

PREFACE

The structure of the Environmental Impact Statement for the Limerick Southern Ring Road Phase II is laid out in the preface of each volume for clarity. It consists of 4 volumes as follows:

Volume 1 - Non-Technical Summary

A non-technical summary of the information contained within Volume 2.

Volume 2 - Environmental Impact Statement

This volume deals with the environmental impact of the proposed development including the mainline, tunnel, ancillary roads and road realignments arising from the proposed scheme. Information on the design of the road including a description of the traffic and alternatives considered is also included.

Volume 3 - Geometric Drawings

Geometric drawings for the entire route including the Shannon Crossing.

Volume 4 - Technical Appendices

Specialist technical reports.

Additional documents, which support the information presented in this EIS, include;

- Limerick Southern Ring Road Phase II Constraints Study Report (2000)
- Limerick Southern Ring Road Phase II Route Selection Report (2001)

The documents listed above are available to the public from the Mid West National Roads Design Office, Mungret College, Limerick. They can also be viewed (without diagrams and mapping) on the Mid West National Roads Design Office website - www.midwestroads.ie

Ph: 061 227382

Fax: 061 226259

E-mail: srr2@midwestroads.ie

ACKNOWLEDGEMENTS

This Environmental Impact Statement has been prepared by M.C. O'Sullivan and COWI Consulting Engineers, their Environmental Sub-consultants and with the assistance of staff based at the Mid West National Road Design Office in Mungret, and also staff from Limerick County Council, Limerick City Council and Clare County Council.

Environmental Sub-Consultants

Community Impact	Michael Cummings Ltd.
Air Quality	Envirocon Ltd
Noise and Vibration	Enterprise Ireland Ltd.
Landscape and Visual Impact	Brady, Shipman, Martin
Terrestrial Ecology	Roger Goodwillie and Associates
Genetics	BEC Consulting Ltd.
Freshwater Ecology	Conservation Services Ltd.
Estuarine Ecology	COWI Consulting Engineers Dr. Jane Lyons
Fisheries	Shannon Regional Fisheries Board
Drainage	MCOS-COWI Joint Venture
Soils Geology and Hydrogeology	MCOS-COWI Joint Venture
Material Assets - Agricultural Properties	Farm Management Consultants Ltd.
Material Assets - Non-Agricultural Properties	MCOS Consulting Engineers
Architecture, Archaeology and Cultural Heritage	Margaret Gowen & Co. Ltd.
Underwater Archaeology	Management for Archaeology Underwater Ltd.

TABLE OF CONTENTS

PREFACE	I
ACKNOWLEDGEMENTS	I
ACKNOWLEDGEMENTS	II
1 INTRODUCTION	1
2 BACKGROUND TO THE SCHEME	1
2.1 PRESENT SITUATION	1
2.2 TRAFFIC	2
2.3 "DO NOTHING" AND "DO SOMETHING" SCENARIOS	2
2.4 PUBLIC PRIVATE PARTNERSHIP (PPP) SCHEME	2
3 DESCRIPTION OF THE SCHEME	3
3.1 GENERAL	3
3.2 GRADE SEPARATED INTERCHANGES.....	4
3.2.1 Rossbrien Interchange	4
3.2.2 N69, Dock Road Interchange	4
3.2.3 Coonagh West Interchange	4
3.2.4 N18 Interchange	4
3.3 TUNNEL	5
3.4 TOLL PLAZAS.....	5
3.5 BRIDGES	6
4 TRAFFIC	6
5 ALTERNATIVE ROUTES CONSIDERED	7
5.1 INTRODUCTION.....	7
5.2 RIVER SHANNON CROSSING OPTIONS	10
5.2.1 Recommendations	10
5.3 TOLL PLAZA OPTIONS	11
6 ENVIRONMENTAL IMPACTS OF THE SCHEME	11
6.1 COMMUNITY	11
6.2 AIR QUALITY	13
6.3 NOISE AND VIBRATION	14
6.4 LANDSCAPE AND VISUAL IMPACT	15
6.5 TERRESTRIAL ENVIRONMENT	16
6.6 FRESHWATER ENVIRONMENT	17
6.7 ESTUARINE ENVIRONMENT	19

6.8	SOIL, GEOLOGY AND HYDROGEOLOGY	20
6.9	CLIMATE	21
6.10	MATERIAL ASSETS: AGRICULTURAL PROPERTIES.....	21
6.11	MATERIAL ASSETS: NON AGRICULTURAL PROPERTIES.....	22
6.12	RESOURCES.....	22
6.13	ARCHITECTURAL, ARCHAEOLOGICAL AND CULTURAL HERITAGE.....	23
6.13.1	Buildings of Architectural Interest.....	23
6.13.2	Archaeology	23
6.13.3	Sites of Cultural Interest.....	23
6.14	POTENTIAL CONSTRUCTION IMPACTS.....	23
7	UNTOLLED SCENARIO.....	24
7.1	TRAFFIC	25
7.2	COMMUNITY	25
7.3	AIR QUALITY	25
7.4	NOISE	26
7.5	LANDSCAPE.....	26
8	WHAT HAPPENS NEXT?	26
8.1	VIEWING AND PURCHASING THE EIS	26
8.2	NEXT STEPS	26

1 INTRODUCTION

This Environmental Impact Statement (EIS) for the Limerick Southern Ring Road Phase II (LSRR Phase II) Scheme has been prepared on behalf of Limerick County Council (acting on behalf of Limerick City Council and Clare County Council), by consulting engineers M.C. O'Sullivan (Ireland) & COWI (Denmark) and additional specialist environmental consultants.

The Environmental Impact Statement comprises four volumes of which this Non-Technical Summary is the first. The title of each of the subsequent volumes is given in the preface at the front of this volume.

The proposed Limerick Southern Ring Road Phase II scheme extends west from the end of the Limerick Southern Ring Road Phase I (currently under construction) at Rossbrien, to the existing N18 near Cratloe Castle. This dual-carriageway will be promoted as a tolled road forming part of the Government's Public Private Partnership (PPP) initiative.

The proposed scheme is in accordance with European, National and Regional roads objectives and forms part of the development strategy for National Primary Roads as outlined in the National Development Plan (2000-2006).

2 BACKGROUND TO THE SCHEME

2.1 PRESENT SITUATION

The Adare to Limerick scheme has been constructed and is open to traffic since June 2001. This provides a single carriageway from north of Adare to Attyflin (junction of N20 Cork Road and N21 Kerry Road) and a dual carriageway from Attyflin to Rossbrien. The Limerick Southern Ring Road Phase I is presently under construction. Once completed this scheme will provide a dual carriageway around the southeastern side of Limerick City from Rossbrien to the N7 (Dublin Road) at Annacotty.

Once completed, the Limerick Southern Ring Road Phase II will form the final part of a bypass around Limerick City, linking all national routes converging on the city. It will connect the Limerick Southern Ring Road Phase I and the N20 Adare/Limerick scheme to the existing N18 Ennis Road in the townland of Cratloemoyle adjacent to Cratloe Creek.

2.2 TRAFFIC

Traffic wishing to cross the River Shannon at Limerick currently must travel through the city. The three existing bridges in Limerick, namely Shannon Bridge (Mallow Street), Sarsfield Bridge and Thomond Bridge, carry significant amounts of cross-city traffic with both national and local destinations. Increased traffic demands on these bridges has resulted in increased and unpredictable journey times and increased delays on the bridges and the surrounding street and road infrastructure.

2.3 "DO NOTHING" AND "DO SOMETHING" SCENARIOS

If the proposed LSRR Phase II scheme does not go ahead, the "do nothing" scenario will consist of the existing road network and the LSRR Phase I, currently under construction. This would require all traffic wishing to enter or exit Limerick City via the N18 Ennis Road to travel through the city and cross the Shannon by one of the existing bridges.

The "do something" scenario includes the existing network with the LSRR Phase I and Phase II, and it also takes account of elements highlighted in the Planning, Land Use and Transportation Study (PLUTS) being carried out on behalf of Limerick City Council. This includes a northern distributor road, the Corbally Link Road and a city centre strategy including pedestrian and cyclist measures.

2.4 PUBLIC PRIVATE PARTNERSHIP (PPP) SCHEME

The Limerick Southern Ring Road Phase II Scheme was announced by the Minister for Finance as a pilot Public Private Partnership (PPP) scheme. As with all the PPP road schemes under development, it is planned to be a Design/Build/Operate/Finance contract with a long-term concession period, in the order of 30 years. During this period, the concessionaire will recoup some or all of the up-front construction costs and the on-going operation/maintenance costs through the collection of tolls. These types of schemes are used successfully throughout the world as a means of providing vital public infrastructure and also ensuring operation and maintenance to a high standard over the long term for the benefit of the user. The PPP scheme is based on the idea that better value for money can be achieved for suitable projects through the utilisation of private sector enterprise, enhanced scope for innovation and the allocation of risk to the party best able to manage it.

The National Roads Authority (NRA) is progressing all its PPP schemes as toll roads. Toll charges will be set at a level consistent with balancing the objectives of producing satisfactory

revenue and attracting maximum traffic on the new roads. Public subsidy will be available for high cost schemes to ensure that tolls are set at affordable levels.

The actual toll charges will be determined in accordance with the procedures contained in the Roads Act 1993, as amended by the Planning and Development Act 2000, which provide for public consultation on a tolling proposal brought forward by the NRA. An Oral Hearing and consideration of submissions is also provided for prior to the determination of the proposal.

3 DESCRIPTION OF THE SCHEME

3.1 GENERAL

The route commences in the townland of Rossbrien, immediately west of the Limerick Southern Ring Road Phase I scheme in Rathbane South (under construction) and approximately at the location of the existing Rossbrien Roundabout. It proceeds westwards, through the townlands of Rathbane North, Ballinacurra (Weston), Ballinacurra (Hart), Ballykeeffe, Bunlicky, Castlemungret, Coonagh West, Clonmacken, Coonagh East, Meelick and Cratloemoyle where it joins with the existing N18 close to Cratloe Castle (see **Figure 3.0**).

The proposed scheme consists of a mainline of approximately 9.75km of two-lane dual carriageway with an additional 2.3km approximately of single lane dual-carriageway link road, which will link the LSRR Phase II mainline with the existing Clonmacken Roundabout (Clonmacken Link). In addition the following elements are included in the scheme:

- 4 grade separated interchanges.
- Immersed tube tunnel under the River Shannon.
- 2 toll plazas, one on the mainline in Coonagh West and one on the Clonmacken Link in Clonmacken.
- 11 bridges.
- Realignment of part of Ballinacurra Creek and Cratloe Creek.
- Upgrading and realignment of some sections of existing National, Regional and Local Roads affected by the proposed scheme
- Associated ancillary works.

3.2 GRADE SEPARATED INTERCHANGES

The route includes four grade separated interchanges, (i) at Rossbrien joining the Limerick Southern Ring Road Phases I and II and the Limerick to Adare Road, (ii) at the Dock Road (N69), (iii) at Coonagh West and (iv) at the Ennis Road (N18) tie-in. These interchanges provide access to and from the mainline to the local road network, towns and villages. These junctions, and other significant junctions to be developed as part of the scheme, are described below.

3.2.1 Rossbrien Interchange

A grade-separated interchange will be provided in the townland of Rossbrien. This will be constructed where the Limerick Southern Ring Road Phases I and II join with the N20 Adare to Limerick scheme. All traffic movements are provided with the exception of (i) N20/N21 Cork and Kerry to Childers Road and (ii) LSRR Phase I to Childers Road. Public lighting will be provided along the length of the slip roads and loops associated with this interchange.

3.2.2 N69, Dock Road Interchange

The N69, Dock Road grade-separated junction is proposed to be located on the line of the existing N69 between the present accesses to Irish Cement Limited and the Wastewater Treatment Plant. This junction will consist of two roundabouts, one at either side of the mainline and a single bridge between the two roundabouts. The interchange will allow entry to and exit from the mainline. This full movement junction shall be grade-separated with the mainline passing over the N69. Public lighting will be provided along the length of the slip roads and at the roundabouts associated with this interchange.

3.2.3 Coonagh West Interchange

The Coonagh West grade-separated junction will be located to the north of the River Shannon in the vicinity of Shannon Rugby Football Club. This junction will form part of the Clonmacken Link and will provide two traffic movements (i) traffic travelling from Clonmacken Roundabout along the link road and through the tunnel and (ii) a loop will allow northbound traffic to diverge from the mainline and access the Clonmacken Roundabout via the link road. Public lighting will be provided along the length of link road, the slip road and the loop associated with this interchange.

3.2.4 N18 Interchange

A grade-separated junction is proposed where the mainline ties in with the existing N18. A section of both the eastbound and westbound lanes of the existing N18 will be realigned and the LSRR Phase II mainline is designed to cross over it. Two new roundabouts will be located at the Radisson SAS Hotel and the Two Mile Inn Hotel to replace the existing median gaps. Public

lighting will be provided along the length of realigned sections of the existing N18 associated with this interchange.

3.3 TUNNEL

The proposed fourth crossing of the River Shannon is a major element of the scheme under consideration. It is proposed to cross the Shannon via an immersed tube tunnel measuring approximately 900m in length. The structure includes:

- Southern approach ramp through Bunlicky Lake
- Tunnel structure including portal buildings on both the southern and northern side
- Northern approach ramp within the southern part of Coonagh
- Areas for sedimentation ponds at the southwestern part of Coonagh.

Approximately four tunnel units will be cast in an area north of the Shannon. These will be floated out and sunk into a pre-dredged channel. The material removed from the Shannon during dredging will be placed in a sedimentation area, also north of the Shannon, in the townland of Coonagh West.

The tunnel will consist of two bores, one for southbound traffic and the other for northbound traffic. Each of the two bores comprises a dual carriageway with emergency walkways on each side. A diagrammatic representation of the tunnel elements is shown below.

3.4 TOLL PLAZAS

Two toll plazas will be provided as part of the scheme, one on the mainline and a second on the Clonmacken Link. The mainline toll plaza is located in the townland of Coonagh West and will be a distance of 350m approximately from the nearest residential houses. It is envisaged that the operation of the mainline toll plaza will ultimately involve the management of up to seven lanes in each direction by the year 2028. The Clonmacken Link toll plaza is located in the townland of Coonagh West, approximately 300m from the nearest residential houses. It is envisaged that the operation of the Clonmacken Link toll plaza will ultimately involve the management of up to four lanes in each direction by the year 2028. An access road will be provided close to both toll plazas for parking, administration building, septic tank etc.

3.5 BRIDGES

In order to minimise closure of local roads as a result of the proposed route a total of 11 bridges will be constructed as part of this scheme. Three of these structures will exceed 100m in length and a fourth is just slightly shorter.

Three non-national local roads which will be facilitated either over (overbridge) or under (underbridge) the mainline include the Greenfields Road (1144), St. Nessian's Road (R526) and Ballykeeffe Boreen (LP1441). The *Greenfields Road and Rail Underbridge* will span the railway line and Greenfields Road and no realignment of either the railway line or Greenfields Road will be required. The *R526 (St. Nessian's Road) Overbridge* will be constructed in the vicinity of Ballinacurra Bridge to carry the realigned R526 over the LSRR Phase II mainline. This overbridge will also cross over a realigned section of Ballinacurra Creek and the railway line. Finally the *Ballykeeffe Boreen Overbridge* will be constructed to carry the realigned Ballykeeffe Boreen (LP1441) over the LSRR Phase II mainline.

4 TRAFFIC

If the proposed Limerick Southern Ring Road Phase II scheme does not go ahead, the “do-nothing scenario” is the current road network and the Limerick Southern Ring Road Phase I from Rossbrien to Annacotty (which is currently under construction). This would mean that all traffic wishing to either enter or exit Limerick via the N18 Ennis Road would still have to travel through the city to cross the River Shannon by means of one of the existing three main bridges (Shannon, Sarsfield and Thomond Bridges).

In this scenario, the scale and the extent of the existing traffic problems in this area would increase significantly due to increased car ownership and growing economic prosperity leading to space requirements on the road system which is already congested. The result would be even greater congestion over longer periods leading to reduced safety for road users and reduced environmental quality for those living and working in the area.

The accident numbers recorded in the area are an indication of the safety problem involved. Just over half the accidents with fatalities involved pedestrians. In 2008 and 2028, the LSRR Phase II scheme will result in a significant reduction in the volume of traffic, including heavy goods vehicles, on the existing three bridges in the city centre (approximately 33%). Consequently the city centre roads and streets will become safer for both pedestrians and cyclists and it will become possible to implement city centre strategies in relation to bus lanes and pedestrianisation, cycle lanes etc. which will be more difficult without this project. With the

provision of the new road it can also be expected that delays and transport costs will be reduced and accessibility will be enhanced both at a local and regional level.

Improvements in journey time to both national and local traffic are expected as a result of the predicted reduction in the volume of traffic on the local road network and the improvement to the national route network arising from the proposed LSRR Phase II. In 2028, for national traffic travelling between Cratloe and Annacotty, a time saving of 13 minutes is predicted (52%). Similarly the trip from Cratloe to Patrickswell in 2028 shows a 17 minute saving or 59%. In terms of local traffic, a time saving of 8 minutes (50%) is expected in 2008 and 4 minutes (25%) in 2028 on the journey time from Ivan's Cross to Raheen. From Ivan's Cross to Annacotty the saving is predicted to be 4 minutes in 2008 (24%) rising to 7 minutes (44%) by 2028.

5 ALTERNATIVE ROUTES CONSIDERED

5.1 INTRODUCTION

The Route Selection Report (2001) outlined the range of route options studied for the Limerick Southern Ring Road Phase II (**Figure 5.0**) and their principal characteristics. Essentially, they comprised the following:

- **Group 1 (Green) – Routes 1B, 1C and 3B**

Three options commencing at Rossbrien Interchange, proceeding west via Ballinacurra/Ballykeeffe, with the Shannon Crossing in the Ballinacurra Creek/Bunlicky area, continuing north to the N18 via Clonmacken and Coonagh Roundabouts.

- **Group 2 (Red) – Routes 4B, 4B3, 4C, 4C2, 5B, 5C (Straight) and 5C (Curved)**

Seven options commencing at Rossbrien Interchange, proceeding west via Ballinacurra/Ballykeeffe, with the Shannon Crossing in the Ballinacurra Creek/Bunlicky area, continuing north to the N18 near Cratloe, by various routes east and west of Coonagh Village.

- **Group 3 (Blue) – Routes 6B, 6B2, 6B3, 6D2 and 6E**

Five options based on connection to the existing network at the Rootiagh Interchange, routed to the Dock Road (N69) via Quinns Cross, then extending north across the Shannon to the N18. Further variants on these options could be generated for different options north of the river.

- **Group 4 (Yellow) – Routes 8 and 9**

Two outer options beginning south of the Rootiagh Interchange and passing to the west of the Irish Cement Plant at Mungret before crossing the river west of Coonagh Village to join the N18 near Cratloe Castle.

The following points were noted in relation to the new River Shannon crossing in the design year, 20 years after opening:

- Route 4C2 attracted the highest volume of crossing traffic with 43,890¹ vehicles per day with Route 5C (west of Coonagh) marginally lower at 43,605 vehicles per day (straight option) and 40,375 vehicles per day (5C curved option).
- Route 6B2 with an vehicles per day of 41,420 vehicles facilitates significant traffic, though the figure represents a greater local traffic element commuting between Raheen to north of the River Shannon and lower national traffic from the east (N7 and N24).
- Routes 8 (28,120 vehicles per day) and 9 (24,605 vehicles per day), which are the routes furthest west, attract the least volume of crossing traffic.
- The five route options which incorporate a link to the Clonmacken Roundabout (4C2, 5C (Straight), 6B2, 5C (Curved) and 6B3) rank 1, 2, 3, 4 and 5 respectively in terms of attracting the highest volume of crossing traffic showing the importance of this link in maximising benefit to the City Centre.

The traffic analysis concluded that the west of Mungret options (Routes 8 and 9) and Routes through Corkanree (Routes 1C and 3B) are relatively ineffective in attracting traffic away from Limerick City when compared with the majority of routes commencing with the numbers 4, 5 and 6. An interchange at Dock Road, while necessary on traffic grounds, is physically very difficult to provide for options 1C and 3B without significant disruption and property/business acquisition. Routes 1C, 3B, 8 and 9 were therefore rejected from further consideration. The most viable routes taken forward for further appraisal in terms of the need for interchanges and links were the routes commencing with the numbers 4, 5 and 6.

Based on the results of the analysis on interchanges and links, Routes 4B, 4B3, 4C, 5B, 5C, 6B, 6D2 and 6E routes were eliminated from further consideration and Routes 4C2, 5C (straight) and 6B2/6B3 were taken forward for further consideration.

¹ A factor of 0.95 has been used to convert Annual Average Daily Traffic (AADT) to Vehicles per Day e.g. 46,200 AADT * 0.95 = 43,890 vehicles per day.

Analysis showed that Route 6B3 and similarly Route 6B2 did not adequately fulfil the project objective of facilitating national route traffic in bypassing Limerick City Centre to the same degree as Routes 4C2 and 5C (Straight). 6B3 and 6B2 would in fact offer poor service to the N18-N17/N24 traffic and lower utilisation of the Annacotty-Rossbrien link.

Routes 6B2 and 6B3 were rejected from further consideration on traffic grounds leaving Routes 4C2 and 5C (straight) as the remaining options.

The multi-criteria assessment of the alternative route options indicated the following:

- **Environmental**

The Western Option (5C (Straight)) scored significantly better than the Eastern Option (4C2) in terms of minimising severance at Coonagh, minimising impact on the Aerodrome and on the Coonagh Sports and Social Club also. While visual intrusion is classed as similar, the perception was that an Eastern Option would have more impact when considered in combination with the severance impact,

- **Engineering**

Both options were generally equivalent in engineering terms, with marginal benefit to road users in option 4C2 (Eastern Option) by virtue of slightly higher traffic levels on the route and corresponding traffic reductions in the city centre with associated reductions in accident rates. The one area of difference related to the poorer ground conditions associated with the Western Option, closer to the River Shannon. The differences were not believed to be decisive.

- **Economic**

The Western Option would be marginally cheaper to construct than the Eastern Option. However, the internal rate of return (IRR) showed a small benefit for the Eastern Option associated with the marginally higher traffic flows likely to be served by it. Therefore, a marginal economic advantage was assigned to the Eastern Option (4C2).

The analysis showed that both routes were comparable when assessed against the relevant criteria in the framework assessment.

In conclusion, the framework assessment of both options showed them to be approximately similar in satisfying the selection criteria. The decision, therefore, was to support the option which had significantly less adverse environmental impacts, reflected in strong popular support locally, on the basis that this will contribute significantly to a successful implementation particularly in

terms of the statutory process. Accordingly, the Western Option, route 5C (Straight), was recommended.

5.2 RIVER SHANNON CROSSING OPTIONS

The need to accommodate marine traffic on the River Shannon ruled out the option of a fixed low-level bridge for the scheme. Therefore, the options considered for detailed examination were:

- Tunnel option, 'immersed tube or cut and cover'
- Low level opening bridge
- High level bridge

Taking environmental, engineering and cost considerations into account, it was concluded that the high-level bridge option would not be a viable alternative, leaving the choice between a low-level opening bridge and the immersed tunnel options.

Provision of the tunnel option would have the following advantages compared with the low level opening bridge:

- No disruption to traffic flow from necessary shipping movements.
- No constraints on port and recreational traffic on the river as a result of the development.
- No constraints on the crossing operator as a result of port activities
- While the construction impacts of the tunnel on the environment are more severe, the long-term impacts of the tunnel are less than the bridge alternative.
- Availability of significant public support for the tunnel compared to the bridge based on the public consultation and opinions expressed by elected members reflecting the general view that freeflow for road and river traffic offers the best long-term socio-economic benefit to Limerick and to the region.

5.2.1 Recommendations

The Route Selection Report, therefore, made the following recommendations:

- Route 5C (Western Option) should be adopted for the route of Limerick Southern Ring Road Phase II
- A tunnel crossing of the River Shannon is regarded as the best overall solution for the crossing and should be adopted.

These recommendations have been accepted by Limerick County Council (acting as lead authority) and approved by the National Roads Authority.

5.3 TOLL PLAZA OPTIONS

It is proposed that the scheme will be developed as a Public Private Partnership (PPP) scheme and as such will be tolled. Thus it is necessary to provide tolling facilities. Physical constraints ruled out a single toll plaza location. For this reason, two toll plazas will be provided, one on the mainline between the N18 interchange tie-in and the spur to Clonmacken and one on the Clonmacken spur.

6 ENVIRONMENTAL IMPACTS OF THE SCHEME

This section outlines the environmental impacts of the proposed alignment of the LSRR Phase II scheme and gives an overall assessment of these impacts. Environmentally sensitive areas in the vicinity of the proposed route were identified during the various phases of the development of the scheme. The proposed alignment has been selected to minimise the potential impact of the scheme by avoiding, where possible, the sensitive areas identified during the scheme development.

HUMAN BEINGS

Human beings interact, to a greater or lesser extent, with all aspects of the receiving environment, therefore, impacts on any aspect of the environment have the potential to impact on human beings. The impact of the scheme as it specifically relates to human beings is covered under the headings, *Community, Air Quality, Noise and Vibration* and *Landscape and Visual Impacts*.

6.1 COMMUNITY

Michael Cummings & Co. Ltd. assessed the impact on communities affected by the proposed route. The route passes through predominantly urban/suburban areas on the south side of the River Shannon where a residential element is interspersed with commercial, industrial and recreational activities. The route north of the River Shannon passes through predominantly rural countryside where the existing landuse is almost exclusively agricultural. Settlement along the route generally consists of dense housing estates at Rossbrien, Ballykeeffe and Ballinacurra, some individual houses along Ballykeeffe Boreen and close to the N18 tie-in, small scattered groups of housing at Clonmacken Roundabout and the small village of Coonagh.

In general, the improved road network brought about by the completion of the scheme will provide significant benefits at the regional and sub-regional levels. Travel times and transport costs will be reduced and journeys will be safer. This will enhance prospects for economic development, will

stimulate increased tourist activity and will improve accessibility of recreational and cultural facilities. With the provision of the mitigation measures, the advantages of the scheme considerably outweigh the disadvantages and the community as a whole will benefit from the completion of the scheme.

At a local level, there will be both positive and negative impacts. Local residents in Limerick City and suburbs will enjoy the benefits ensuing from the reduction in traffic volumes through the city centre, i.e. the relief from existing severance caused by traffic and the improvement in amenity and safety. The reduced traffic volumes on the existing road network will also create a safer and more pleasant environment in which to work and live, and the accessibility of neighbouring properties and facilities will be greatly enhanced. The improved traffic circulation and the enhanced road network will reduce delivery and journey times. The business community in the city and surrounding suburbs will be expected to benefit from increased productivity and greater reliability in the conveyance of goods and services.

Certain businesses, particularly those along the by-passed section of the N18, may suffer as a result of the loss of passing trade. However access to these services by the local community will be enhanced. In mitigation for any loss of passing trade occurring as a result of redistribution of national/through traffic, general services information signs, in keeping with safety requirements for a road of this type, will be provided on the approach to the off-ramp at the Coonagh West Interchange. These standard information signs will indicate the range of services along the bypassed section so as to ensure loss of passing trade is minimised.

To minimise severance due to the new route eleven new road bridges are being provided. In addition, a number of access roads and underpasses are being provided to facilitate access to properties severed by the proposed route. No major roads will be severed as a result of this scheme. However it will be necessary to close off one of two vehicular access points to the Ballykeeffe Estate. In mitigation, traffic lights and a yellow box will be provided at the remaining access point to facilitate traffic entering and leaving the estate. A benefit is that the use of the front road of the estate as a 'ratrun' for traffic trying to bypass the roundabout at the Crescent Shopping Centre during busy times will be prevented as a result of the road closure. Once operational, three further locations will experience a restriction on traffic movements. The first is Rossbrien Interchange where the following traffic movements will not be permitted:

- From LSRR Phase I to Childers Road
- From N20/N21 Cork and Kerry roads to Childers Road

The second location is at Clonmacken where traffic travelling southbound from the N18 Ennis Road on the LSRR Phase II will not be permitted to exit via the Clonmacken Link. Also, traffic travelling along the Clonmacken Link from the Clonmacken Roundabout will not be permitted to

head northwards toward the N18 tie-in. Finally at the tie-in with the N18, traffic travelling northwards from the LSRR Phase II will not be permitted to travel eastbound to the city centre and similarly traffic travelling westwards from the city centre will not be permitted onto the LSRR Phase II southbound.

Cycle/pedestrian footways will be provided along the St. Nessian's Road Overbridge. The existing pedestrian crossing on St. Nessian's Road is scheduled for upgrading to a formalised crossing and this will be replaced close to its current location when the St. Nessian's Road Overbridge is completed. The realignment of St. Nessian's Road will allow the removal of the vehicular railway level crossing at that location. This will mean the removal of traffic delays on the road when trains are passing, especially where trains coincide with peak traffic flow and/or emergency vehicles. A cycle lane will also be included at the Dock Road Interchange.

A number of recreational facilities will be impacted by the proposed route including a juvenile soccer pitch as O'Higgins Drive, a sports pitch at John Carew Park and a training pitch at Portland Park. However, in mitigation, facilities of a standard, equivalent to that currently available, will be provided as close as possible to the current location. An all-weather training pitch in the grounds of the Shannon Rugby Football Club will also be impacted by the proposed road and this will have to be relocated within the grounds of the club.

During construction, there will be negative impacts of a temporary nature - mainly inconvenience to road users and local residents because of disruption to existing roads and services and nuisances created by noise, mud and dust. The Contractor's Construction Management Plan will ensure that disruption to traffic is minimised during the construction phase. In addition, the walkways along Ballinacurra Creek and the Shannon Estuary will be temporarily disrupted during the construction of the scheme. This will be a temporary impact and the access will be maintained post-construction. The construction phase will generate employment and will increase local economic activity. Some businesses may be affected at times as a result of changes to travel patterns arising from temporary road closures or temporary traffic diversions necessitated by the construction works.

6.2 AIR QUALITY

Envirocon Ltd. carried out an assessment of the likely significant impacts on air quality in the vicinity of the proposed road. Baseline air quality (nitrogen dioxide, carbon monoxide, particulate matter (PM₁₀) and benzene) was measured along the proposed route at eight locations. The results of these measurements indicate that no exceedance of the National Air Quality Standards (NAQS) at locations downwind of the LSRR Phase II scheme for both 2008 and 2028 traffic projections is predicted. Predicted ground level concentrations at the nearest houses to the

scheme are well below the limit values for NO₂, PM₁₀, CO and Benzene. Apart from NO₂, the predicted maximum levels for both the years 2008 and 2028 are close to the analytical detection level of air monitoring equipment used in ambient air quality surveys. In the case of CO and benzene predicted levels are comparable to existing background levels in the area. Since NO₂ is the main pollutant associated with vehicle exhausts, levels are expected to increase close to the new road. However, the maximum predicted concentrations are still well below the future NAQS and beyond 200 metres downwind they are likely to be comparable to existing levels experienced near the route of the road scheme. The results indicate that the predicted change in ambient levels from traffic travelling along the LSRR Phase II will not have an adverse impact on the local environment or on community health.

Along most of the route, the potential air quality impact at nearby housing will be low due to the separation distances between housing and the route corridor. Exceptions to this south of the River Shannon are Ballykeeffe Boreen, St. Nessian's Road and Greenfields Road where housing is within 100m of construction. North of the river along the section from the northern tunnel portal to the N18 Interchange, with the exception of one dwelling near Cratloe Creek, houses are over 200m from proposed haul routes. There are also a few houses approximately 50m from the Clonmacken Roundabout at the eastern end of the Clonmacken Link and within 100m at the western end of the link. In these cases, specific measures will be put in place to control dust and PM₁₀ emissions. With the implementation of these measures there will be a slight to moderate temporary impact on local air quality while heavy plant construction work is taking place in the vicinity of this housing.

6.3 NOISE AND VIBRATION

Enterprise Ireland carried out baseline noise measurements at nine locations along the proposed route and along the N18. Computer models were used to predict noise levels at all sensitive locations (23 in total) along the proposed route for the '*do-nothing*' and the '*do-something*' scenarios both for 2008 and 2028. For the purposes of the LSRR Phase II project, where noise levels due to the road scheme are greater than or equal to 68dB_{L_{A10} (18 hour)} in 2028, mitigation measures will be provided.

Of the 23 prediction locations along the scheme, 14 will be above the 68dB_{L_{A10} (18 hour)} criterion in 2028. Mitigation measures such as noise barriers or bunds will be applied near the road in the vicinity of all properties where noise levels are predicted to increase to 68 dB_{L_{A10-18hr}} or above due to noise generated by traffic on the new scheme. With these measures in place, no existing property along the proposed route will experience increases in noise levels to 68 dB_{L_{A10-18hr}} or above due to traffic using the new scheme.

At one of the 14 locations - the R526 (St. Nessian's Road) - noise levels already exceed the 68 dBL_{A10-18hr} without the proposed road in place. The R526 will be realigned over the mainline as part of the scheme with the result that the road will be moved further away from housing on the existing road. This together with the predicted reduction in traffic flow on the R526 due to the overall scheme will reduce traffic noise at this location.

The ground vibration from the operation of the new road will be expected to be several orders of magnitude less than that which may cause disturbance or structural damage. The vibration will be less than that caused by traffic on the surfaces of the existing roads.

A variety of items of machinery will be used during the construction phase of the development and some have the potential to create adverse noise conditions. The contractor will be obliged to manage and control noise on site during the construction period through the implementation of mitigation measures including the restriction of working hours and the adherence to the guidance set out in British Standard BS 5228 1997 "*Noise Control on Construction and Demolition Sites*". It should be noted that although construction of the proposed road and tunnel will take approximately four years to complete, the impact and the disruption at individual locations will only be for the duration construction works are taking place in proximity to that location.

6.4 LANDSCAPE AND VISUAL IMPACT

Brady, Shipman, Martin assessed the landscape and visual elements of the route. The character of the route corridor is of lowland rural/urban fringe. The urban area to the south of the River Shannon is dominated by residential, commercial and industrial development divided by large areas of open space. To the west and north of the River Shannon the suburban landscape is slightly distanced and particularly in Coonagh, the area has a rural context for its immediate setting. The expansive Shannon Estuary with associated reed beds is the most notable natural feature in the landscape. The rural agricultural landscape has relatively small to medium field sizes where the primary land-use is as pasture for livestock and dairying.

With the exception of Coonagh, the completed road will have only a slight impact on the landscape character of the area. Coonagh is particularly rural and agricultural in character and as such, the impact on the landscape character will be substantial during the operational phase of the development when the road, associated illumination and the toll plazas will permanently alter the existing character of the area.

A total of 112 locations were identified as having some degree of visual impact including two properties that will be fully acquired or demolished. Excluding the two properties to be fully acquired/demolished, in the pre-establishment stage (short-term) 11 locations will experience a

severe impact and a further 12 will experience a major impact as a result of the proposed development. In the post-establishment stage and again excluding the two properties to be fully acquired/demolished, six locations will continue to have major negative visual impact.

A schedule of general landscape mitigation measures has been proposed for the scheme and, in addition, a series of specific landscape measures are proposed in relation to areas where specific impact was identified. Given the urban/rural context of the development, it is not considered that any property will experience a medium to long-term severe negative impact if the mitigation measures, as specified in the EIS, are implemented.

NATURAL ENVIRONMENT

This section covers the potential effects of the proposed scheme on the natural environment. The scheme will pass through a number of designated areas including Bunlicky Lake, a proposed Natural Heritage Area (pNHA), the Shannon Estuary, Ballinacurra, Meelick and Cratloe Creeks, all part of the Lower Shannon candidate Special Area of Conservation (cSAC). The Shannon Estuary is recognised as an important location for birds and is also covered by a Special Protection Area (SPA) designation for much of its length including at the crossing point proposed for the Shannon Tunnel in this project. Also present in the study area is the triangular clubrush (*Schoenoplectus triqueteter*), a plant protected under the Flora Protection Order 1999.

6.5 TERRESTRIAL ENVIRONMENT

Roger Goodwillie & Associates surveyed the terrestrial flora and faunal along the proposed route corridor. BEC Ltd. were also commissioned to investigate the genetics of the protected plant, *Schoenoplectus triqueteter*, with a view to potential mitigation of direct impacts on the plant. The majority of the fields surveyed contained improved agricultural grassland, where vegetation is species poor. Many fields are poorly drained and have minimal management. A number of areas comprise unmanaged rough grassland, which has developed in abandoned fields and on river embankments. Amenity grassland occurs in small patches along road verges, where it is regularly mowed, allowing low-growing rosette species to flourish. The hedgerows are generally species-poor, with improved grassland occurring up to their bases. This practice has resulted in an impoverished flora, with few species save some rough grasses. The majority of hedgerows have seasonal or permanent drains at their bases and few contain mature trees. The estuary of the River Shannon supports extensive reed beds and large sedges on the intertidal muds. The rare triangular clubrush, (*Schoenoplectus triqueteter*), a species protected under the Flora Protection Order 1999, is one of a number of specialised species in the marginal vegetation adapted to the brackish conditions. The Shannon and its tributaries have large earthen embankments built up along their banks, as a means of flood control. The smaller rivers also contain abundant reeds.

There is an extensive network of drainage ditches throughout the survey area. The largest ditches run along the embankments that border the Shannon. Fauna identified in the vicinity of the proposed route include badgers, bats, small mammals, and birds typical of estuarine and farmland habitats. There was some evidence of otter activity near Bunlicky Lake.

The route passes through Bunlicky Lake, an important area for birds including Teal and Cormorants. There will be disturbance and loss of habitat during the construction of the road at this location and the lake will be considerably changed once the road is open. In mitigation, an area of land at the northeast corner of the lake will be extended to form open water shallows.

It is proposed to place material, taken from the Shannon during dredging for the tunnel, onto land west of the mainline on the northern banks of the River Shannon. A permit/license will be required and it is envisaged that this will be sought with a view to recovering the area for benefit to agriculture/ecology in the medium to long term. A detailed Management Plan will be developed for the area at detailed design stage in consultation with the EPA.

There are a number of locations along the proposed route where there is potential for direct impacts on *Schoenoplectus triqueter*. Extensive discussions have been held with Dúchas and a programme of further work has been agreed for the period between detailed design and construction. The programme will facilitate the implementation of mitigation measures where direct impact cannot be otherwise avoided.

6.6 FRESHWATER ENVIRONMENT

Conservation Services Ltd. carried out the freshwater assessment along the proposed route. The proposed LSRR Phase II will have a potential impact on six freshwater streams in the catchment of the River Shannon Estuary. The proposed development will also impact on Bunlicky Lake, a small man-made lake in the grounds of the Irish Cement. Biological assessment including assessment of water quality and fish habitat was carried out at or close to each potential stream impact location. In addition, the suitability of the stream habitat downstream of each potential impact point was assessed for different trout life stages. Fish stocks were assessed at the potential impact points where practicable.

Biological assessment of water quality indicates that all six watercourses are at least moderately polluted, with three being heavily polluted. No salmonid fish were found. Five of the watercourses were assessed as having no habitat suitable for trout. In Watercourse 6 (flowing to the Ballinacurra Creek Estuary) 200m approx. of poor quality trout spawning and nursery habitat was identified 500m approx. downstream of the proposed development. Lack of any adult trout habitat and culverting make this stream unsuitable for a sustainable trout population. Bunlicky Lake was

found to have a diverse flora and fauna, including a few rare and relatively rare species. Bunlicky Lake was classified as of regional importance.

The principal potential impacts of the proposed new road development on freshwater invertebrate fauna, flora, fish and habitats were identified as follows:

1. Pollution of waterbodies with suspended solids due to runoff of soil from construction areas, or due to disturbance of fine subsurface substrates in the course of in-stream construction and excavation.
2. Pollution of waterbodies with other substances such as fuels, lubricants, waste concrete, waste water from site toilet and wash facilities, etc.
3. Pollution of waterbodies with contaminated water draining from the new road during its operation.
4. Permanent loss of lake habitat where the new road is constructed across/under Bunlicky Lake.
5. Changes in the structure of the plant and animal communities in Bunlicky Lake due to suspended solids, and provision of extra hard surfaces to which zebra mussels will attach.
6. Spread of zebra mussels to other waterbodies by transport of early life stages on machinery, etc., which have been in contact with the lake water.

The crossings of streams by the proposed development will not involve any significant loss of freshwater stream habitat nor obstruct movement of salmonid fish.

The recommended mitigation for freshwater sites impacted by the LSRR Phase II road scheme is:

- Strict control of erosion and sediment generation and other pollutants associated with the construction process should be implemented where works are to take place close to or in streams/lake.
- Where possible filter drains (or other drainage system which will produce similar properties) should be used to reduce pollutants in runoff from the proposed road.
- The rock fill (or similar) used for any infilling of Bunlicky Lake should be a type which will result in the minimum of suspended solids contamination. Sediment curtains will be used in the lake to prevent any contamination.
- To prevent the transfer of aquatic organisms, particularly the pest species *Dreissena polymorpha* (zebra mussel) to other catchments, all equipment which is in contact with the water of Bunlicky Lake, particularly equipment which can contain water, must be cleaned and disinfected before being moved to other areas.

6.7 ESTUARINE ENVIRONMENT

COWI Consulting Engineers, with contributions from the Shannon Regional Fisheries Board and Dr. Jane Lyons, assessed the impact, principally of tunnel construction on the estuarine environment the River Shannon.

The Shannon Estuary is of international importance for birds, hosting the largest number of wintering waterfowl in Ireland, however, as the mudflats at the crossing location are narrow and support an impoverished fauna, the crossing corridor is less important in this regard. The crossing corridor is also of major importance as a migratory path for fish including salmon, trout, smelt, various lampreys and eel, several of which are listed in Annex II of the EU Habitats Directive. A population of Bottlenose Dolphins resides in the estuary and has been sighted as far up as Limerick Dock suggesting they use the entire tidal estuary.

Permanent impacts in terms of changes in current patterns and water levels will not take place in the Shannon Estuary as a result of the proposal as there will be no structures protruding out into the water column. During construction of the tunnel in the River Shannon the following potential impacts have been highlighted and mitigation measures have been considered;

- *Impact on Protected Areas and Species* - The tunnel crossing site is located in a candidate Special Area of Conservation site. The River Shannon has been so designated because it is an estuary with mudflats (listed in Annex I of the Habitats Directive) and because it contains the following Annex II listed species: Salmon, Sea Lamprey, Brook Lamprey, River Lamprey and Otter.
- *Impacts from spilled sediment in the water column on fish and fisheries* - It will be necessary to dredge a channel across the Shannon at the crossing location. Sediment plumes resulting from spilled sediments could cause avoidance by fish trying to migrate upstream. It will therefore be necessary to dredge outside of the main migration period for the most vulnerable fish species.
- *Impacts of sedimentation of spilled material on Benthic Fauna* - The crossing location holds an impoverished fauna composed primarily of the mud shrimp *Corophium volutator* and the polychaete worm *Neris diversicolor*. During dredging and construction the benthic fauna (animals living on or in the river bed) will be covered by sediment and may be killed. These two species are known to be very fast colonisers and a full recovery is expected within 1-6 months after completion of dredging, depending on the time of the year.
- *Birds* - In 2000, the crossing corridor area was host to nationally significant levels of redshank. *Corophium* is a favourite food item of the Redshank but the abundance of this mud shrimp varies from year to year depending on salinity conditions. In a worst case scenario, sedimentation from dredging may kill the *Corophium volutator* on the intertidal flats stretching

from south of the mouth of Meelick Creek to Limerick Docks. This would equate to the loss of feeding area of 50 Redshank or some 1-3% of the feeding population in the entire Shannon / Fergus Estuary.

In the case of the three creeks, there will be a minor permanent loss of creek habitat as a result of bridge piers in the water column. However it is considered unlikely that any ecologically significant habitats will be threatened with the exception of *Schoenoplectus triquetter* habitat. A realignment along Ballinacurra Creek will also lead to the destruction of some habitat but it is considered likely that the habitat will recover quickly. The straightening of the channel may have a positive effect on the environment as it may lead to some increase in water velocity and reduction in sedimentation in the creek.

6.8 SOIL, GEOLOGY AND HYDROGEOLOGY

The sub-surface conditions in the vicinity of the scheme were identified through the study of existing maps and reports, aerial photography and extensive site investigation.

The area through which the LSRR Phase II passes is on the alluvial plain of the River Shannon and as such is generally low lying. There will be a minor impact on the local topography due to the construction of the road and tunnel, especially in terms of proposed embankments.

Earthworks will require the removal of material from two locations along the scheme. The first is at Ballykeeffe Boreen where a cut of 7m approximately is proposed. The second is from the Shannon itself where it is proposed to remove 400,000 m³ of soft alluvial clay/silt. In the case of the cut at Ballykeeffe Boreen, the material will be used where possible as fill or in landscaping proposals. Any material considered unsuitable for reuse elsewhere along the scheme will be disposed of in accordance with Waste Management Legislation. The 400,000m³ of soft alluvial clay/silt will be pumped to a series of sedimentation ponds north of the Shannon River. Here, the material will settle and drain. Some of this material may also be re-used in the project if it is suitable. Once consolidation has been achieved it is envisaged that the area will be allowed to develop into a wildlife area.

The potential of the scheme to impact on groundwater is generally considered to be low along the length of the scheme. The potential of road drainage to contaminate groundwater will be mitigated by channelling road run-off to drainage ditches for discharge to surface waters after attenuation to remove hydrocarbons and particulate contaminants.

Particular attention has been paid to groundwater levels in the vicinity of private wells/boreholes where construction activity may impact on groundwater levels or quality. The effects of major

accidents and incidents on the road, which are not known in advance, represent a potential residual impact in terms of soil, surface and groundwater contamination. An emergency plan to deal with accidental spillages will be drafted.

6.9 CLIMATE

It is considered that in general the proposed scheme will not have an effect on the macro-climate in Limerick. Traffic volumes are predicted to increase in the area irrespective of the development of the scheme. National strategies for reducing the impact of increased traffic and the emission of greenhouse gases include improving fuel efficiency in cars and improving the transport network leading to free flowing traffic, of which the LSRR Phase II is a component.

MATERIAL ASSETS

This section covers the potential effects of the proposed scheme on Material Assets including agricultural properties, non-agricultural properties (residential, commercial and recreational) and existing resources such as the existing road network and the River Shannon. A total of approximately 210 ha (520 acres) of land will be required for the scheme. The majority of this is agricultural land.

6.10 MATERIAL ASSETS: AGRICULTURAL PROPERTIES

Agricultural enterprise along the route was assessed by Farm Management Consultants Ltd. The LSRR Phase II route traverses land in both County Limerick and County Clare. Grassland based livestock farming is particularly important in both counties with over 98% of the total in each case devoted to livestock enterprises of dairying, cattle and sheep. There will be 35 farms directly affected by the proposed alignment accounting for a total agricultural landloss of approximately 163 hectares (403 acres). The impact of the scheme will be in most cases limited to farms directly traversed by the route and while the loss of land to individual farmers may be significant it will not be significant to agricultural production on a county or national scale.

The impact of the scheme was assessed in terms of the overall impact including loss of land, loss of facilities such as farm buildings and severance. The degree of overall impact on individual farms will vary from not significant to severe with most farms falling into the moderately impacted category (16 of the 35 farms). The majority of farms traversed by the route will not suffer any severance but several will suffer a major impact which will have implications in terms of farm management on these farms.

Where appropriate, access to severed land parcels will be provided as part of the scheme, following discussions with relevant landowners. Access will be in the form of roadways, overbridges or underbridges. In addition, landowners will be compensated for loss of land and injurious affection under existing legislation.

6.11 MATERIAL ASSETS: NON AGRICULTURAL PROPERTIES

The effects of demolition and loss of land on residential, commercial and non-agricultural properties have been considered as part of this Environmental Impact Assessment. There will be a total landloss for non-agricultural properties in the order of 46 hectares (113 acres).

Two residential properties will be fully acquired as part of the scheme. A further five residential properties will be minorly impacted by the scheme through the acquisition of part of their holding. Twelve commercial/non-agricultural holdings will suffer impacts as a result of the scheme ranging from not significant to moderate through the acquisition of part of the holding. The impact on three of these holdings will be not significant, a further six will experience a minor impact, and three will experience a moderate impact. Included in the three moderately impacted holdings is the Shannon Rugby Football Club which will have to relocate an all weather training pitch from its current location.

Compensation payments for loss of land, buildings and other injurious affection will be agreed with all the property owners affected by land taken for the scheme as part of the Compulsory Purchase Order (CPO) procedure. Where compensation cannot be agreed, the matter can be referred to arbitration (or conciliation). In cases where access to properties is curtailed due to the construction of the scheme, new access to these properties will be provided.

6.12 RESOURCES

The road scheme will have a minor negative impact on natural and other resources. Much of the expected disruption to services and the existing transport network will be of a temporary nature during the construction of the road which can be mitigated against through provision of adequate notice to Service Providers, permitting them to organise alternative supply routes for their customers.

ARCHITECTURAL, ARCHAEOLOGICAL AND CULTURAL HERITAGE

This section deals with the impacts on known and potential archaeological sites, features of cultural heritage value and buildings of architectural, artistic, cultural or historic interest and was assessed by Margaret Gowen & Co. Ltd.

6.13 ARCHITECTURAL, ARCHAEOLOGICAL AND CULTURAL HERITAGE

6.13.1 Buildings of Architectural Interest

A study of buildings and structures of architectural, historic, cultural and artistic importance in the general vicinity of the proposed route identified six structures/buildings of some architectural, cultural or heritage value. Of these one will be directly impacted and will be removed as part of the scheme (Gate-Keeper's Cottage). The remaining five will be indirectly impacted but mitigation measures are available for each one.

6.13.2 Archaeology

Desk studies and subsequent field walkovers and surveys indicate that the chosen route runs through an archaeologically sensitive landscape. A total of 10 recorded archaeological sites were identified within 100m of the proposed route. Of these, 2 will be directly impacted and a further 2 will be indirectly impacted i.e. the route passes through their zone of archaeological potential. Of the remaining six known sites there is the possibility in each case that associated features may be revealed during the comprehensive pre-construction testing strategy. Two sites, considered to be of archaeological potential, were identified during the field inspection as were two areas of potential. In each case, a comprehensive strategy, agreed between Dúchas and the Project Archaeologist, will be adopted at the pre-construction stage. There may also be other potential, unidentified sites uncovered during pre-testing/construction work.

The route includes four stream/river crossings. A mitigation programme specifically in relation to these stream/river crossings will be agreed between the Consultant Underwater Archaeologist, the Project Archaeologist and Dúchas and implemented at the pre-construction stage.

6.13.3 Sites of Cultural Interest

Seven sites of cultural heritage potential were identified along the proposed route. Of these six will be directly impacted and the final one will be indirectly impacted. These have been identified for the purposes of alerting the licensed archaeologist at assessment stage to the possibility that building remains and or other features may be uncovered in these areas. Pre-construction mitigation measures may be considered in the case of some or all of these features in order to establish the full extent of any surviving sub-surface features.

6.14 POTENTIAL CONSTRUCTION IMPACTS

Potential impacts of construction activities include:

- nuisance caused by noise, vibration, mud and dust

- disruption to road users due to temporary road closures, other road works and construction traffic
- temporary loss of land and potentially permanent loss of habitat due to the presence of construction compounds and emissions from construction activities (the impact of the permanent loss of land due to the footprint of the scheme is considered in the previous sections).

Occupiers of properties, landowners and habitats in close proximity to the proposed route are likely to be the most affected by construction activities. While it is estimated that the construction of the proposed scheme will take about four years to complete, at individual locations construction activities should be of a much shorter duration.

While it is inevitable that the construction of the proposed scheme will have varying degrees of impact on the local environment, Limerick County Council intend to minimise these effects by:

- Setting and implementing standards relating to working hours, use of explosives, discharges to watercourses and the control of dust and emissions especially during the execution of the works
- Ensuring the Construction Contractor locates construction compounds with due regard to the proximity of residential properties and other sensitive receptors and habitats and their visual intrusion on the landscape
- Ensuring proper maintenance of roads and footpaths during the construction period
- Limiting the use of existing roads by construction traffic
- Limiting the number and duration of road closures
- Reinstatement/replanting of landscape and habitats disrupted by construction activities

7 UNTOLLED SCENARIO

It is intended to procure the provision of the Limerick Southern Ring Road Phase II Scheme on a Public Private Partnership (PPP) basis. The NRA is progressing all its PPP schemes as toll roads. Details of the scheme and the assessment presented in the earlier parts of this Non-Technical Summary have been based on the scenario that the PPP will involve tolling. The statutory process governing the provision of tolling on a national road involves a separate procedure from the motorway and environmental assessment process.

To take account of the fact that the tolling proposal involves a separate decision, an untolled scenario has also been considered. The untolled scenario assumes that all elements of the tolled scheme will be built but that the toll plazas will not function. Thus, the only appreciable differences between the tolled and untolled scenarios arise from the differences in traffic volumes and journey patterns between the two scenarios and the impact of some elements of the toll plaza infrastructure.

Any differences in the potential impact of these two scenarios can therefore, be covered under the headings Traffic, Community, Air Quality, Noise and Landscape.

7.1 TRAFFIC

The main impact of not collecting tolls at the two proposed toll locations is to increase traffic on the proposed carriageway. When no tolls are collected, traffic which would otherwise divert to the existing road network through Limerick City to avoid paying tolls, will use the dual carriageway.

In 2008, the increase of traffic on the crossing for the untolled scenario (34,490 Vehicles per day) above the tolled scenario (27,120 Vehicles per day) is of the order of 27%. In future years as traffic volumes rise due to traffic growth the effect of tolls reduce. Therefore, as time passes, diversion because of the toll is not as significant. In 2028, the increase on the crossing for the untolled scenario (48,200 Vehicles per day) above the tolled volume of (40,650 Vehicles per day) is of the order of 19%.

7.2 COMMUNITY

The traffic appraisal would indicate that under the untolled scenario there would be a slightly lower traffic volume remaining on the existing road network and correspondingly slightly higher volumes on the new LSRR Phase II. With the exception of a slight increase in the relief of severance due to current traffic levels on the existing road network, the impact of the tolled and untolled scenario are expected to be similar.

7.3 AIR QUALITY

The difference in impact of the untolled scenario, relative to the tolled scenario, is minor with some small increases in concentrations of traffic generated air pollutants on the new road and a slight reduction of pollution on the existing roads. The levels of traffic derived air pollutants will not exceed the ambient air quality standards for either the tolled or untolled scenarios.

7.4 NOISE

Should the road be untolled, more traffic is expected to divert from the existing road network to the proposed new road. However, the increase in traffic on the new road will not result in significant differences in noise. The mitigation outlined for the tolled scenario is considered sufficient to achieve the 68dBL_{A10} (18 hour) criterion used in the assessment of this road. The existence of the toll plazas will not contribute significantly to noise levels. There will be no significant difference between the tolled and untolled scenario in terms of noise and vibration.

7.5 LANDSCAPE

The impacts of the untolled scenario on landscape and visual obstruction and intrusion are anticipated to be similar to those described for the tolled scenario with the exception of the reduction of impact of lighting at the toll plazas.

8 WHAT HAPPENS NEXT?

8.1 VIEWING AND PURCHASING THE EIS

Copies of the Environmental Impact Statement are available for examination at the locations detailed in the published newspaper notices.

The Environmental Impact Statement is also available for purchase in hardcopy or CD format from:

Mid West National Road Design Office,
Limerick County Council,
Mungret College
Mungret
County Limerick

Prices are as shown in the published newspaper notice.

8.2 NEXT STEPS

Construction of the scheme is dependent on approval from An Bord Pleanála.

Written submissions relating to the environmental effects of the proposals may be made to the Board prior to the date specified in the published newspaper notices.

An Bord Pleanála, at its discretion, may hold an Oral Hearing.

The written submissions, together with any representations made at the Oral Hearing, will be considered by the Board before making their decision on whether or not to approve the scheme (with or without modifications).

The Board's decision shall be published in one or more newspapers circulating in the area; including, where appropriate, particulars of any modifications to the scheme.