avoided by amendments to the Preferred Route of the scheme. Some others, however, could not be avoided – because of other constraints – and will be directly affected.

Further assessment of these affected sites & monuments is proposed if the scheme is approved by An Bord Pleanála. This will be in the form of extensive test excavations. Full archaeological excavation of affected sites will follow, with analysis and publication of the results, where the test excavations show that this is required. These excavations will be the principal form of mitigation of the archaeological impacts of the scheme and would be described as 'preservation by record' in national heritage policy documents.

The known or suspected archaeological sites & monuments that are directly affected or lie in close proximity to the scheme include several ringforts and other enclosures of probable early medieval date (e.g. Derrydonnel More, Ballynastig, Kiltiernan East, Owenabristy, Drumharsna North, Ballyglass West and Glenbrack), former castles or tower houses (Moyveela and Toberbrackan),

and a group of burnt mounds (Caherweelder), as well as some 'unclassified earthworks' that were probably parkland features (Coole Demesne). Most of the sites and monuments directly affected are either no longer surviving above ground level or are poorly preserved, and in at least two cases the alleged monuments appear to be non-antiquities, included in the public record of sites & monuments on the basis of map evidence alone.

3.11 ARCHITECTURAL HERITAGE

Impacts

The proposed road will not result in a direct negative impact on the integrity of Coole Park demesne. The demesne has already been severely fragmented on the eastern side and the parkland character of this land has disappeared due to changes in both land use (from parkland to farming and housing) and land cover (from designed parkland with dispersed trees to improved grassland and domestic dwellings). The proposed development will have a slight negative impact on the setting of Coole Park due to the minor increase in noise levels that are likely during both the construction and operational stages of the proposed development. The proposed development will result in the further isolation of the Gregory museum at the former Kiltartan Schoolhouse and former gate lodges from the core of the estate.

Of the seventy-eight individual buildings or groups of buildings identified during the course of fieldwork for this assessment (i.e. structures or features within 250 metres of the centre line of the road), the scheme will affect only seven areas, structures or features. These are:

- Four features of **local** architectural significance (the roadway connecting the former gate lodge to Coole Park (including flanking stone walls), the former entrance gates to Raheen House, Old Kiltiernan School and the avenue leading to Lavally House), and
- Three '**record-only**' features (two modern bungalows and a prefabricated house). ('Record-Only' is a term used by the National Inventory of Architectural Heritage (NIAH) to refer to structures or architectural features that are of little or no heritage value/interest save for being recorded for archival purposes.)

Mitigation

Screening, in the form of additional tree cover, will be necessary between the demesne, particularly the walled garden, and the proposed road development.

A new entranceway to Lavally will have to be created; this should seek to link into the traditional axis of approach to the house.

Where buildings or structures of local or record-only significance are affected by the scheme, an adequate photographic and descriptive record should be made. In the case of the rusticated ashlar gates it may be possible to record, remove and reconstruct them in a new location close to their original position.

3.12 CULTURAL HERITAGE

The assessment of the schemes impacts on elements of the archaeological heritage was conducted in accordance with published national policies and guidances and evolving good practice. The methods used included a) consultations with national bodies, local organisations, local heritage professionals, landowners and other individuals; b) a review of relevant archives, publications and early maps; c) a walkover inspection of the scheme corridor; and d) an archaeological geophysical survey that sought buried evidence of ancient human activity using magnetic detecting equipment. Arising from all of this some archaeological sites & monuments have been avoided by amendments to the Preferred Route of the scheme. Some others, however, could not be avoided – because of other constraints – and will be directly affected.

Further assessment of these affected sites & monuments is proposed if the scheme is approved by An Bord Pleanála. This will be in the form of extensive test excavations. Full archaeological excavation of affected sites will follow, with analysis and publication of the results, where the test excavations show that this is required. These excavations will be the principal form of mitigation of the archaeological impacts of the scheme and would be described as 'preservation by record' in national heritage policy documents.

The known or suspected archaeological sites & monuments that are directly affected or lie in very close proximity to the scheme include several ringforts and other enclosures of probable early medieval date (e.g. Derrydonnel More, Ballynastig, Kiltiernan East, Owenbristy, Drumharsna North, Ballyglass West and Glenbrack), the site of a former castle or tower house (Toberbracken), and a group of burnt mounds (Caherweelder), as well as some 'unclassified earthworks' that were probably parkland features (Coole Demesne). Most of these are either no longer surviving above ground level or are poorly preserved, and in at least two cases the alleged monuments appear to be non-antiquities, included in the public record of sites & monuments on the basis of map evidence alone.

Mitigation

Noise reduction measures are required between Coole Park and the proposed road. Detailed mitigation measures to ameliorate the likely increase in noise levels are dealt in Chapter 9, the section on Noise in this EIS.

Improved signage will be required between the three sites of Coole Park, Kiltartan Gregory Museum and Thoor Ballylee. The collective significance of these three important cultural sites is underplayed at each of the sites. This is probably due to the fact that all three are independently managed. Significant potential exists for marketing all three as linked attractions comprising an internationally significant cluster within easy access of one another.

3.13 THE INTER-RELATIONSHIP BETWEEN THE ABOVE FACTORS

The interaction of environmental factors are summarised in Table 1.4 below. The table below highlights where different aspects of the environmental inter-relate with each other. The table shows how causing one element of the environment to change can interact with, or have knock-on effect on, other specialist areas. This has implications if the specimen design, of the project on which this EIS is based, is altered during the Design Build process. The interactions, below, do not take into account the mitigation measures detailed in the sections above.

Table 1.4 Matrix showing Interaction of Environmental Effects

CAUSE	EFFECT													
	Human Beings (Socio-Economics)	Agriculture	Flora/ Fauna	Soils / Geology	Hydrogeology	Water: Hydrology	Drainage to rivers and ground	Air Quality	Noise & Vibration	Landscape	Climate	Archaeological Heritage	Architectural Heritage	Cultural Heritage
<i>Horizontal alignment*</i>	●	●	●	●	●	●	●	●	●	●	●	●	●	●
<i>Vertical alignment*</i>	●	●	●	●	●	●	●	●	●	●	●	●	●	●
<i>Human Beings</i>		●					●	●	●	●		●	●	●
<i>Agriculture</i>	●						●		●					
<i>Flora/Fauna</i>				●	●	●	●	●	●	●				
<i>Soils / Geology</i>			●		●	●	●	●		●				
<i>Hydrogeology</i>	●		●	●		●	●							
<i>Water: Hydrology</i>			●	●	●		●			●	●			
<i>Drainage</i>		●	●	●	●	●				●	●			
<i>Air quality</i>	●	●	●								●			
<i>Noise & vibration</i>	●	●	●											
<i>Landscape</i>			●	●			●					●	●	
<i>Climate</i>						●	●	●						
<i>Archaeological Heritage</i>	●		●							●			●	●
<i>Architectural Heritage</i>	●									●		●		●
<i>Cultural Heritage</i>	●									●		●	●	

Note:

* = including road closures and accommodation roads

3.13.1 ENVIRONMENTAL INTERACTION WORKSHOPS

Two workshops were held between environmental specialists and the design team to discuss the interactions of environmental effects:

The first workshop was held on 21st June 2005 which focussed on the initial findings of the environmental specialists reports. The main significant impacts and mitigation measures encountered were discussed by each of the specialists. This workshop allowed for the transfer of knowledge between specialists and allowed for clarification of information between specialists and road design engineers. All specialists agreed that where mitigation was being proposed that they would interact with the relevant specialists to insure that this did not have a negative impact on another areas of expertise.

The second workshop took place on 5th October 2005. This workshop focussed on how the specialist mitigation measures being proposed by the specialists affected the specimen design and how these measures could be incorporated into the design. Specific impacts were discussed and specialists gave their views on how altering the design slightly could reduce impacts these impacts.