Department for Regional Development - TransportNI

A24 BALLYNAHINCH BYPASS

Public Inquiry

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Proof of Evidence:

Environmental Statement

by

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1. INTRODUCTION

1.1 Introduction

1.1.1.1 My name is Gareth Coughlin, Associate and Environmental Scientist with AECOM, the consultants appointed to assist TransportNI Southern Division's Strategic Road Improvement Team to deliver the A24 Ballynahinch Bypass ('the Proposed Scheme').

1.1.1.2 I hold a First Class Bachelor of Science (Honours) degree in Environmental Science, and a Master of Philosophy degree, by research, in quarrying and its impacts on the environment. I am a Chartered Environmentalist, Chartered Water and Environmental Manager, Chartered Scientist, and Fellow of the Chartered Institution of Water & Environmental Management (CIWEM). I am also past Chairman of the Northern Ireland branch of CIWEM.

1.1.1.3 I have over sixteen years' experience of carrying out Environmental Impact Assessments (EIA) for major infrastructure projects and development proposals, and in particular a range of major road projects throughout Northern Ireland. The assessments have included the preparation of both Scoping Reports and Environmental Statements.

1.1.1.4 I am responsible for the environmental assessment of major road improvement schemes throughout Northern Ireland. This has included the environmental appraisal of road schemes in Armagh, Enniskillen, Strabane and Omagh, and the environmental assessment of numerous major road improvement schemes including the A5 Newtownstewart Bypass, A8 Belfast to Larne Road improvements, M2 Motorway widening (Junctions 4 to 2), Six Road Ends junction improvement, A1 Beech Hill to Cloghogue dualling (Newry), A6 Randalstown to Castledawson dualling, A6 Londonderry to Claudy dualling, and the York Street Interchange.

1.1.1.5 I am the Environmental Coordinator for this project, responsible for the EIA of the Proposed Scheme, and subsequent preparation and delivery of the A24 Ballynahinch Bypass Proposed Scheme Report: Part 1 Environmental Statement, March 2015. I have been involved in the management and coordination of the EIA of the overall scheme since 2005.

1.1.1.6 The EIA of the Proposed Scheme was undertaken, managed and compiled by AECOM, as part of a TransportNI commission for assessment, preparation and reporting of the A24 Ballynahinch Bypass scheme. Reviews and audits of assessments have been undertaken at key stages to ensure a robust EIA that complies with requirements of Part V of The Roads (Northern Ireland) Order 1993 as substituted by The Roads (Environmental Impact Assessment) Regulations (Northern Ireland) 1999 and amended by The Roads (Environmental Impact Assessment) Regulations (Northern Ireland) 2007.

1.1.1.7 For the purpose of this Proof of Evidence, any reference to AECOM may include reference to its former legacy companies, including URS, Scott Wilson and Ferguson McIlveen.

1.2 Scope of Evidence

1.2.1.1 Mr Daly has outlined the background to the Proposed Scheme and the Statutory Procedures, and Mr Kissick has addressed the scheme development, up to the publication of Draft Orders and has set the context for the current Environmental Statement (ES). My evidence will therefore deal only with the March 2015 ES.

1.2.1.2 The ES adopts the structure set out in the Design Manual for Roads & Bridges (DMRB) Volume 11: Environmental Assessment, which lists ten environmental topics as follows:

- Air Quality;
- Cultural Heritage;
- Ecology & Nature Conservation;
- Landscape & Visual Effects;
- Land Use;
- Noise & Vibration;
- Pedestrians, Cyclists, Equestrians & Community Effects;
- Vehicle Travellers;
- Road Drainage & the Water Environment; and
- Geology & Soils

1.2.1.3 The effects resulting from construction, and any associated disruption are assessed under the individual topic headings as listed above. The effects on specific policies and plans are reported where they are most relevant (i.e. under Strategic Need for the Proposed Scheme and the individual environmental topic headings).

1.2.1.4 A number of Interim Advice Notes (IANs) have been issued by Highways Agency in relation to the DMRB environmental assessment techniques. Whilst these contain specific guidance, they are normally used in connection with works on motorways and trunk roads in England, subject to any specific implementation instructions contained within the IAN. However, TransportNI has published a Director of Engineering Memorandum, which adopts these into policy and implements them within Northern Ireland. Where applicable, the DMRB environmental assessment has been supplemented by or superseded using this guidance (i.e. as is the case with Highways Agency Interim Advice Note (IAN) 135/10 '*Landscape and Visual Effects Assessment*', which provides instructions on the assessment of landscape and visual effects of highway projects and replaces guidance outlined in DMRB 11.3.5 '*Landscape Effects*').

1.2.1.5 The opening Departmental Statement has already covered the general topic of 'Policies and Plans'.

1.3 Legal basis for the Environmental Statement

1.3.1.1 The ES has been issued in accordance with European Communities (EC) Council Directive 85/337/EEC, as amended by EC Council Directive 97/11/EC and Directives No. 2003/35/EC & 2009/31/EC of the European Parliament and of the Council (hereafter referred to as the EIA Directive) and required by Part V of The Roads (Northern Ireland) Order 1993 as substituted by The Roads (Environmental Impact Assessment) Regulations (Northern Ireland) 1999 and amended by The Roads (Environmental Impact Assessment) Regulations (Northern Ireland) 2007. The initial Directive of 1985 and its three amendments have been codified in Directive 2011/92/EU of 13 December 2011. Directive 2011/92/EU was amended by Directive 2014/52/EU which entered into force on 15th May 2014. Member States have to apply these rules from 16th May 2017 at the latest.

1.4 Structure of the Environmental Statement

1.4.1.1 The ES comprises three volumes in accordance with DMRB 11.2.6; these are:

- Volume 1 Environmental Assessment – the main text of the document which includes separate Non-Technical Summary, separate Introduction (Part I), Environmental Assessment (Part II), Conclusions (Part III) and References & Glossary (Part IV);
- Volume 2 Appendices – all supplementary information associated with the document; and
- Volume 3 Drawings – figures as referenced within the various chapters of Volume 1 Environmental Assessment.

1.4.1.2 The ES adopts the following structure:

Volume 1 – Environmental Assessment

Non-Technical Summary

Part I – Introduction

- Introduction;
- Strategic Need for the Proposed Scheme;
- Alternatives Considered;
- Scheme Description;
- Existing Conditions; and
- Consultations.

Part II - Environmental Assessment

- Environmental Impact Assessment (EIA) Methods;
- Air Quality;

- Cultural Heritage;
- Ecology & Nature Conservation;
- Landscape & Visual Effects;
- Land Use;
- Noise & Vibration;
- Pedestrians, Cyclists, Equestrians and Community Effects;
- Vehicle Travellers;
- Road Drainage & the Water Environment; and
- Geology & Soils.

Part III – Conclusions

- Assessment of Cumulative Environmental Effects;
- Summary of Environmental Effects; and
- Schedule of Environmental Commitments.

Part IV – References & Glossary of Terms

- References; and
- Glossary of Terms.

Where relevant, reference has been made to the methodologies outlined in the DMRB Volume 11: Environmental Assessment.

Volume 2 – Appendices

- Introduction;
- Scheme Description;
- Consultations;
- Air Quality;
- Cultural Heritage;
- Ecology & Nature Conservation;
- Landscape & Visual Effects;
- Noise & Vibration;
- Pedestrian, Cyclist, Equestrian and Community Effects;

- Vehicle Travellers;
- Road Drainage & the Water Environment;; and
- Geology & Soils.

Volume 3 – Drawings

- Introduction;
- Strategic Need for the Proposed Scheme;
- Alternatives Considered;
- Scheme Description;
- Air Quality;
- Cultural Heritage;
- Ecology & Nature Conservation;
- Landscape & Visual Effects;
- Land Use;
- Noise & Vibration;
- Pedestrian, Cyclist, Equestrian and Community Effects;
- Vehicle Travellers;
- Road Drainage & the Water Environment; and
- Geology & Soils.

1.4.1.3 Each of the environmental topics is reported in the same format:

- An **Introduction** describing the purpose of the section;
- A description of the **Methodology** used in the section, including relevant Limitations and Assumptions;
- A synopsis of **Consultations** undertaken in relation to the topic;
- The relevant Regulatory & Policy Framework;
- A description of the aspects of the Existing Environment or **Baseline Conditions** relevant to the environmental topic under consideration;
- An assessment of the **Predicted Impacts**, (both Operation and Construction) of the Proposed Scheme on the environmental topic, including secondary impacts where relevant;

- Recommendations for **Mitigation & Enhancement Measures** (both Operation and Construction) to reduce or eliminate any significant negative impacts identified;
- Where appropriate, an assessment of the **Residual Effects** which will remain assuming that the recommended mitigation measures are fully and successfully implemented; and
- **Summary & Conclusions** of the assessment for the topic.

1.5 Compliance with Legislation

1.5.1.1 As per the requirements of The Roads (Environmental Impact Assessment) Regulations (Northern Ireland) 1999, the ES contains the information referred to in Annex IV of the EIA Directive, which is relevant to the specific characteristics of the Proposed Scheme and to the environmental features likely to be affected.

1.5.1.2 In line with the requirements of the codified EIA Directive 2011/92/EU, as amended by Directive 2014/52/EU, the ES has identified, described and assessed in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of the Proposed Scheme on the following factors:

a) population and human health;

b) biodiversity (for example fauna and flora), with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;

c) land (for example landtake), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air and climate (for example greenhouse gas emissions, impacts relevant to adaptation);

d) material assets, cultural heritage (including architectural and archaeological aspects) and the landscape; and

e) the interaction between the factors referred to in points (a) to (d).

1.5.1.3 Table 1 lists where these factors have been addressed/considered within the respective technical chapters of the ES.

Table 1: EIA Directive environmental factors and respective technical chapters from the ES.

EIA Directive Environmental Factors:	Covered in the A24 Ballynahinch Bypass ES under:
Population and Human Health	Air Quality Landscape & Visual Effects Land Use Pedestrians, Cyclists, Equestrians & Community Effects Noise & Vibration
Biodiversity	Ecology & Nature Conservation Road Drainage & the Water Environment

Land	Land Use
Soil	Land Use Geology & Soils
Water	Ecology & Nature Conservation Road Drainage & the Water Environment Geology & Soils
Air	Air Quality Noise & Vibration
Climate	Air Quality
Material Assets	Cultural Heritage Land Use Pedestrians, Cyclists, Equestrians & Community Effects
Cultural Heritage	Cultural Heritage
The Landscape	Landscape & Visual Effects

1.6 Consultation

1.6.1 Stakeholder Consultation

1.6.1.1 An integral element of the environmental assessment includes consultation with statutory authorities and other interested bodies to establish any relevant constraints or factors to be taken into account when considering the Proposed Scheme. All statutory consultations undertaken to date were in accordance with TransportNI's '*Communications Guidelines for Major Works Projects*' document and '*Good Practice Communications Guide*'.

1.6.1.2 The main aim of the consultation process was to ensure that there was effective communication with key stakeholders and other interested parties as the scheme development progressed. As part of the scoping for the ES, the following statutory and non-statutory bodies were consulted:

- Ballynahinch Regeneration Committee;
- Ballynahinch United Football Club;
- Belfast & County Down Railway Museum Trust;
- Blackhead Angling Club;
- Department of Agriculture & Rural Development - Countryside Management Development Branch;
- Department of Culture, Arts & Leisure - Fisheries Operations & Technical Support;
- Down District Council:

  - Chief Executive;
  - Corporate Services Department;
  - Cultural and Economic Development Department;
  - Environmental Services Department;
  - Recreation and Community Services Department;
- Department of the Environment - Air & Environmental Quality Unit;
- Department of the Environment – Planning and Local Government :
  - Ards Down Area Plan Team;
  - Area Planning Manager;
  - Minerals Development & Compliance;
  - Southern Area Development Plan;
  - Tree Preservation Orders;
- Department for Regional Development - Cycling Unit;
- Department for Social Development;
- Dromara Cycling Club;
- Geological Survey of Northern Ireland;
- Glassdrummond Jubilee Orange Hall;
- Irish Whooper Swan Study Group;
- Johnston Memorial Orange Hall;
- National Trust;
- Northern Ireland Agricultural Producers' Association;
- Northern Ireland Badger Group;
- Northern Ireland Bat Group;
- Northern Ireland Raptor Group;
- Northern Ireland Environment Agency (NIEA):
  - Built Heritage (Historic Buildings Unit);
  - Built Heritage (Historic Monuments Unit);
  - Environmental Protection (Conservation, Designations & Protection);

  - Environmental Protection (Water Management Unit);
  - Environmental Protection (Waste Management Unit);
  - Natural Heritage (Development Management Team);

- Northern Ireland Housing Executive;
- Rivers Agency - Area Engineer;
- Rivers Agency – Headquarters;
- Rivers Agency – Planning Advisory Unit (PAU);
- Royal Society for the Protection of Birds;
- South Eastern Education & Library Board;
- Statutory Advisory Councils to the Department of the Environment;
- Sustrans Northern Ireland;
- Translink - Research & Technical Support Manager;
- Translink - Service Delivery Manager;
- Ulster Angling Federation;
- Ulster Farmers' Union;
- Ulster Wildlife Trust; and
- Woodland Trust.

1.6.2 Public Consultation Event – November 2009

1.6.2.1 A public consultation event was held on 12 November 2009 from 10am to 9pm in the Market House, Ballynahinch during Stage 2 (route options). The aim was to inform the local population, elected representatives and other interested parties on the current stage of development, provide an indicative programme for delivery of the A24 Ballynahinch Bypass scheme, as well as enabling views and information to be collected from the public and their representatives to help inform the design development. The exhibition was hosted by TransportNI staff, assisted by the Project Design Team.

1.6.2.2 A number of elected representatives, including MEPs, MPs, MLAs, Mayor and Councillors, were invited to a presentation at the Market House on the evening of the exhibition which was well attended. The audience was addressed by the Project Sponsor and the Project Manager; the presentation was followed by a Question & Answer session.

1.6.2.3 A visitor attendance list was kept for those attending the event, and a total of 107 names were logged on the day. Attendees were given a leaflet and encouraged to complete a questionnaire, which they could leave at reception on their way out, or post back to TransportNI.

1.6.2.4 Within the Market House foyer, a series of display boards were placed for viewing, containing written text, photographs and plans; these boards supplemented the information contained in the leaflet. Visitors were encouraged to discuss any matter of their choosing with the staff in attendance. Most visitors took up this invitation and made known their views.

1.6.2.5 A report on the event entitled "*Public Consultation November 2009 – Summary Report*" was submitted to TransportNI in June 2010 and is included in Appendix 6, Annex A in Volume 2 of the ES.

1.7 Summary

1.7.1.1 On the basis of comprehensive preliminary investigations and extensive public and statutory consultations, the significant environmental effects have been identified. These effects have been investigated and reviewed, and are presented in the ES, Volume 1, Chapters 8 to 17.

1.7.1.2 Chapter 18 of the ES details the cumulative effects associated with the Proposed Scheme on the surrounding area from a single project perspective (i.e. Interaction of Impacts); and cumulative impacts from different projects (in combination with the Proposed Scheme being assessed). A Summary of the Environmental Effects is also given, which provides a brief summary of the overall environmental effects described throughout each of the technical chapters (8-17), taking into account the effectiveness of mitigation measures (where appropriate), thus allowing for the overall significance of effect to be rated. At the end of the chapter, a Schedule of Environmental Commitments is given, providing a collective summary of the proposed mitigation to ensure compliance during and beyond the construction contract period.

1.7.1.3 The Statement details the likely impacts of construction and operation of the Proposed Scheme, as appropriate under each technical chapter assessed. Similar to other reports generated by earlier studies, construction impact is the consideration of any potential environmental impact (the majority of which are transient or short-term) before opening, and once opened, operational impact considers long-term usage impacts of the Proposed Scheme upon the surrounding environment.

1.7.1.4 I shall now summarise each topic from the ES.

2. AIR QUALITY

2.1 Methodology

2.1.1.1 The assessment was carried out using the DMRB 11.3.1.3 'Simple' procedure for assessing impacts, which has two components. The first is for Local air quality, which is an estimation of pollutant concentrations that could change as a result of the proposal at specific locations. These concentrations are compared with the air quality criteria set to protect human health or vegetation, as appropriate. Both construction and operational effects are considered for local air quality.

2.1.1.2 The second component is for the Regional impact assessment, which examines the change in emissions for a range of pollutants as a result of scheme implementation, as these pollutants can have impacts on a regional, national and international scale.

2.1.1.3 Transport Analysis Guidance (TAG) (Department for Transport, 2014) was also used to complement the DMRB assessment procedure.

2.2 Findings

2.2.1.1 When compared to the existing A24 strategic route through Ballynahinch, the proposed bypass would result in a decrease in the total number of properties within 200m that would be exposed airborne pollutants attributable to strategic traffic through movements, and would result in a significant reduction (approximately 97%) in the number of existing properties within 50m (the zone where airborne pollution concentrations are typically highest). On this basis, an overall higher number of properties are anticipated to experience a marginal improvement in local air quality than experience a deterioration with scheme implementation.

2.2.1.2 The findings of the Local air quality assessment of operational phase impacts concluded that whilst some receptors would experience changes in NO_2 and PM_{10} concentrations, the significance of effect would be Negligible in all cases, as pollutants are well below National Air Quality Standard limit values. It has also been identified that in relation to absolute concentrations of NO_2 in the assumed 'Opening Year' (2019), local air quality would improve for approximately 1546 properties and deteriorate for approximately 216 properties close to the affected road network. Similarly, in relation to absolute concentrations of PM_{10}, local air quality would improve for approximately 1646 properties and deteriorate for approximately 116 properties close to the affected road network.

2.2.1.3 The findings of the Regional air quality assessment indicates that total emissions of CO, THC, NO_x, PM_{10} and C are forecasted to decrease from the 'Do-Minimum' and Base Year (2013) scenarios, for both the assumed 'Opening Year' (2019) and 'Design Year' (2033) with scheme implementation. These results can be attributed to the removal of a significant proportion of traffic from the town, which currently leads to congestion. The provision of the bypass would allow traffic to flow more freely both through the town, and on the new bypass route, reducing pollutants produced by idling vehicles.

2.2.1.4 In terms of potential air quality impacts during the construction phase, approximately 308 properties would be within 200m of the proposed works. With regards to potential disruption to these properties, nuisance may be in the form of excessive dust, generated particularly during prolonged dry periods, and operation of construction machinery, which can emit higher than normal levels of airborne contaminants. This is typical on any project which involves movement of large quantities of material for earthwork and road construction.

2.3 Mitigation Measures

2.3.1.1 It is predicted that pollutant concentrations following construction of the Proposed Scheme would remain well below the NAQS limit values. Therefore, no specific mitigation measures are deemed necessary for operational phase impacts.

2.3.1.2 Mitigation measures would be required so that construction works could be carried out in such a manner that emissions of dust and other pollutants are limited and that best practicable means are employed to minimise disruption, risks to human health, and to avoid unnecessary impacts on sensitive ecological habitats. Effective implementation of the Contractor's Dust Minimisation Plan would reduce or eliminate adverse impacts.

2.4 Conclusions

2.4.1.1 The air quality assessment, carried out according to recognised methodologies, indicates that no significant impact on air quality would occur with implementation of the scheme.

3. CULTURAL HERITAGE

3.1 Methodology

3.1.1.1 The assessment of cultural heritage within the study area reviewed the three subtopics of archaeological remains, historic remains and historic landscapes. In accordance with DMRB 11.3.2.3, for the purposes of the ES, a 'Detailed' Assessment was deemed the most appropriate level of assessment. The objective of this was: to undertake sufficient assessment to identify the location, type and importance of cultural heritage constraints; to characterise and assess the importance of the cultural heritage of the study area; to determine the likely nature and scale of potential impacts from construction and operation of the Proposed Scheme; and to determine mitigation measures to reduce or remedy any adverse impacts.

3.1.1.2 The study area was determined with reference to DMRB 11.3.2, examining the layout of the proposed road scheme area and a study corridor 300m from the scheme boundary. The extent of the study corridor was determined based on the nature of the route, the sensitivity of the surrounding environment, and the local topography.

3.1.1.3 Previous studies and sources of information were utilised, including the initial Cultural Heritage report prepared by Archaeological Associates (Ireland), and information held by the Northern Ireland Environment Agency (NIEA) – Monuments & Buildings Record (MBR). This was to identify major constraints, such as the presence of statutorily designated Archaeological Sites, Listed Buildings, Historic Parks, Gardens & Demesnes, Battlefield Sites, Defence Heritage Sites, Industrial Heritage, Conservation Areas, World Heritage Sites, National Trust Inalienable Land, and any other relevant designations, important assets and important historic landscapes that may be affected by the Proposed Scheme. Background archaeological baseline information was gathered from various publications, including the Ulster Journal of Archaeology, and the Archaeological Survey of County Down. An assessment of place-name evidence for the Proposed Scheme was also prepared.

3.1.1.4 Other sources consulted included selected aerial photographs from the Ordnance Survey (OS) archives; relevant 18th Century estate papers; 18th Century maps and plans; 19th and early 20th Century OS 6-inch maps held at the Public Records Office of Northern Ireland (PRONI); the Ordnance Survey Memoirs; and the special collection of local history sources available at Queen's University Library.

3.1.1.5 Ground investigation work has been undertaken at various stages in the scheme development process. The results of the exploratory holes (trial pits) have been assessed as part of the 'Detailed' assessment to characterise below ground conditions and the potential for encountering buried archaeological deposits within the Proposed Scheme boundary. A number of the trial pits were also subject to archaeological monitoring in 2013 in order to assess the presence/absence and survival of buried archaeological remains.

3.1.2 Fieldwork

3.1.2.1 A cultural heritage walkover survey was undertaken in order to assess the Proposed Scheme footprint for unidentified heritage remains and to confirm the identification of assets within the study area, including the wider area, where appropriate.

3.2 Findings

3.2.1.1 The Proposed Scheme would traverse a rural landscape characterised by scattered evidence for prehistoric burial, Early Christian and medieval settlement, churches and defended sites. The town and the grounds surrounding Montalto House were the scene of the historic Battle of Ballynahinch (1798). The town slowly recovered from the rebellion and during the 19th Century it grew, and new buildings were added, including the corn and flax mill next to the Ballynahinch River (opposite Millbridge Playing Fields). From the early 19th Century, it is likely that farmland in the vicinity of the Proposed Scheme was improved and drained, resulting in the historic field pattern which is recorded on the OS maps and that still survives to the present day. The historic landscape features within the route corridor include these post-medieval agricultural field systems, the historic road system and the former extent of post-medieval demesnes that are present within the Ravarnet Valley and Quoile Valley lowlands.

3.2.1.2 In terms of archaeological remains, the Proposed Scheme would have a Slight Adverse impact on five assets of High value (Court tomb and graveyard at Killygony Graveyard, Rath in Ballylone Little Townland, Cashel in Glasdrumman Townland Church, graveyard and enclosure, Magheradrool and the Windmill stump in Ballynahinch), and a Moderate Adverse impact on one asset of Medium value (Palaeo-environmental remains within the Glassdrumman and Ballynahinch river floodplains). Seven Low value assets (Mass Rock, Demolished building opposite Bridge Cottage and five Aerial Photograph (A.P.) sites) would experience a Slight Adverse impact. Two sites of Negligible value would experience Slight Adverse impacts (A.P. site and Circular earthwork) and a further two sites of Negligible value would experience a Neutral effect (two A. P sites).

3.2.1.3 The impact on each of these assets is either as a direct result of the landtake that is required for the Proposed Scheme, or an impact on the setting. Where archaeological/buried environmental remains survive, they would be destroyed by the groundworks for the Proposed Scheme. Where appropriate, archaeological trial trenching would be carried out, followed by detailed excavation.

3.2.1.4 The Proposed Scheme would impact on the setting of sixteen historic building assets (eight Medium value and eight Low value). For seven of the Medium value assets (First Presbyterian Church, Windmill Street; Old Court House (former Market House), The Square; Magheradrool Church of Ireland Parish Church, Church Road; Northern Bank, 29 High Street; Belle Vista, 27 Mourne View; 2 Crossgar Road; and Ballynahinch Butcher's shop, 1 Dromore Street), and one Low value asset (Mill Hill, 52 Church Road, Ballynahinch (record only)), a Slight Beneficial effect would be experienced due to a reduction in traffic in Ballynahinch town centre. One Medium

value asset (Corn Mill, 62 Church Road ('Mill Bridge')), and six Low value assets (Former schoolhouse (sic) at 4 Drumaness Road (record only); Millbrook Lodge Hotel, 5 Drumaness Road (record only); Farm outbuildings located on private agricultural access lane off Crossgar Road; Bridge on Belfast and County Down Railway (BCDR) Branch Line at Ballynahinch Junction; Bridge at Ballymaglave South; and Bridge Cottage on Crossgar Road) would experience a Slight Adverse impact with scheme implementation, due to either a direct impact or an indirect impact on setting. The Low value asset (Bridge at Ballylone Big) would experience a Neutral impact.

3.2.1.5 During construction, temporary impacts would be caused to the setting of these buildings, as a result of noise, dust, visual intrusion and disruption to access.

3.2.1.6 The Proposed Scheme would impact five historic landscape elements (setting impacts and impacts to buried and upstanding remains), which includes one Medium value (Montalto House landscaped park), three Low value (townland boundaries; earthwork and dry stone wall field boundaries; BCDR branch line) and one Negligible value (Historic road pattern) assets. Impacts would range from Neutral to Slight Adverse.

3.3 Mitigation Measures

3.3.1.1 Procedures would be adopted to ensure that archaeological areas and sites are protected during construction. This would involve temporary fencing where appropriate and clear notices on site fences. Toolbox talks would be undertaken as necessary to inform construction supervision staff and site operatives of archaeologically sensitive areas.

3.3.1.2 A procedure to agree a minimum period of time to undertake mitigation actions for unforeseen finds during the construction process would be agreed with the Employer and would be recorded in the Construction Environmental Management Plan (CEMP).

3.3.1.3 The Archaeological Mitigation Programme would commence prior to the start of the main construction works.

3.3.1.4 During Phase 1 (during the enabling works or as soon as access is available), a programme of trial trenching, and if appropriate, test pit evaluation would be undertaken. Sample-based mechanical or hand excavated trenches would be used to assess and record the character of archaeological remains. Targeted trenching would be used where remains have been identified through non-intrusive survey or where there is archaeological potential. The results of this intrusive trenching or test pit investigation works would inform decision making on further mitigation recording that may be appropriate. Geo-archaeological assessment would also be carried out.

3.3.1.5 Phase 2 (during enabling works) – areas or sites that require preservation by record and that were identified at Phase 1 for detailed excavation, would be investigated. This would also determine the scope of further mitigation works. If additional detailed geo-archaeological investigations are required, these would also be carried out. A General Watching Brief (GWB)

would be carried out for ground works, such as utility diversions and road diversions. Detailed design work for preservation *in-situ* would be developed if required.

3.3.1.6 Phase 3 (during later enabling works and in advance of and concurrent with construction) - at the start of the construction period, a Targeted Watching Brief (TWB) would be undertaken before or concurrent with the main groundworks (stripping of made ground /topsoil) at selected locations. The GWB would be undertaken in all other areas where it is required.

3.3.1.7 Phase 4 - a post-excavation assessment would be undertaken in accordance with NIEA - Historic Monuments Unit advice, followed by an appropriate scheme of detailed analysis and reporting. Phase 4 would commence as soon as practicable following completion of the main investigative works.

3.4 Conclusions

3.4.1.1 Of the 26 archaeological assets, 27 historic buildings, and 6 historic landscape elements identified throughout the study area, the assessment has indicated that 17 archaeological sites, 16 historic buildings and 5 historic landscape assets would be impacted by the Proposed Scheme. The Scheme design has avoided impacts where possible and minimised adverse effects. The Proposed Scheme would have beneficial effects on the setting of a number of designated historic buildings that are in the centre of Ballynahinch and one non-designated historic building that is on the southern approaches to the town. Where archaeological sites, historic buildings and historic landscape elements are adversely impacted by the Proposed Scheme, appropriate archaeological mitigation is proposed in advance of and during construction. This would preserve by record these heritage assets prior to their modification / removal. The overall significance of effect on the cultural heritage assets of the study area is assessed as Minor Adverse.

4. ECOLOGY & NATURE CONSERVATION

4.1 Methodology

4.1.1.1 The assessment was undertaken in accordance with the requirements of DMRB 11.3.4. Suitably experienced ecologists reviewed existing ecological, anecdotal information, and conditions in the vicinity of the Proposed Scheme. The ecologists also examined recent aerial photography for areas of nature conservation interest. A range of specialist surveys were undertaken, with copies of the various specialised survey reports included in Appendix 10 in Volume 2 of the ES.

4.1.1.2 Consultation was undertaken with; DARD - Countryside Management Branch, DCAL - Fisheries Operations & Technical Support; Irish Whooper Swan Study Group (IWSSG); the National Trust; NIEA – Natural Heritage; NIEA – Environmental Protection; NI Bat Group; NI Raptor Study Group; Northern Ireland Badger Group; Rivers Agency; Royal Society for the Protection of Birds (RSPB); Ulster Angling Federation; the Woodland Trust; and Ulster Wildlife Trust (UWT).

4.1.1.3 A desktop study was undertaken, to gather together ecological evidence based on previous surveys of the area, website-based research for ecological records and knowledge, including the Habitas website and information from a data request (at Stage 2) from the Centre for Environmental Data and Recording (CEDaR) was considered.

4.1.1.4 An ‘Extended’ Phase 1 Habitat Survey was undertaken to identify notable and protected habitats, and species. The entire site and adjacent habitats were walked by suitably experienced ecologists, noting plant communities, habitats, landscape features of ecological value, potential habitats, and signs of any mammal or notable invertebrate activity.

4.1.1.5 A modification of the Phase 1 field survey and mapping methodology, developed by the Joint Nature Conservation Committee (JNCC) was used, categorising habitats and landscape features on site, whilst recording any Protected Species or features capable of supporting Protected Species. The survey was appropriately timed to enable a full survey of key habitats and macrophyte species, and also incorporated a survey for invasive [non-native] species.

4.1.1.6 Due to the possibility of potential impacts, a Habitats Regulations Assessment (HRA) was undertaken in tandem with the ecological assessment. This consisted of a Stage 1 Screening Assessment (Test of Likely Significance) and a Stage 2 Statement to Inform the Appropriate Assessment, both undertaken in accordance with the Habitats Directive 92/43/EEC.

4.1.1.7 Specific surveys for the presence of badger, otter and bat were undertaken, using NIEA survey requirements specific for each species.

4.1.1.8 A smooth newt breeding potential survey was undertaken to identify potential areas of standing water that were suitable newt habitat. Watercourses were also assessed for potential areas of smooth newt habitat.

4.1.1.9 A breeding bird survey was undertaken, using adapted British Trust for Ornithology (BTO) Breeding Bird Survey methodology. The study area was walked at a steady pace and all birds seen or heard in the vicinity of the Proposed Scheme were recorded.

4.1.1.10 A specialist fisheries consultant undertook the Fisheries Assessment. Background data on the Ballynahinch River was sourced through consultation with the AFBI and DCAL Inland Fisheries. Initial site inspections of watercourse crossing points were undertaken, followed by habitat assessments and fish stock surveys at selected sites. A biological survey of selected sites across the river catchment was also conducted to assess biological quality.

4.2 Findings

4.2.1.1 The operational phase of the Proposed Scheme would have adverse impacts on the majority of species. In general, in the short-term, the loss of natural habitat would remove opportunities for all species to forage and breed within the Proposed Scheme area. In the medium to longer term, as the site becomes more established and vegetation begins to develop and mature, opportunities for increased biodiversity within the route corridor would develop. A summary of operational phase general impacts is outlined in Table 2.

Table 2: Operational Phase Impacts Summary

Operation Impacts	Nature of Impact
Noise disturbance	Regular traffic noise may displace sensitive species (e.g. badgers, otters, birds) especially in the short-term although most animals would become habituated to noise with time. Long-term impacts on some bird species through displacement of breeding territories may occur.
Visual disturbance	Visual disturbance due to vehicles and human activity acting on sensitive species (e.g. sensitive mammals and birds).
Water quality impacts	Potential for contaminated petrochemical run-off from spills on roads, following flood events.
Air quality impacts	Traffic redistribution on the network could affect roadside vegetation.
Artificial lighting	Street lighting and traffic headlights would disturb sensitive species, particularly where the environment was previously unlit.
Landscaping	With the introduction of new vegetation types, vegetation structure, botanical species composition and growth patterns, as influenced by the post-construction habitat management regime, planted habitats in landscaped areas would influence the faunal species that colonise these areas, which would be an adverse or beneficial impact, depending on the species.
Road mortality	Increased risk of road mortality to wildlife, especially mammals and birds, and road development on site may form a substantial barrier to dispersal.

4.2.1.2 In terms of impact on badgers, an inactive Main sett and an active Outlier sett would be lost due to the Proposed Scheme. In addition, an active badger territory lies within the study area with associated badger activity including latrines, snuffle holes, push-throughs and trails noted. Part of the territory would be severed by the Proposed Scheme footprint.

4.2.1.3 The bat surveys recorded five bat species in relatively low numbers across the immediate study area, namely Daubenton's bat, Whiskered bat, Leisler's bat, Common and Soprano Pipistrelle. Suitable bat habitats exist including mature treelines, river corridors and linear vegetation, specifically along the Ballynahinch River, the mature lines around the Spa Road junction, the Crossgar Road / former Ballynahinch Branch Railway line, and mature vegetation close to farm buildings scheduled for demolition. Demolition of the former Ballynahinch Branch Railway line bridge on the Crossgar Road would remove an important foraging area for the Whiskered bat. No roosts would be lost, although significant lengths of hedgerow and linear vegetation would be removed.

4.2.1.4 Whilst evidence of protected mammal activity has been observed within the immediate study area, further surveys should be conducted prior to the construction phase to confirm the presence or otherwise of such protected mammals. Any active setts or roosts revealed within the confines of the proposed development would require implementation of appropriate mitigation measures required by the NIEA – Natural Heritage.

4.2.1.5 The Ballynahinch River has a direct hydrological link to Strangford Lough Special Protection Area (SPA) and Special Area of Conservation (SAC). The same hydrological link would also exist with other designated sites of Quoile Area of Special Scientific Interest (ASSI) and Quoile Pondage Basin National Nature Reserve (NNR). The Stage 2 Appropriate Assessment undertook a thorough examination of potential impacts and concluded that on full implementation of the mitigation measures, all remaining residual impacts would be removed and there would be no significant effects on the integrity of either Strangford Lough SAC or Strangford Lough SPA Natura 2000 sites.

4.2.1.6 During the construction phase, site clearance could create significant risks to habitats to be retained. Disturbance close to mature tree roots has the potential to destabilise the roots and ultimately kill the specimen. Other habitats could be lost as part of site clearance works to provide temporary access roads or space for site compounds or construction purposes.

4.2.1.7 With large areas of earthworks and bare earth surfaces on site during the construction period, there is a risk that adjacent vegetation could be impacted through smothering from dust and dirt deposition, particularly along haul roads.

4.2.1.8 Construction would involve site clearance, physical removal of existing deposits and vegetation, and the introduction of artificial construction materials and active machinery. A summary of construction phase impacts is outlined in Table 3.

Table 3: Construction Phase Impacts Summary

Construction Impacts	Nature of Impact
Habitat damage and loss	The magnitude of this impact is directly related to the relative amount of habitat lost, the ecological value of the habitat, whether it is a temporary or permanent loss, and whether the habitat can be restored or recreated (compensated). Development would take areas of terrestrial habitats, and both permanent and temporary impacts can be anticipated.
Noise and vibration	Noise associated with construction, especially piling and machinery acting on sensitive species (e.g. breeding birds). The magnitude of impacts would be seasonally and spatially dependent. Vibration associated with construction could cause an indirect temporary impact upon sensitive species within or very close to the construction footprint.
Visual disturbance	Many birds and mammals are sensitive to visual disturbance (usually in combination with noise disturbance). These indirect impacts would be temporary and seasonally or spatially dependent.
Water quality impacts	Pollution of watercourses is an indirect impact. There are several potential sources of pollution: run-off of water-laden sediment from stockpiles close to the watercourses, accidental chemical/fuel spillage, and disturbance of previously confined contaminants. Whilst the source of impacts is often temporary, these indirect effects may be either temporary or permanent.
Dust and air quality	Dust deposition adjacent to work sites leading to damage to vegetation, along with air quality and water quality impacts. This indirect effect would be either a temporary or permanent impact.
Artificial lighting	Construction lighting could displace sensitive protected species or provoke behavioural changes. Impacts would be seasonally and spatially dependent. This would be an indirect temporary (but possibly prolonged)impact.

4.3 Mitigation Measures

4.3.1.1 A number of general principles should be adopted. A suitably experienced ecologist would oversee all works during the Construction Phase and ensure that satisfactory mitigation measures are put in place at all times in relation to ecological issues. This role is termed as the Ecological Clerk of Works (ECoW). The ECoW would provide the client with all the necessary information to ensure the development protects the natural heritage of the site, as laid down in Northern Ireland legislation and as a requirement of the ES, or NIEA.

4.3.1.2 An Environmental Management Plan (EMP) has been prepared to ensure work and management practices relating to the Proposed Scheme take cognisance of the environment. This plan would be carried forward by the contractor and developed further to become the Construction Environmental Management Plan (CEMP). A Habitat Management Plan would be prepared as part of the CEMP outlining how natural habitats would be managed through scheme construction and operation.

4.3.1.3 All vegetation clearance works should take place ideally during the winter months (September to February) to avoid the key breeding periods of bats and birds. It is against the law to disturb

breeding birds and bats, therefore, working outside of this period risks encountering nesting birds or roosting bats which may result in a delay to programme. Any vegetation clearance work undertaken between March and August would have the specific approval of the ECoW to ensure that no ecological constraints exist.

4.3.1.4 As Strangford Lough SPA, Strangford Lough SAC and the Quoile ASSI / Quoile Pondage NNR all have a direct hydrological link with the Proposed Scheme via the Ballynahinch River, it is possible that any pollution events or hydrological changes may affect the protected areas downstream. In this regard, various prescriptive mitigation measures are proposed which have been outlined in Sub-Section 10.7 of the ES.

4.3.1.5 Landscape planting objectives would attempt to mitigate and compensate for the mosaic of habitats to be lost as part of the Proposed Scheme. A range of prescriptive measures have been outlined in Sub-Section 10.7 of the ES including incorporation of existing trees where possible, replacement of removed trees and planting replacement hedgerows.

4.3.1.6 Pre-construction surveys of all protected species would be undertaken by a suitably experienced ecologist to establish the current status of these species (including badgers, otters, bats, breeding birds and newts), and whether further mitigation would be required.

4.3.1.7 There would be the loss of an active outlier badger sett and inactive main sett in the study area and therefore mitigation may be required in the form of an artificial sett. In addition, active badger territories are likely to be bisected. Badger fencing and underpasses would be required to keep badgers off the proposed road and provide linkages to otherwise isolated habitats. Further prescriptive measures have been outlined in Sub-Section 10.7 of the ES, specifically for badgers.

4.3.1.8 Ballynahinch River and its tributaries are part of an important wildlife corridor for otters and additional care would be taken to avoid disturbance during construction. Further prescriptive measures have been outlined in Sub-Section 10.7 of the ES, specifically for otters.

4.3.1.9 A suitably experienced ecologist would undertake pre-construction surveys on any semi-mature / mature trees to be felled, and the buildings and structure to be demolished for the likelihood of bat presence. Mitigation planting including bat hop-over vegetation and further prescriptive measures have been outlined in Sub-Section 10.7 of the ES, specifically for bats.

4.3.1.10 Landscaped planted areas would be created to provide bird species with nesting opportunities across the site as well as seed and berry-rich plants. A range of bird box styles would be provided throughout the planted areas.

4.3.1.11 Measures would be taken to minimise adverse impacts to watercourses, and to retain as much habitat as possible. The CEMP would outline precautions to be taken against accidental spillages of fuels and chemicals. Further prescriptive measures have been outlined in Sub-Section 10.7 of the ES, specifically for fisheries interests.

4.3.1.12 Any modified stream bed would have 100% coverage of habitat, with pool and riffle sequence to provide habitat for fish. Culverted sections would have double the culverted area enhanced upstream/downstream where at all feasible.

4.3.1.13 TransportNI has a duty under The Wildlife and Natural Environment (WANE) Act (Northern Ireland) 2011, "*in exercising any functions, to further the conservation of biodiversity so far as is consistent with the proper exercise of those functions*". Biodiversity enhancement opportunities throughout the site that could be used to comply with the WANE Act (2011) are outlined in detail in Sub-Section 10.7 of the ES.

4.4 Conclusions

4.4.1.1 Overall, the Proposed Scheme would have a low effect on the ecological integrity and conservation status of the study area, its habitats and its species. The landscape and associated species that would be impacted upon are not considered to be particularly sensitive to the proposed development. The predicted impact would be such that coherence of ecological structure and function would be preserved and the populations of species would be maintained to pre-development conditions. Overall, the residual effects on the ecology and nature of the route corridor are considered either Minor Adverse or Negligible.

5. LANDSCAPE & VISUAL EFFECTS

5.1 Methodology

5.1.1.1 The landscape and visual assessment is based upon guidance contained within the Highways Agency Interim Advice Note (IAN) 135/10 *'Landscape and Visual Effects Assessment'*, published in November 2010. This IAN provides instructions on the assessment of landscape and visual effects of highway projects and replaces guidance set out in DMRB 11.3.5 *'Landscape Effects'*. The assessment has also been supported by using guidance from the Landscape Institute (LI) and the Institute of Environmental Management and Assessment (IEMA) *'Guidelines for Landscape and Visual Impact Assessment: Second Edition'* (2002).

5.1.1.2 Regular site visits between 2012 and early 2013 were undertaken to assess key features of the landscape and critical view points. The significance of the scheme and visual dominance within the landscape were recorded. In addition, an assessment of the existing landscape character was undertaken.

5.1.1.3 Desktop research was undertaken to establish any landscape designations present on or in close proximity to the Proposed Scheme. This process was in accordance with the staged process for undertaking a landscape effects assessment (as outlined within Annex 1 of IAN 135/10), which also included:

- define the study area;
- collect and collate information on the landscape;
- assess the character and value of the landscape through consultation and desk study;
- carry out site survey to assess landscape character and augment the desk study;
- assess the magnitude of impact, or degree of change, caused by the project;
- assess the sensitivity of the landscape to accommodate change arising from the project;
- identify and develop mitigation measures as a component of the iterative design process, to avoid, reduce and where possible remedy adverse effects; and
- assess the significance of the residual landscape effects.

5.1.1.4 As part of this process, photographs were taken from critical viewpoints with a 50mm lens, in line with Landscape Institute best practice guidance. The photomontages were prepared to show the impact of the scheme before and after the implementation of any mitigation measures. An assessment was then undertaken through analysis of the photomontages, desktop and site survey information.

5.1.1.5 In terms of assessing visual effects, again the staged process for undertaking such an assessment (as outlined within Annex 1 of IAN 135/10) was followed, and included:

- determine the extent of visibility of the Proposed Scheme;

- collect and collate information on the visual context of the Proposed Scheme;
- identify receptors and evaluate their sensitivity;
- describe the degree of visual change caused by the Proposed Scheme;
- identify and develop mitigation measures as a component of the iterative design process, to avoid, reduce and where possible remedy adverse effects; and
- assess the significance of the resultant visual effects.

5.1.1.6 An illustrated statement on the potential visual impacts of the Proposed Scheme was prepared, along with a map showing private properties and public amenities and facilities within the zone of visual influence.

5.2 Findings

5.2.1.1 A review of baseline conditions, taking into account the Northern Ireland Landscape Character Assessment and statutory designations, was undertaken. The study area lies within three Landscape Character Areas: Ravernet Valley (LCA 90), Quoile Valley Lowlands (LCA 91) and the Craggy Dromara Uplands (LCA 88). There are no landscape designations, such as Areas of Outstanding Natural Beauty (AONBs) or Areas of High Scenic Value, in the scheme vicinity.

5.2.2 Landscape Impacts

5.2.2.1 The description of the potential landscape character impacts associated with the Proposed Scheme are described according to the three broad Local Landscape Character Areas (LLCAs) identified during the desktop and field survey work. These are: A24 Belfast Road / A21 Saintfield Road junction to Moss Road (LLCA 1), Moss Road to B7 Crossgar Road (LLCA 2), and B7 Crossgar Road to A24 Drumaness Road (LLCA 3).

5.2.2.2 The impact of the Proposed Scheme on the landscape character within LLCA 1 and LLCA 2 is deemed to be Moderate Adverse. The impact of the Proposed Scheme on the landscape character within LLCA 3 is deemed to be Major Adverse.

5.2.3 Road Lighting

5.2.3.1 The presence of road lighting on the Crossgar Road junction is deemed to have an immediate Moderate Adverse visual impact upon individual property views. The most significant impact is deemed to be at the Crossgar Road junction and on the proposed road where it is located on an embankment on the approach to the proposed roundabouts.

5.2.3.2 The new street lighting proposed for the proposed Saintfield and Downpatrick Road roundabouts would be introduced to areas in which existing lighting is present; thus the impact on individual property views would be Minor Adverse. No street lighting is proposed in between the three main junctions, thus the impact on individual property views would be No Change. The entire proposed road lighting scheme is therefore deemed to have a Minor to Moderate Adverse impact on the landscape character.

5.2.4 Visual Impacts

5.2.4.1 Changes in views may give rise to adverse or beneficial visual impacts through obstruction in views, alteration of components of the view, and through opening-up of new views by the removal of screening. Assessments of impact associated with the Proposed Scheme have therefore been gauged against the level of impact already caused by the existing road infrastructure.

5.2.4.2 A description of the visual impact on each property has been assessed and is contained within Appendix 11, Annex C in Volume 2 of the ES. The visual impacts have been assessed prior to any mitigating measures and are given for Year 1, Winter scenario, and for Year 15 Summer when mitigation measures/ screening planting has been established.

5.2.5 Construction Effects

5.2.5.1 Many of the effects specifically related to construction are expected to be temporary. Short-term visual impacts associated with the construction phase can take several forms and there is little that can be done to reduce or mitigate them.

5.2.5.2 Site clearance and earthworks are among the more visible operations and would inevitably have a significant effect on the local landscape during the construction period. The removal of vegetation during site clearance and earthworks would essentially be a permanent effect, however the appearance would be transient and likely to be more visually obtrusive during the construction phase than operation, as new mitigation planting would take time to establish, and earthworks/structures would create new uncharacteristic landscape elements.

5.3 Mitigation Measures

5.3.1.1 The mitigation measures to address the potential landscape and visual impacts associated with the Proposed Scheme are illustrated on the Landscape Mitigation drawings (Figure 11.6) in Volume 3 of the ES.

5.3.1 Avoidance Measures

- avoid the use of dominant road elements on the skyline wherever possible, although this would be unavoidable with the proposed Crossgar Road junction and overbridge;
- signage should be located sensitively during detailed design so that it does not increase the visual impact to residential dwellings;
- road lighting would be kept to essential locations only and designed to reduce unnecessary light spill, to decrease the visual impact of the road at night in the rural setting; and
- retention and enhancement of views from the road where appropriate.

5.3.2 Reduction Measures

- rounding of the top and bottom of cut and embankment slopes to tie in smoothly into existing adjacent landform;

- measures to ensure that road lighting would not remain a dominant feature in the long-term, as the proposed trees would screen the light and lighting columns, thus detracting from the strong vertical appearance of the lighting columns themselves; and
- minimising disturbance of existing vegetation and carrying out proposed planting so as not to emphasise the linear intrusion of the road into the landscape, but rather to reflect vegetation patterns of local habitats, to re-establish a field pattern, and to reflect the landscape character of the area.

5.3.3 Remediation Measures

- provide appropriate screen planting where the road would have a visual impact on adjacent properties or views. The use of larger size and feathered trees, with a high proportion of evergreen species, to be used in selected locations where the visual effect is Very Large to Large Adverse and immediate screening is required;
- where possible and feasible, off-site planting should be considered where it can reduce the visual impact of the road to properties;
- the boundary treatment for the road should be timber post and stock proof fencing, with hedgerow planting, to re-establish field patterns and vehicle barriers should be as visually unobtrusive as possible;
- consideration would be given to the use of grass on verges to reflect the rural setting of the road;
- use of full cut-off lanterns would minimise light spillage onto adjacent areas and limit nuisance from glare;
- providing new planting as an integral part of all infrastructure development, aiming to reinforce local landscape character, giving special consideration to landscape patterns, hedgerows and tree planting, to create a seamless fit with the surrounding landscape;
- the proposed Crossgar Road junction overbridge should have sloping abutments to allow the road corridor landscape to flow under the structure, in order to minimise its visual prominence;
- the proposed bridge across the Ballynahinch River would be as open as possible to allow the river corridor to flow beneath; and
- consideration would be given to the development of gateway features at the proposed roundabouts to the north and south of Ballynahinch to create a sense of arrival into the town.

5.3.4 Construction Measures

- construction compounds and stockpile locations would be sensitively located in relation to adjacent and nearby properties to reduce the extent of adverse visual impacts;
- during construction, avoid disruption and destruction of important, mature tree features, prominent clusters and single stands and hedgerows; and

- construction compounds would be fully reinstated and landscaped following completion of the works.

5.4 Conclusions

5.4.1.1 The Proposed Scheme would introduce new roads into a tranquil rural drumlin landscape east of Ballynahinch town, in close proximity to residential developments. Sensitive design and landscaping would gradually integrate the road into the surrounding landscape. The proposed mitigation measures would reduce the long-term visual impact of the Proposed Scheme. The mitigation planting would restrict open views of the Proposed Scheme and visually screen the proposed lighting. In addition, the introduction of native tree and hedgerow planting would positively reinforce the local landscape character.

5.4.1.2 Views from receptors in close proximity to the Proposed Scheme would change. Mitigation of these impacts has been considered through the arrangement of the Crossgar Road junction, Saintfield Road Roundabout, Downpatrick Road Roundabout, and the design of structures and planting to address residual effects. The construction of the Crossgar Road junction with associated lighting and embankments and cuttings would be the most visually significant features of the Proposed Scheme.

5.4.1.3 No Areas of Outstanding Natural Beauty (AONB), or Areas of High Scenic Quality would be affected by the Proposed Scheme.

6. LAND USE

6.1 Methodology

6.1.1.1 Under guidelines laid down in DMRB 11.3.6, the principal issues considered when assessing the effects of the Proposed Scheme on land use were as follows:

- demolition of private property and associated landtake;
- effects on private land;
- effects on development land;
- effects on community land (i.e. public open space);
- effects on agricultural land; and
- effects on restoration proposals for abandoned waterways.

6.1.1.2 Schedules were drawn up showing the range of properties which would need to be demolished or from which land (both private and agricultural) would be required for the Proposed Scheme. A review of the Ards Down Area Plan 2015 was made, to give an indication as to the likely impact on planning applications and development land.

6.1.1.3 An Agricultural Impact Assessment (AIA) was undertaken by an agri-business consultant for those farm units affected by the Proposed Scheme, which considered how the scheme alignment would affect the farm enterprise.

6.2 Findings

6.2.1 Demolition of Private Property

6.2.1.1 Two commercial (agricultural) and two residential properties would be at risk of demolition in order to accommodate the Proposed Scheme. Three of these properties are located between Moss Road and Crossgar Road and would be lost to accommodate the mainline carriageway and associated earthworks. The loss of the fourth property would be primarily to provide a connector road to serve existing properties on Ballylone Road and as an access to severed agricultural lands. Demolition of any property is considered significant; thus predicted losses are assessed as having a Major Adverse impact.

6.2.2 Potential Private Land Loss

6.2.2.1 Seven plots would be subject to private land loss impacts to accommodate the Proposed Scheme. The current land use of these plots include: residential, commercial (agricultural), community land (Millbridge Playing Fields) and rough ground.

6.2.2.2 In terms of magnitude (after mitigation), one plot would experience Major Adverse impacts, two plots would experience Moderate Adverse impacts, two plots would experience Minor Adverse impacts, and two plots would experience Negligible impacts.

6.2.2.3 With the exception of Millbridge Playing Fields, all losses of private land would be to accommodate the roundabouts and/or modification of the roads that would tie-in to these at either end of the Proposed Scheme.

6.2.3 Potential Effect on Planning Applications

6.2.3.1 Eight extant planning applications for various forms of development, at varying stages in the planning process would be directly affected by the Proposed Scheme.

6.2.3.2 Two residential development proposals (one Outline/Approved and one Full/Pending) would be subject to major adverse impacts associated with the Proposed Scheme, precluding the possibility of both planning applications being developed in their current proposed layouts. It is however envisaged that the principle of development on each site would not be prejudiced; rather an alternative development layout may be required and subject to securing of planning approval from DOE Planning or the Council. The remaining directly affected applications would be subject to either Minor Adverse or Negligible impacts.

6.2.4 Potential Loss of Development Land

Settlement

6.2.4.1 To achieve minimum DMRB standards with regard to the vertical and horizontal alignment of the road, the layout of the Proposed Scheme is not exactly congruent with the indicative road proposal line of the Area Plan and thus is also not congruent with the .Settlement Limit of Ballynahinch (Proposal BH 01) as indicated on Map No. 3/003a (Ballynahinch Settlement Map) of the Area Plan.

6.2.4.2 A new Settlement Limit would essentially be established and formed by the western edge of the Proposed Scheme (i.e. the boundary fence line), which in turn would be protected against any development proposals that would prejudice its implementation. This matter has been discussed and confirmed by DOE Planning.

Housing

6.2.4.3 Three zoned housing areas (as described below) would be subject to direct impacts associated with the Proposed Scheme. A key design consideration to all zoned areas is that 8-10m of the land zoned for development adjacent to the bypass is to be a planted 'buffer' screening belt. Whilst the Proposed Scheme would not limit the possibility of this being provided in any of the sites, it was confirmed with DOE Planning that screen planting should be established at the first available opportunity, whether it is developer-led or TransportNI led, to allow for establishment of effective screening. The landscape mitigation proposed as part of the scheme would facilitate this and complement the buffer planting strip by providing additional screen planting between the development site and the mainline carriageway.

Proposal BH 13 (5.21ha of housing land between the Belfast Road and the Proposed Ballynahinch Bypass)

6.2.4.4 Although the vesting associated with the Proposed Scheme would not encroach into the northern apex of this zoned housing area, the provision of a lane to facilitate access to severed agricultural lands would result in marginal encroachment. However, from a future development perspective, the provision of this lane would have no impact, as its purpose is not to serve as a residential access to BH 13, and if this site was subsequently developed, the access lane would become redundant.

6.2.4.5 With scheme implementation, the bypass would be largely aligned along the eastern boundary of this development site. However, in terms of vesting, the land required for the Proposed Scheme would still extend into the zoned housing area, as this land is required for landscaping purposes and/or in areas where ground conditions are poor. Overall, this would result in the loss of approximately 0.8ha from along the fringe of the zoned area.

6.2.4.6 In terms of indirect impacts, the Proposed Scheme would result in the loss of a secondary access to this site from the A21 Saintfield Road (via old Saintfield Road), however this would have no bearing on the access requirements as per the key design considerations for BH 13. In terms of future access provision, it would be a requirement for the developer to provide an access of acceptable standard from the A24 Belfast Road.

6.2.4.7 On this basis, the magnitude of impact associated with changes to the BH 13 land would be Minor Adverse.

Proposal BH 14 (14.48ha of housing land south of Moss Road and west of the Proposed Ballynahinch Bypass)

6.2.4.8 The bypass would be largely aligned along the eastern boundary of BH 14. However, land required for the Proposed Scheme would extend into the zoned housing area. The provision of a lane from a residual section of Ballylone Road to facilitate access to severed agricultural lands would result in marginal encroachment (c. 0.5ha) within the southern apex of this site.

From a future development perspective, the provision of this agricultural access lane would have no impact, as its purpose is not to serve as a residential access to BH 14, and if this site was subsequently developed, the access lane would become redundant.

6.2.4.9 On this basis, the magnitude of impact to the BH 14 land would be Minor Adverse.

Proposal BH 12 (11.53ha of housing land south of Crossgar Road and west of the Proposed Ballynahinch Bypass)

6.2.4.10 The western (northbound) connector loop associated with the B7 Crossgar Road compact grade-separated junction, a lane to facilitate access to severed agricultural lands and vesting of the land for landscaping purposes and/or in areas where ground conditions are poor, would

result in the loss of approximately 1.45ha from the north-eastern apex and the south-eastern fringe of the zoned area.

6.2.4.11 The land lost was considered by Northern Ireland Housing Executive (NIHE) to have development potential to address social housing need in the area and the proposed agricultural access lane through this land would not serve as a residential access to BH 12.

6.2.4.12 In terms of key design consideration for this zoned area, the B7 Crossgar Road requires to be upgraded, a footway provided along the site frontage to link to existing footway, and a right-turn facility provided at the access point on Crossgar Road. Whilst the Proposed Scheme has not made any allowances for these upgrades/facilities, it would not preclude them from being provided by a developer (though may be subject to conditions).

6.2.4.13 On this basis, the magnitude of impact associated with changes to the BH 12 zoned housing land would be Moderate Adverse.

Industry

6.2.4.14 Land zoned for Industry between the A24 Belfast Road and Old Belfast Road (BH 17) would be subject to minor encroachment (c. 0.19ha) to accommodate the proposed Saintfield Road Roundabout and slight realignment of the A24 Belfast Road, from along the eastern fringe of the zoned area. There is currently no proposal to connect this site to the proposed roundabout. The loss of land would be a Minor Adverse impact.

Local Landscape Policy Areas

6.2.4.15 The Proposed Scheme would be aligned immediately adjacent to LLPA 11 (lands to the north and south of Moss Road), with very marginal encroachment into the site. Impacts would be minimised by the landscape mitigation proposals, as detailed within the ES.

6.2.4.16 LLPA 1 (Ballynahinch River) would be crossed by the Proposed Scheme on an open span bridge. This LLPA is the link that the river valley corridor provides between the town and the countryside, and potential recreation value for public access for riverside walks. Whilst there is currently no public access in the vicinity of the crossing point of the river, the open span bridge structure would not preclude the possibility of developing a riverside walk in the future, resulting in a Minor Adverse impact.

6.2.5 Potential Loss of Community Land

6.2.5.1 In terms of impacts upon existing amenity open space and recreation, the Proposed Scheme would encroach into Millbridge Playing Fields at A24 Drumaness Road. Access to this facility from the A24 Drumaness Road would be subject to slight modification.

6.2.5.2 A second pitch/training pitch would be lost to accommodate the scheme mainline and the proposed Downpatrick Road Roundabout. However, due to constraints associated with this site (i.e. suitable available land), it is not possible to eliminate the adverse impacts associated with

the Proposed Scheme, thus no specific mitigation measures are proposed. Overall, the magnitude of impact would be Moderate Adverse.

6.2.6 Park & Ride / Park & Share sites

6.2.6.1 In line with the Area Plan requirements, a Feasibility Study has been undertaken and determined that a Park & Share site would be suitably located within a parcel of land located between the A21 Saintfield Road and A24 Ballynahinch Road, immediately north of the proposed Saintfield Road Roundabout. It is anticipated that the site would provide 27 parking bays, three of which would be dedicated disabled bays.

6.2.7 Potential Loss of Agricultural Land

6.2.7.1 The Proposed Scheme would affect a total of approximately 25 agricultural land plots, with five of these not currently in agricultural usage. Approximately 34ha of land would be vested to construct the Proposed Scheme, the majority of which is currently in agricultural usage. There are cases throughout the study area where agricultural land is owned, rented in conacre and/or operated by multiple parties.

6.2.7.2 Of the 20 individual land plots currently in agricultural usage, three would be subject to a Significant Adverse impact; one would be subject to a Moderate Adverse impact, with the remaining 16 being subject to a Slight Adverse impact with scheme implementation.

6.2.7.3 The agricultural assessment considered necessary accommodation works to mitigate adverse impacts in relation to the estimated amount of agricultural land required and degree of severance. Mitigation measures would be implemented where possible, however ultimately land loss would be a compensatory issue addressed by Land & Property Services (LPS) and detailed mitigation measures would be discussed with the landowners as part of the accommodation works. Suitable generic accommodation works (i.e. replacement fences, hedgerows, field gates, stock welfare and handling facilities) would be provided to help reduce the impact of the Proposed Scheme.

6.2.8 Effects on restoration proposals for abandoned waterways

6.2.8.1 There are currently no navigable, unnavigable, disused or abandoned waterways within the study area, nor are there any current waterway scheme development proposals.

6.2.9 Construction

6.2.9.1 Land and property required to facilitate construction of the Proposed Scheme would be acquired in advance of the works. Construction works should not have a major impact on adjacent land use, however some agricultural activities may be affected depending on the timing of the works.

6.2.9.2 Some temporary landtake may be required for site compounds or stockpile locations for the duration of the construction period. Access to these areas would be directly off the public road network and such areas would be reinstated upon completion.

6.2.9.3 Properties subject to partial demolition and/or private land loss during the construction phase would be located within the works and thus likely to experience the most significant adverse transient impacts (i.e. air, noise, visual, access, etc.).

6.3 Mitigation Measures

6.3.1.1 Typical measures to mitigate land use impacts associated with the Proposed Scheme include:

- Minimise landtake where feasible, particularly as a clearer understanding of the underlying ground conditions during the detailed design stage may result in less extensive earthworks, and thus possibly a reduced impact at certain properties;
- Where land would be lost and subject to compulsory purchase, compensation would be made in accordance with the statutory requirements for land acquired under any subsequent draft Vesting Order for the Proposed Scheme; and
- Whilst the individual mitigation measures described previously are considered feasible to provide, actual measures would be developed through dialogue and agreed with the affected landowner as part of the accommodation works and are thus subject to change.

6.3.1.2 An Agricultural Management Plan (AMP) would be prepared as part of the CEMP in advance of construction to mitigate potential impacts and maintain continued access and operation of active farm units, and would include:

- Up-to-date landownership details, enterprise/husbandry information and associated farm practices prior to commencement of works, including maps, accesses, watercourses, drainage ditches and existing culverting arrangements;
- Measures to be adopted to protect agricultural land and practices adjacent to the works area (i.e. stock proof fencing);
- Surveys of existing ground and drainage conditions and reinstatement proposals for any land utilised by way of third party agreement during construction;
- Procedures to be adopted in relation to the provision of accommodation works, including a programme for provision of same; and
- Procedures to be followed in relation to the stripping, handling, storage and replacement of topsoil on areas of land to be returned to agricultural use following construction.

6.3.1.3 Temporary access arrangements would be provided as appropriate in consultation with landowners to minimise disruption to adjacent agricultural land and other activities during construction.

6.3.1.4 In summary, specifically in relation to impacts on land use during construction, mitigation measures would include:

- Construction compounds would be located in areas that cause least disturbance to existing land uses;
- Reinstating all land used for temporary construction works; and

- Topsoil would be stripped and stored to prevent soil structure damage.

6.4 Conclusions

6.4.1.1 A total of four properties would be demolished. A further seven properties would experience private land loss only. Two planning applications would be lost in their current layouts to accommodate the Proposed Scheme, though the development sites would not be sterilised for future development.

6.4.1.2 In the context of direct impacts upon the three zoned housing areas, the significance of effect associated with the Proposed Scheme would be Slight Adverse within Proposal BH 13 and Proposal BH 14, and Moderate Adverse within Proposal BH 12. The possibility of providing a screen planting 'buffer' as part of the mitigation measures has a Slight Beneficial effect.

6.4.1.3 The significance of effect on land zoned for Industry and the effect upon LLPAs would be largely Neutral. The significance of effect associated with the loss of existing amenity open space and recreation at Millbridge Playing Fields would be Large Adverse.

6.4.1.4 Land would be lost from 20 individual agricultural land plots/farm units. For 16 units, the likely significance of effect would be Slight Adverse. One farm unit is likely to experience a Moderate Adverse effect, with three units likely to experience Significant Adverse effects.

7. NOISE & VIBRATION

7.1 Methodology

7.1.1.1 The potential impact of traffic noise has been assessed for all properties within 600m of the existing route and Proposed Scheme, following the methodology of the DMRB Volume 11.3.7 HD 213/11 (Noise and Vibration) Chapter 3 (Procedure for Assessing Impacts) (November 2011) and in line with a 'Detailed' assessment. This included a night-time assessment. An acoustic specialist was engaged to undertake this study; a copy of their report is included at Appendix 13 in Volume 2 of the ES.

7.1.1.2 In addition, there is the potential impact of construction works associated with the proposed development, and has been assessed in line with BS5228-1: 2009 '*Code of practice for noise and vibration control on construction and open sites- Part 1: Noise*.'

7.1.1.3 Calculations were carried out at heights of 1.5m and 4.0m for each property within the Baseline/Opening and Future/15th year for the 'Do-Minimum' and 'Do-Something' scenarios. In general, the noise assessment is used to predict the noise impact on properties close to the Proposed Scheme layout and compare this impact with existing noise levels at these locations, in terms of a change in noise level and potential nuisance. This information is then compared to the effects of not proceeding with the Proposed Scheme - the 'Do Minimum' option - in terms of ongoing noise impact on properties close to the existing route. In this regard, it is considered appropriate for use as the basis of a noise assessment as part of the ES.

7.1.1.4 Prediction of noise levels was calculated using the Datakustik Cadna/A proprietary acoustic modelling software. The Cadna/A calculation system complies with the *'Calculation of Road Traffic Noise (CRTN)*' methodology (DoT and Welsh Office, 1988), and is also in accordance with DMRB.

7.2 Findings

7.2.1.1 An assessment table has been produced for each of the comparisons required by DMRB. The number of properties which would experience an increase or decrease in noise level is presented in Tables 13.5, 13.7 and 13.8 in Volume 1 of the Environmental Statement. Locations that would experience an increase in noise level of more than 5 dB or 10 dB have been presented in supplementary noise tables (Tables 13.6 and 13.9 respectively). A summary of findings for the Noise Nuisance assessment is presented in Table 13.10, with a summary of the night-time noise assessment presented in Table 13.11.

7.2.1.2 The introduction of the proposed bypass and associated junctions would result in a redistribution of traffic on the existing road network. Properties located close to the Proposed Scheme would experience a relative increase in noise levels. The proposed route alignment would create a perceptible increase in noise levels at locations that are currently not exposed to high levels of transportation noise. However, there would be a significant number of properties

currently exposed to high levels of noise, for example in the centre of Ballynahinch, which would benefit from a reduction in through traffic and subsequent noise impact.

7.2.1.3 Following the Noise Insulation Guidelines, if a property is exposed to a noise level greater than 68dB $L_{A10,\ 18hr}$ and is subject to an increase of more than 1dB due to the scheme, then the property may be eligible for Noise Insulation. Under the 'Do-Something' scenario, it is predicted that the noise level at a number of locations would be in excess of 68dB $L_{A10,\ 18hr}$ and experience more than a 1dB increase with scheme implementation (Table 13.16 in the ES). However, specific mitigation measures are proposed to reduce this noise impact.

7.2.1.4 In terms of potential vibration impacts, the highest levels of traffic-induced vibration are generated by irregularities in a road, and this is unlikely to be an important consideration for new roads. With reference to BS7385, and allowing for normal circumstances of modern design road construction, vibration levels are predicted not to be of a severity that might cause any structural damage to property.

7.2.1.5 There is the potential for noise and vibration impact from construction works, associated with the Proposed Scheme, although this is relatively short-term in nature and a temporary impact at any single property. It would ultimately be the responsibility of the appointed contractor to specify the plant to be used, and the most efficient methodology. However, there are types of plant and activities which are typical for these construction works, and 'worst case' levels have been compiled from BS5228, calculated for each significant stage of work at varying distances, and presented in Tables 13.13 and 13.14 in Volume 1 of the ES. Based on the predicted impact levels, it is anticipated that construction noise levels would exceed the existing ambient noise levels at properties closest to the site. The extent of this impact at any property would vary, depending on the specific plant being used, the distance or range of distances to the property, the "on time" of each activity, and any localised screening. Due to the linear nature of road construction, the duration of activity at any property near to the proposed works is likely to be comparatively short in nature. There may be occasions where work is extended in one location, or it may be the contractor's preference to carry out different stages of works at different times.

7.3 Mitigation Measures

7.3.1.1 The traffic noise assessment has shown that the Proposed Scheme would reduce noise and nuisance levels at some properties close to the existing A24 route. Conversely, properties close to the Proposed Scheme would experience an increase in noise and nuisance levels.

7.3.1.2 As noted above, there are several assessed locations where the potential noise impact would exceed the 68 dB $L_{A10,\ 18hr}$ value used for the determination of statutory sound insulation eligibility and experience more than a 1dB increase due to the impact of the Proposed Scheme. The Noise Insulation Guidelines indicate that a property exposed to a noise level greater than 68 dB $L_{A10,\ 18hr}$, and subject to an increase of more than 1dB due to the Proposed Scheme, may be eligible for noise insulation.

7.3.1.3 Low noise road surfacing along the mainline would reduce noise at source, reducing the overall noise impact at all of these locations. The low noise road surface would reduce the noise levels at source by typically between 3 and 5 dB, and therefore below the 68 dB $L_{A10,\ 18hr}$ level or to within 1 dB of the noise level under the 'Do-Minimum' scenario. This would provide the required level of mitigation at all receptor locations, assuming a minimum reduction of circa 1.5 dB.

7.3.1.4 These measures are in line with the guidance of DMRB 11.3.7 and are appropriate for consideration at this stage for the Proposed Scheme.

7.3.1.5 There are a number of construction noise mitigation measures which are considered appropriate and of good working practice for all construction contracts. These measures are detailed in BS5228 (2009) '*Code of practice for Noise and Vibration Control on Construction and Open Sites'*, and are summarised below. These guidelines would form the basis of control and limiting of potential impact to noise sensitive locations. The Contractor would take note of the control measures for relevant plant listed in BS5228 and apply the appropriate measures where practicable. These measures would include:

- Positioning of static plant as far as possible from residential properties, and utilising available screening by temporary structures and stockpiles for example;
- Use of well-maintained plant, and where possible new plant manufactured under more strict EC guidelines;
- Substitution of unsuitable plant; and
- Maintenance of silencers and moving components.

7.3.1.6 Temporary screening using sandbags, 20mm plywood sheeting or similar dense boarding may be required to reduce impact of static machinery or extensive works close to noise sensitive locations. Such measures can be best assessed during the contract by monitoring. It would be appropriate to conduct noise monitoring of construction during noisy or extensive works at locations close to residential properties. With regard to vibration, it may be beneficial to monitor vibration levels at the beginning of any pile driving process to ensure that levels at the most proximate properties do not cause damage.

7.3.1.7 It is not anticipated that the contract would require any construction works for the Proposed Scheme to take place outside normal hours. However, there may be items of plant (e.g. dewatering pumps and similar) in use during night-time hours. They would be chosen, sited and enclosed such that levels at the nearest properties do not exceed 45 dB L_{Aeq}. This level is based on the World Health Organisation criteria for undisturbed sleep, and assumes a resident may have a partially open window.

7.4 Conclusions

7.4.1.1 There would be fewer properties in proximity to the Proposed Scheme than along the existing route. Hence, there would be a net benefit with decreased noise levels for the majority of

properties close to the existing route. Traffic noise from the new bypass would impact properties that currently do not experience significant noise from traffic, due to their existing rural location and low existing ambient noise levels.

7.4.1.2 The noise assessment identified a number of residential properties which, without any mitigation measures, are predicted to meet or exceed the Noise Insulation Regulations (Northern Ireland) 1995 criteria. In order to mitigate this effect, it is planned to use a low noise road surface on the mainline which would sufficiently reduce road noise levels at properties identified as qualifying for insulation and other areas potentially subject to adverse noise impacts.

7.4.1.3 Certain construction activities would result in increases in noise levels (particularly in the vicinity of structures and major earthworks), though considering the linear nature of the project, duration near any one receptor would be temporary. To mitigate effects, the appointed Contractor would be required to adopt good working practice on site, as described in BS5228 (2009), '*Noise and Vibration Control on Construction and Open Sites'*.

8. PEDESTRIANS, CYCLISTS, EQUESTRIANS & COMMUNITY EFFECTS

8.1 Methodology

8.1.1.1 The assessment was undertaken in accordance with the requirements of DMRB 11.3.8 and included a review of community facilities used by pedestrians and others, which may be affected by the Proposed Scheme. A review of the potential implications on the public transport network, local vehicle journey routes, cycling facilities, public equestrian facilities and pedestrian facilities was included. An assessment was also undertaken as to whether pedestrians' and others' journeys would be lengthened or reduced by the scheme, whether the amenity value of such journeys would increase or diminish, and whether some people would be deterred from undertaking journeys which they currently make.

8.2 Findings

8.2.1 Local Vehicle Movements

8.2.1.1 With implementation of the Proposed Scheme, the safety of the highway environment would improve significantly for the vehicle user, as the bypass would achieve separation of a significant proportion of strategic and local traffic. Traffic through the town would become more regulated. In terms of existing congestion, the reduction in strategic traffic in the town centre would improve access to the majority of community facilities for the town's residents (particularly non-motorised users), with a significant reduction in town centre vehicular/pedestrian conflict. It would provide a Moderate Beneficial impact in terms of relief from existing severance, thus potentially resulting in more of a town community atmosphere and much improved amenity. In essence, with implementation of the Proposed Scheme, amenity, journey time and community severance for the majority of residents would be vastly improved.

8.2.2 Community Facilities

8.2.2.1 There would be no full loss of community facilities with the Proposed Scheme. However, there is likely to be a Moderate Adverse impact on the Millbridge Playing Fields, primarily due to the fact that the second pitch/training pitch would be lost to accommodate the mainline of the bypass, the proposed Downpatrick Road Roundabout and associated earthworks. This would have implications on the usage of the facility. A number of other community facilities would experience either Negligible or Minor Beneficial effects.

8.2.3 Public Transport

8.2.3.1 In terms of public transport, there is a wide variety of public and school bus services which pass through Ballynahinch and its wider hinterland, all utilising the A24 through the centre of the town. With scheme implementation, it is unlikely that any services would be significantly altered, as the town centre would remain the hub for routes in order to serve the local community. The town itself is the population centre and the origin/final destination for a number of services, with the central location being convenient for bus users.

8.2.3.2 Bus services would continue to utilise the existing road network, though the highway environment would improve significantly for buses, as the bypass would achieve separation of a significant proportion of strategic and local traffic.

8.2.3.3 An informal Park & Share is incorporated on the northern side of the proposed Saintfield Road Roundabout, between the A24 Belfast Road and A21 Saintfield Road. It would accommodate 27 parking bays (including 3no. disabled bays).

8.2.4 Pedestrian Facilities

8.2.4.1 Access for Non-Motorised Users (NMUs) to a wide range of community facilities within the town centre would be enhanced by the redistribution of a significant proportion of town through traffic to the Proposed Scheme, resulting in a Moderate Beneficial impact due to relief from severance.

8.2.4.2 The assessment of amenity is concerned with changes in the degree and duration of people's exposure to traffic (fear/safety, noise, dirt and air quality) and the impact of the road itself (primarily visual intrusion). Whilst the Proposed Scheme would have no impact on existing pedestrian facilities, other than at the existing A24 Drumaness Road/B2 Downpatrick Road junction, the changes in volume and composition of traffic is a very important determinant of amenity. On this basis, the reduction in the volume of traffic passing through the town would result in perceptible amenity improvements for pedestrians within the town centre.

8.2.4.3 The Proposed Scheme is likely to have little bearing on pedestrian journey time or severance in terms of rural roads, as strategic traffic would have limited interaction with local movements and all minor roads would remain open by the incorporation of over/underpasses or slight realignments. However, amenity may be slightly reduced with the introduction of a new road and associated structures into an attractive quiet rural environment. The route from Ballylone Road to the B7 Crossgar Road would be increased by approximately 200m to accommodate the grade-separated junction and partial realignment of Ballylone Road, resulting in an increased journey time of approximately two and a half minutes per one-way journey.

8.2.4.4 The Proposed Scheme would incorporate a dedicated shared footway/cycleway on the Ballynahinch [western] side of the bypass, with pedestrian linkages to the existing footway network (where available) at the three proposed bypass junctions.

8.2.4.5 This would be an attractive recreational facility, providing an opportunity for walks along the bypass and into the town for the residents of Ballynahinch. However, it is not proposed that the footway/cycleway be lit, except at each of the junctions associated with the scheme.

8.2.4.6 Overall, as a result of scheme implementation, pedestrians are likely to experience a Moderate Beneficial impact, due to strategic traffic on the existing trunk route, and the creation of new walking routes in the study area.

8.2.5 Cycling Facilities

8.2.5.1 There are no existing Sustrans National Cycle Network (NCN), or designated local cycling routes currently within the study area. Journey times and ambience for cyclists would improve with the Proposed Scheme, as a result of the significant improvements in road standard, accessibility and the reduced physical length of the journey. It is assessed that the Proposed Scheme would have a Moderate Beneficial impact upon cyclist provision in the vicinity of Ballynahinch.

8.2.6 Equestrian Facilities

8.2.6.1 Equestrians are active within the study area, however, there would be no direct impact upon any known public equestrian facilities. The Proposed Scheme is unlikely to have any impact on equestrian activity, as all minor roads would remain open, therefore the impact on equestrian facilities is likely to be negligible.

8.2.7 Angling Facilities

8.2.7.1 Stretches of the Ballynahinch River downstream from the study area (where it becomes the Annacloy River at Kilmore) are fished by the Blackhead Angling Club. As the proposed bridge crossing of the Ballynahinch River would be open span, with no piers in the river and abutments set back from the river's edge, the impact upon angling would be negligible.

8.2.8 Construction

8.2.8.1 Throughout the construction period, pedestrians and others would experience varying degrees of disruption which would include temporary impacts caused by the generation of noise, mud, dust, reduced amenity and visual impacts, associated with major roadworks. The significant increase in construction vehicle activity would affect pedestrians, cyclists and equestrians. Disruption to local vehicle movements would largely be limited to the scheme tie-in points with the trunk road network and the crossings of the local road network, as online widening is not required. There may also be temporary disruption to access.

8.3 Mitigation Measures

8.3.1.1 In terms of local vehicle movements, the design of the road itself is a form of mitigation to ensure that mixing of strategic and local traffic is minimised, and where interaction does occur, it is facilitated through a safer environment. Therefore, no further mitigation is proposed.

8.3.1.2 No specific measures are proposed to mitigate the loss of the training pitch at Millbridge Playing Fields, due to constraints associated with this site (i.e. suitable available land).

8.3.1.3 As there would be no direct impact on the regional bus or rail network, then no mitigation is proposed.

8.3.1.4 Outwith the Proposed Scheme, there would be no alteration to the existing footway provision. The scheme itself would incorporate a dedicated shared footway/cycleway, opening-up a new walking corridor. The redistribution of a significant proportion of strategic traffic from the town to

the bypass would improve the situation for pedestrians, reducing the risk of vehicle/pedestrian conflict. No further mitigation is deemed necessary. The creation of a new cycle route alongside the Proposed Scheme is an additional benefit, coupled with a decrease in traffic on the existing route, would reduce the potential for vehicle/cyclist conflict and improve accessibility.

8.3.1.5 As there would be no impact on known equestrian or angling facilities, no specific mitigation measures are proposed.

8.3.1.6 All road users would have to exercise greater care during construction. The Contract would include restrictions to prevent non-essential use of local roads by construction traffic. Traffic management would be in operation to facilitate safe passage for pedestrians and others and closely monitored on-site and every effort would be made to ensure the safety of NMUs is maintained. It is expected that the Contractor would put in place liaison measures to communicate with local people and organisations.

8.4 Conclusions

8.4.1.1 The Proposed Scheme would improve road safety for strategic and local road users, remove a bottleneck on the key network, and improve the environment by relieving the effects of heavy through traffic in the town centre.

8.4.1.2 Traffic through the town would become more regulated and the removal of some strategic traffic from the town centre onto the Proposed Scheme would improve access to the majority of community facilities for the town's residents (particularly NMUs), with a significant reduction in town centre vehicular/pedestrian conflict. This would result in a moderate beneficial impact in terms of relief from existing severance, potentially increasing community atmosphere and improving amenity. Pedestrians and cyclists would also benefit from the creation of a new footway/cycleway route adjacent to the bypass.

8.4.1.3 The largest impact in terms of community facilities would be experienced at Millbridge Playing Fields. In most cases, it is unlikely that continued usage at any community facility would be significantly affected during the operational phase.

8.4.1.4 The highway environment would improve significantly for buses, due to separation of a significant proportion of strategic and local traffic. Traffic through the town would become more regulated, less congested and bus services should benefit significantly with the reduction in traffic flows, perhaps even resulting in marginally shorter journey times for a number of services.

8.4.1.5 Construction activities may affect community facilities and local businesses with regards to accessibility and severance, or disruption to routes used by NMUs. Careful traffic management would reduce delays, rat-running, and aid in the safe passage of pedestrians, cyclists and equestrians during the construction phase.

9. VEHICLE TRAVELLERS

9.1 Methodology

9.1.1.1 The impact of the scheme on vehicle travellers includes '*Views from the road'* and '*Driver stress'*. The effects of the scheme on vehicle travellers have been assessed taking into account the advice in DMRB Volume 11.3.9.

9.1.1.2 An assessment of views from the road for both the existing route and Proposed Scheme was made, drawing upon the landscape assessment. The assessment considered types of scenery or landscape character, extent to which travellers may be able to view the scenery, landscape quality and features of particular interest or prominence in the view.

9.1.1.3 In terms of driver stress, the assessment was carried out in accordance with the method outlined in DMRB 11.3.9.4, with the use of a three-point descriptive scale for driver stress – 'Low', 'Moderate' and 'High'. The assessment is based on average hourly traffic flows and journey speed, and was made for the Design year (2033), for both the 'Do-Minimum' and 'Do-Something' scenarios. An assessment of the Base year (2013) was also made to give an indication of existing driver stress levels on the existing A24 through Ballynahinch.

9.2 Findings

9.2.1 Views from the Road

9.2.1.1 The proposed A21 Saintfield Road Roundabout would be situated close to existing ground levels. The topography would allow for open views across the flat landscape which is bounded by drumlins. From the proposed Saintfield Road Roundabout, the road would rise on embankment, crossing Moss Road on an overbridge. This elevated road would create new open panoramic views of the Glassdrumman River valley and surrounding landscape.

9.2.1.2 The vehicle travellers' experience along the existing Moss Road would change as it passes under the proposed bypass. As the vehicle traveller passes along Moss Road, their views would be short and mid distance, as long distance views would no longer be possible due to the embankment associated with the bypass.

9.2.1.3 At the grade-separated junction with the B7 Crossgar Road, the Ballylone Road would be partially realigned to tie into the southbound connector loop. As part of this proposed junction, the Crossgar Road overbridge would be constructed across the bypass, which would involve removing a large amount of existing mature vegetation.

9.2.1.4 Approaching the proposed Crossgar Road Junction, the bypass would be in varying depths of cut, with views ranging from restricted to no view. The large cutting into the drumlin on the eastern side of the proposed bypass would be clearly discernible to the vehicle traveller. In the short-term, this would form a discordant feature in the landscape until the mitigation planting has established. The Crossgar Road overbridge would also be a visible and discordant feature.

9.2.1.5 When travelling west across the Crossgar Road overbridge, the elevated position would facilitate open long distance views over the eastern side of Ballynahinch, which is bounded by low-lying land and the drumlin landscape. Views would be afforded of Windmill Hill and windmill stump, which is a key landmark in Ballynahinch.

9.2.1.6 Travelling southwards from the Crossgar Road Junction, the vehicle travellers' experience would change as the road transitions from being in cutting to being on embankment. The cutting would restrict short and mid distance views, and the eye would be drawn to the planting on the cutting slopes. When the road is on embankment, views would be longer range.

9.2.1.7 Passing over the new bridge, travellers on the bypass would experience views of the Ballynahinch River. Approaching the proposed Downpatrick Road Roundabout, the flat open landscape would allow for expansive views of the drumlin landscape and field patterns.

9.2.1.8 Construction of the Proposed Scheme would result in a moderate transient alteration in views from the existing road as the works are mostly offline. The structures, site clearance and earthworks would be the most visible elements during the construction period. It is likely that the moving and changing elements would be of greatest visual interest during the construction period; as such, elements would potentially catch the attention of the vehicle traveller. The site clearance may be the most unsightly element viewed from the road.

9.2.2 Driver Stress

9.2.2.1 One of the primary objectives of provision of a new bypass around Ballynahinch is to reduce the amount of strategic traffic passing through the town centre. This should lead to reduced congestion and provide less potential for vehicular/pedestrian conflict, leading to lower driver stress levels. The junctions are designed to appropriate standards to provide a comfortable transition between the new bypass and the adjoining roads, resulting in reduced driver stress.

9.2.2.2 The introduction of the proposed bypass would result in a significant reduction in stress levels for the strategic vehicle driver on the main Belfast to Newcastle road. Driver stress over the entire length of the Proposed Scheme is predicted to be 'Low'. The local vehicle driver would also benefit from the Proposed Scheme, due to the separation of a significant proportion of local and strategic traffic. Although lower flows are predicted on the majority of links on the existing A24, with a subsequent reduction in risk of vehicular and pedestrian conflict, the reduction in flows is generally not sufficient enough to reduce the overall stress level from 'High' between the Crossgar Road/Belfast Road junction, to Spa Road.

9.2.2.3 In terms of the local network on the B7 Crossgar Road and through Windmill Gardens, Hillfoot Crescent and Carlisle Park, there is no forecasted change in driver stress level of 'Moderate' between 'Do-Minimum' and 'Do-Something' scenarios.

9.3 Mitigation Measures

9.3.1.1 In terms of views from the road, mitigation measures would include; retention and enhancement of positive views from the road where appropriate; open parapets on overbridges to allow views from the road and to reduce the mass of the structure; use of timber post & wire stock proof fencing to agricultural land; sensitive positioning of signage; and planting design would consider the conflict between retaining views from the road and screening the road to adjacent properties. The Crossgar Road overbridge should have open sloping abutments to minimise its prominence, and less visually intrusive wire rope vehicle restraint systems should be used where feasible to reduce the dominance of road infrastructure in a rural environment.

9.3.1.2 Travellers either bypassing Ballynahinch or driving through the town centre, would experience an overall less stressful journey, due to the removal of a significant proportion of through traffic. This in itself is a form of mitigation.

9.3.1.3 During construction, careful traffic management procedures would minimise the overall level of disruption experienced. Such mitigation measures may include advanced publicity of specific traffic management measures, reducing lane widths, contraflow, and adequate advance signing of the works. These measures should reduce delays to traffic, limiting traffic rat-running on the local road network.

9.3.1.4 During construction, all temporary road layouts shall comply with the standards outlined in the DMRB Volume 8, Section 4 of the Traffic Management at Roadworks Manual. The Construction Contract would require the Contractor to maintain at least two-way traffic on the A24 during weekday am and pm periods of peak traffic flow.

9.4 Conclusions

9.4.1.1 New views would be opened-up to the vehicle traveller, which would afford panoramic views of the surrounding rural drumlin landscape to the east of Ballynahinch and introduce views that are currently not experienced by the vehicle traveller.

9.4.1.2 The Proposed Scheme would not result in an overall lowering of stress levels on the existing A24 route through the town centre, however reduced flows through the town would occur and driver stress would reduce to ‘Moderate’ on a significant stretch of the A24 Belfast Road north of the town centre. Stress levels on the proposed bypass would be ‘Low’.

9.4.1.3 During the construction phase, a heightened sense of driver stress would be experienced, however these effects would be transient. Careful attention to traffic management would minimise the overall level of disruption.

10. ROAD DRAINAGE & THE WATER ENVIRONMENT

10.1 Methodology

10.1.1.1 The assessment was carried out in accordance with DMRB 11.3.10 - Road Drainage and the Water Environment (HD 45/09), Northern Ireland Environment Agency (NIEA) – Water Management Unit (WMU) Guidance Note '*Carrying out a Water Framework Directive (WFD) Assessment on EIA Developments*' (March 2012) and NIEA – WMU Guidance Note '*EIA Scoping Guidance for Road Schemes Likely to Impact upon the Water Environment*' (January 2012). The objective was to ensure that the key areas of assessment (surface water, groundwater, spillage and flood risk) were tailored to the characteristics of the Proposed Scheme and carried out to an appropriate level of detail, related specifically to the degree of environmental risk.

10.1.1.2 Consultation took place with NIEA – WMU to determine the location of sensitive receptors (protected areas) – potable water sources, fishery areas, amenity areas, nutrient sensitive areas and areas designated for the protection of habitats or species. In terms of fisheries interest, consultation took place with Blackhead Angling Club, Department of Agriculture and Rural Development (DARD) – Fisheries Division, Department of Culture, Arts & Leisure (DCAL) – Inland Fisheries Group, NIEA - Natural Heritage, and the Ulster Angling Federation. DARD Rivers Agency were consulted with regards to drainage and flooding..

10.1.1.3 The following topics were assessed when considering potential impacts on the water environment:

- Effects of Routine Runoff on Surface Waters;
- Effects of Routine Runoff on Groundwater;
- Pollution Impacts from Accidental Spillages; and
- Flood Impacts.

10.1.1.4 The methodologies for each topic are set out in DMRB 11.3.10 (HD 45/09) Annex I, and were adopted as appropriate. The assessment and conclusions are also summarised by using the tables set out in Schedule A (Surface water impact scoping) and Schedule B (Details of mitigation required) of the NIEA - WMU Guidance Note '*Carrying out a Water Framework Directive (WFD) Assessment on EIA Developments*'.

10.2 Findings

10.2.1 Surface Water

10.2.1.1 The Proposed Scheme would traverse one minor (Glassdrumman River), one urban (Windmill Stream) and one main (Ballynahinch River) surface water, as defined under the Drainage (Northern Ireland) Order 1973 [as amended]. It would also traverse a number of very minor

watercourses/drainage ditches. To maintain the function of these surface waters and the drainage regimes in the surrounding area, it is proposed that they be accommodated through construction of twelve culverts, nine watercourse diversions, one bridge structure (namely the crossing of the Ballynahinch River) and a number of pre-earthworks drainage ditches/filter drains.

10.2.2 Routine Runoff

10.2.2.1 In accordance with the objectives identified in the WFD, there must not be any overall deterioration in water quality in any of the water bodies affected by the Proposed Scheme. Essentially, discharges from the road must not lead to a deterioration in the classification status of the receiving surface water identified in the Quoile LMA, and if possible contribute to improved overall water quality. To establish environmental risk, the Highways Agency Water Risk Assessment Tool (HAWRAT) was utilised to investigate the effects of routine runoff on receiving waters and their ecology.

Runoff Specific Thresholds (RSTs)

10.2.2.2 Ecologically-based Runoff Specific Thresholds (RSTs) for assessing the acute impacts caused by dissolved copper & dissolved zinc have been designed specifically for highway runoff and account for the fact that, due to the intermittent nature of highway runoff, soluble pollutant concentrations may be high but only for short periods.

10.2.2.3 Following the HAWRAT assessment for short-term soluble acute impacts, the magnitude of impact is considered Negligible for Outfalls 1 and 2 (to Glassdrumman River), and Outfall 3 (to Windmill Stream). Whilst there would be an increase in the number of vehicles contributing to pollutant concentrations via routine run-off at the outfall points, the associated impact would be of an insufficient magnitude to affect use or integrity, as no risk was identified through the HAWRAT assessment.

For Outfall 4 (to Ballynahinch River) and Outfall 5 (to un-named tributary of Ballynahinch River), the magnitude of impact with regards to short-term soluble acute impacts within the receiving surface water is considered to be Minor Beneficial. The impact is predicted on the basis that with inclusion of SuDS detention basins, there would be a reduced risk of a negative effect occurring, due to the ability of the proposed treatment system (where none currently exists) to attenuate flow, limit the discharge rate from the outfall, and to reduce pollutant concentration through in-basin treatment. In essence, there would be an improvement in discharge quality over the existing situation.

Environmental Quality Standards (EQSs)

10.2.2.4 Environmental Quality Standards (EQSs) are general standards for chemical pollutants which are derived according to methods set out in the WFD. EQSs consider the annual average pollutant concentration in the water body rather than short lived peaks in concentration. With

scheme implementation, it is a requirement that annual average concentrations of dissolved copper and zinc in the receiving surface water do not exceed published WFD EQSs.

10.2.2.5 In summary, the magnitude of impact is considered Negligible for Outfalls 1, 2, and 3, as whilst there would be an increase in the number of vehicles contributing to long-term pollutant concentrations via routine run-off at the outfall points, the associated impact would be of an insufficient magnitude to affect use or integrity, as no risk was identified through the HAWRAT assessment.

10.2.2.6 For Outfalls 4 and 5, the magnitude of impact with regards to long-term annual average pollutant concentrations within the receiving surface water is considered to be Minor Beneficial. Again, the impact is predicted on the basis that with inclusion of SuDS detention basins, there would be a reduced risk of a negative effect occurring, due to the ability of the proposed treatment system (where none currently exists) to attenuate flow, limit the discharge rate from the outfall, and to reduce the pollutant concentration through in-basin treatment. In essence, there would be an improvement in discharge quality over the existing situation. It is also worth noting that long-term annual average pollutant concentrations associated with routine runoff within the wider catchment of the Ballynahinch River should also benefit from the Proposed Scheme, as a significant proportion of trunk road traffic would be redistributed from the town centre to the bypass.

Sediment Quality Guidelines (SQGs)

10.2.2.7 SQGs refer to pollutant concentrations within the sediment derived from the highway. Research has shown that SQGs are exceeded in all highway-derived sediment. As such, the real test is whether sediment will disperse or whether it will accumulate in quantities that might have an adverse effect. For the sediment-bound pollutants that cause chronic impacts, the ability of the receiving watercourse to disperse sediments is considered and, if sediment is expected to accumulate, the potential extent of sediment coverage (the Deposition Index (DI)) is also considered.

10.2.2.8 In summary, for Outfalls 1, 2, and 3 the magnitude of impact with regards to sediment-bound pollutants within the receiving surface water is considered Negligible, as whilst there would be an increase in the number of vehicles contributing to sediment loading via routine run-off at the outfall points, the associated impact would be of an insufficient magnitude to affect use or integrity, as no risk was identified through the HAWRAT assessment.

10.2.2.9 For Outfalls 4 and 5, the magnitude of impact with regards to sediment-bound pollutants within the receiving surface water is considered to be Minor Beneficial. The impact is predicted on the basis that with inclusion of SuDS detention basins, there would be a reduced risk of a negative effect occurring, due to the ability of the proposed treatment system (where none currently exists) to settle sediments. In essence, there would be an improvement in discharge quality over the existing situation.

10.2.3 Accidental Spillage

10.2.3.1 The DMRB assessment of pollution impacts from accidental spillages was used to provide an indication of the risk of a spillage causing a pollution impact upon receiving water bodies. The annual probability of a serious pollution incident occurring would be significantly lower than the acceptable risk limit of 0.5% (or a return period of 1-in-200 years) at all outfall locations associated with the Proposed Scheme.

10.2.4 Hydromorphology and Fisheries Impacts

10.2.4.1 A Fisheries Assessment of part of the Ballynahinch River system has been undertaken by Paul Johnston Associates and included in Appendix 16, Annex A, Volume 2 of the ES. Fisheries impacts were assessed for both construction and operational phases of the Proposed Scheme.

10.2.4.2 Proposed culvert locations on the Glassdrumman River and an un-named tributary of the Ballynahinch River were assessed as being of Negligible sensitivity, with a single site of Low sensitivity on Windmill Stream. The impact of habitat losses from these surface waters would be Negligible. There would be no loss of habitat or reduced productivity at the open span crossing over the main Ballynahinch River, as the existing habitat would be retained and light penetration would be sufficient to maintain normal ecological function.

10.2.4.3 There are no diversions proposed on major channels or any assessed as being of High or Very High fisheries importance / sensitivity. The channel diversion works on the Windmill Stream would be potentially more disruptive, with the realignment of up to 330m of channel in which fish habitat is of reasonable quality and there is a limited level of spawning by brown trout. In terms of magnitude, the works would have a Moderate Adverse impact.

10.2.5 Groundwater

10.2.5.1 The Downpatrick Groundwater Body (UKGBNI4NE007) is classified as being 'Good' for Quantitative and 'Poor' for Chemical status, as shown on the NIEA River Basin Plan Map Viewer. By the Design Year (2033), it is expected to achieve an overall status of 'Good'.

10.2.5.2 The incorporation of SuDS detention basins can inadvertently create a potential pathway for pollution impacts upon groundwater. Discharges from the proposed detention basins would be predominantly to the receiving watercourse, however as there is no proposal for the detention basins to be lined, there would be some direct discharge to ground.

10.2.5.3 Using the DMRB groundwater risk assessment matrix, the routine runoff from the Proposed Scheme to all SuDS detention basins presents a 'Medium' risk to groundwater quality and mitigating measures should be considered to protect groundwater quality. However, with reference to the Scotland & Northern Ireland Forum For Environmental Research (SNIFFER) Report '*Source Control Pollution in Sustainable Drainage'*, the risk to groundwater from passing highway drainage onto soil-based SuDS is considered 'Low'. Considering the

scheme's relatively low traffic volumes, it can be confidently assumed that in reality the risk to groundwater quality with the proposed drainage design would be minimal. The assessment identified that the annual probability of a serious groundwater pollution incident would be significantly lower than the acceptable risk limit of 0.5% (1-in-200 year return period) from each SuDS detention basin.

10.2.6 Flood Risk Assessment

10.2.6.1 As the Proposed Scheme would be located within the floodplain of the Glassdrumman River and Ballynahinch River, a Flood Risk Assessment (FRA) was prepared, including a two-dimensional hydraulic fluvial flood model for both watercourses using InfoWorks RS (v14.0).

10.2.6.2 Without mitigation, the loss of floodplain at Glassdrumman River would result in a localised increase in the Q_{100} flood levels by approximately 80mm upstream at some locations, though would not increase the flood risk to any residential properties. Similarly, the loss of floodplain at Ballynahinch River would result in a localised increase in the Q_{100} flood levels by approximately 140mm upstream of the new bridge. This increase tails off approximately 200m further upstream and would not increase the flood risk to any residential properties.

10.2.7 Construction

10.2.7.1 During construction of the Proposed Scheme, pollution from mobilised suspended solids would generally be the prime concern, but spillage of fuels, lubricants, hydraulic fluids and cement from construction plant may lead to incidents. Although prescriptive mitigation measures must be stringently applied on-site, any breach or failure in the measures has the potential for Moderate/Major Adverse transient impacts.

10.2.7.2 There would be a risk of groundwater contamination due to accidental spillage, throughout the site. Liquids such as oils and weed killers present the greatest risk, but other materials such as cement can also have serious environmental effects. Use of mechanised plant also involves potential for spillage or leakage of contaminants such as diesel fuel. Unmitigated, such spillages could seep through the unsaturated zone and contaminate the groundwater.

10.2.7.3 As the new structure at the Ballynahinch River crossing would be open span, there should be no interruption of fish passage, provided appropriate mitigation is employed. The impacts on fish passage are assessed to be of Negligible magnitude, during the construction phase.

10.3 Mitigation Measures

10.3.1 Operation

10.3.1.1 In line with the NIEA - WMU Culverting Position Statement, Volume 2: Appendix 16, Annex B to the ES provides a summary of good practice mitigation and the reasons as to whether these measures can or cannot be adopted as part of the proposed culvert design for the Proposed Scheme.

10.3.1.2 The diversion of up to 330m of the Windmill Stream would result in the loss of a significant stretch of fish habitat, in a spawning area for brown trout. Mitigation of the loss of habitat would be achieved through design of the realigned channel to provide equivalent and potentially improved habitat features in terms of spawning and nursery areas. The Proposed Scheme design at this location could provide an opportunity for a Moderate beneficial effect on the habitat quality of Windmill Stream.

10.3.1.3 Incorporation of SuDS detention basins into the Proposed Scheme would complement the drainage of water in the natural environment. Drainage water would be discharged from the detention basins at a controlled rate. Solids removal is one of the main features of detention basins, and high removal rates are possible. The detention basins would attenuate peak discharges from storm events by allowing a controlled release of water into the adjacent watercourse, thus reducing flash flooding and assist bank erosion within the channel, lowering sediment release and the subsequent potential for adverse impact on the fish population.

10.3.1.4 Inclusion of SuDS detention basins enhance the protection of the water environment by lowering the annual probability of a serious pollution incident occurring with the Proposed Scheme. In the event of a spillage, contingency measures at the SuDS detention basins have been incorporated, including pollution shut-off valves at the outlet chambers.

10.3.1.5 Implementation of the Proposed Scheme at the Ballynahinch River crossing would reduce floodplain volume. An earthen mound situated within the Q_{100} floodplain south of the river channel has been identified as a suitable area to be excavated to achieve level-for-level compensation. This area would compensate for the lost floodplain and would ensure that the Proposed Scheme would not increase the flood risk to properties further upstream.

10.3.1.6 Implementation of the Proposed Scheme at the Glassdrumman River crossing would increase the Q_{100} flood level, reducing floodplain volume. The area of land situated between the proposed mainline eastern embankment and the Glassdrumman River currently lies above the Q_{100} floodplain, and has been identified as being suitable for excavation to achieve level-for-level compensation for the lost floodplain. This would ensure the Proposed Scheme would not increase the flood risk to properties further upstream.

10.3.2 Construction

10.3.2.1 Measures to protect the water environment would be formulated in accordance with best practice guidance, such as Pollution Prevention Guidelines (PPGs), and CIRIA guidance documentation. This guidance details issues the risk of adverse impacts occurring within the water environment and how to mitigate such impacts.

10.3.2.2 The contract documents for construction would include prescriptive clauses to ensure that the obligation is placed upon the appointed Contractor to meet the environmental commitments and as a minimum, the proposed mitigation measures set out below. As noted earlier, any

works in, near or liable to impact a waterway (including measures to mitigate adverse impacts) **'must'** gain the consent of NIEA – WMU, DCAL – Inland Fisheries, and DARD Rivers Agency, a minimum of two months prior to commencement of such works.

10.3.2.3 A Construction Environmental Management Plan (CEMP) must include an Erosion Prevention and Sediment Control Plan to be submitted to NIEA - WMU prior to works commencing. The aim of this plan would be to minimise erosion by reducing disturbance and stabilising exposed materials. It would consider measures to minimise the release of mobilised sediment which results despite erosion control measures.

10.3.2.4 Construction activities that pose a high risk of surface water impact were identified, and stringent mitigation measures, as detailed in the ES, must be applied to ensure adverse impacts upon the water environment are minimised.

10.3.2.5 Avoiding works during the Salmonid spawning season and egg incubation phases at waters of fisheries significance would avoid the risk of damage to spawning areas, losses of fish eggs or newly hatched fry. Appropriate site management during in-stream and bank works outside of this period would ensure that the channel remains passable for migratory Salmonids.

10.3.2.6 Measures would be taken and procedures put in place to minimise the risk and potential effects of spillage incidents.

10.3.2.7 A discharge consent issued by NIEA under the Water (Northern Ireland) Order 1999, is required for any discharges to the aquatic environment.

10.4 Conclusions

10.4.1.1 It is unlikely that the Proposed Scheme would cause deterioration in the Ballynahinch waterbody, or prevent it from meeting its WFD objectives.

10.4.1.2 Routine runoff from the Proposed Scheme would be within 1km of an EC designated Salmonid fishery (Ballynahinch River), except where discharges are to the Glassdrumman River. However, the risk of negative effects occurring would be reduced due to use of SuDS basins.

10.4.1.3 A clear span bridge across the Ballynahinch River would have no direct hydromorphological or fisheries impacts. Where surface waters are to be culverted or diverted, hydromorphological changes would be experienced. There would be no residual effects on fish passage or principal fish migration channels.

10.4.1.4 There would be some direct discharges to groundwater, though the effect is considered neutral as due to low traffic volumes, it can be confidently assumed that in reality the risk to groundwater quality with the proposed drainage design would be minimal.

10.4.1.5 A loss of floodplain capacity adjacent to both the Glassdrumman River and Ballynahinch River would be mitigated by provision of Flood Compensation Areas. As a result, no new flooding would be introduced to adjacent land or properties.

11. GEOLOGY & SOILS

11.1 Methodology

11.1.1.1 The assessment of the scheme on geology and soils examined the impact on solid & drift geology, important geological mineral deposits, agricultural soil, sites of educational or scientific interest, and the possibility of hazardous materials being exposed.

11.1.1.2 The assessment was undertaken in accordance with DMRB Volume 11.3.11.7, and included consultation with the Geological Survey of Northern Ireland (GSNI) and the Northern Ireland Environment Agency (NIEA) – Natural Heritage to confirm details on the location and nature of any designated sites in the vicinity of the Proposed Scheme; NIEA – Waste Management Unit to confirm details on potential areas of contaminated land; the Department of Agriculture & Rural Development to confirm information on the agricultural quality of land; DOE Planning – Minerals Development, to confirm information on mineral extraction in the area; and consultation with Down District Council to confirm information on known areas of contaminated land.

11.2 Findings

11.2.1 Solid Geology

11.2.1.1 The Proposed Scheme area is generally underlain by the Gala Group – Greywacke and Shale, consisting of sandstone, siltstone and mudstone in varying proportions. The Proposed Scheme would also traverse two parallel south-east – north-west trending fault lines, indicated to be present to the south of Moss Road and south of the proposed Crossgar Road junction.

11.2.1.2 Based on the 2008 and 2013 ground investigations, it is unlikely that there would be any significant rock exposures created in the cuttings associated with the scheme, as the majority of the area is masked by glacial till deposits. A small rock exposure may be created in the drumlin cutting south of the proposed Crossgar Road junction, but it is not envisaged to be of significant height.

11.2.1.3 In terms of magnitude of impact, the removal of bedrock at any point along the Proposed Scheme would be considered 'Negligible' to 'Minor Adverse'. However, where bedrock would be exposed, features of geological interest may be visible and thus the impact may be considered 'Minor Beneficial', depending upon what is exposed.

11.2.2 Superficial (Drift) Geology

11.2.2.1 Ground investigation along the Proposed Scheme has shown an extensive area of peat extends from the proposed Saintfield Road Roundabout (chainage 0m) to chainage 800m south of Moss Road, with peat thickness varying between 0.3m and 5.0m. Any proposed earthworks here would require foundation treatment to ensure stability.

11.2.2.2 Between Moss Road and the proposed Downpatrick Road Junction, the Proposed Scheme would generally traverse glacial tills, with an area of shallow bedrock indicated to the south of the Crossgar Road. Based on the preliminary GI, the large drumlin south of the proposed Crossgar Road Junction is largely made up of glacial till rather than solid rock.

11.2.2.3 Alluvial material (generally in the form of silts and clays) has been encountered in proximity to existing watercourses that would be crossed by the Proposed Scheme. Close to Ballynahinch River and Windmill Stream in the south, depths of soft deposits were found to range between 0.3m and 5.45m. The deeper alluvial deposits are considered likely to occur locally, close to watercourses and/or channels that would be crossed by the Proposed Scheme.

11.2.2.4 Peat has been encountered at several points along the Proposed Scheme, with deposits recorded between the A21 Saintfield Road and Moss Road in the north, and in proximity to the Ballynahinch River and Windmill Stream in the south. Foundation treatment may therefore be required for earthworks where the Proposed Scheme is in close proximity to the Ballynahinch River or the other minor watercourses. In terms of the magnitude of impact, any changes to the characteristics of the underlying superficial deposits would be considered 'Minor Adverse'.

11.2.3 Agricultural Soils

11.2.3.1 In terms of magnitude of impact, changes to the characteristics of soil profile types affected by the Proposed Scheme would be negative. However, as significant areas of shallow brown earths and brown ranker soils would not be lost, and sizeable areas would remain post construction, the impact upon productive agricultural soils is considered 'Minor Adverse'.

11.2.3.2 There are no known areas within the footprint of the Proposed Scheme infested with either Potato Cyst Nematode (PCN) or Potato Wart Disease (PWD), and therefore there are no restrictions in terms of the Plant Health Order (Northern Ireland) 2006 on the movement of soil or other material.

11.2.4 Minerals

11.2.4.1 There are no areas of known mineral deposits, active quarries, or licensed areas of mineral development in the vicinity of the Proposed Scheme.

11.2.5 Contaminated Land Risk Assessment

11.2.5.1 There are known areas of potentially contaminated land within the immediate area of the Proposed Scheme. Where contaminated land is encountered, further investigation would be necessary, including a contaminated land risk assessment to assess the appropriate remediation/mitigation measures. As such, the overall potential adverse risk to human health and the environment would be reduced by either removing or capping any contaminated ground; thus the residual impact could be deemed 'Slight/Moderate Beneficial'. The road construction would also provide a barrier which would reduce infiltration and prevent direct

contact with potentially contaminative soils where they had been left in-situ. Clean fill would also be used to replace made ground materials that were a risk to receptors.

11.2.6 Designated and Non-Designated sites

11.2.6.1 There are no known geological features of scientific importance worthy of statutory or non-statutory protection in the vicinity of the Proposed Scheme.

11.2.7 Construction

11.2.7.1 There would be no short-term impacts on the solid geology of the area, however soil compaction could result from construction machinery usage which would occur in the vicinity of the works. Soil compaction results in impeded drainage and subsequent waterlogging, and could result in permanent damage to the soil characteristics and structure. As the predominant soil type within the area of the Proposed Scheme is surface water gleys, poor drainage is already an issue. The 'ploughing' effect caused by construction machinery would inhibit vegetation growth, both during and immediately after the construction phase. However, affected land should be restored during the next ploughing season.

11.2.7.2 Earthwork material would temporarily be exposed and vulnerable to erosion and ground movements until vegetation establishes.

11.3 Mitigation Measures

11.3.1.1 There are no proposed mitigation measures for the operational period, as no significant impact is expected. However, during the construction period, the Contractor would be required to minimise adverse effects on geology and soils by implementing good operational practices.

11.3.1.2 A Construction Environmental Management Plan (CEMP) containing specific Environmental Management sub-plans would be developed prior to commencement of construction works and submitted to the NIEA by the Contractor. This would ensure that construction activities take place in accordance with all relevant legislation for the protection of surface and groundwater, and best practice guidance.

11.3.1.3 In line with NIEA – Waste Management Unit's requirements, the re-use of site won materials presents a potential risk to environmental receptors. Made Ground associated with historical activities may be encountered, along with road planings and subgrade to existing road pavements which may include bitumen, coal tars and other materials contaminated with hydrocarbons. If coal tars are present, the road arisings may need assessed.

11.3.1.4 Contaminated materials encountered during construction would have to be appropriately remediated on-site or disposed of at an appropriately licensed landfill site. If a potentially contaminating source has been identified, a suitable risk assessment and remediation strategy (if required) would be submitted and agreed to mitigate all risks.

11.3.1.5 The management of all materials onto and off the scheme construction site would be suitably authorised through the Waste Management Regulations (Northern Ireland) 2006 and/or the Water Order (Northern Ireland) 1999. This would be demonstrated through a Site Waste Management Plan (SWMP).

11.4 Conclusions

11.4.1.1 There would be no significant impacts on solid or drift geology, or on soils of the region, and thus the significance of effect is likely to be neutral. Due to the undulating topography of the surrounding landscape, it is inevitable that there would be significant earthworks associated with the Proposed Scheme, particularly in the area of the proposed Crossgar Road junction.

11.4.1.2 Potential areas of contaminated land may be encountered at a number of locations throughout the area of the scheme. Where contaminated land is encountered, further investigation would be necessary, including a contaminated land risk assessment to assess the appropriate remediation/mitigation measures.

12. CUMULATIVE EFFECTS

12.1 Methodology

12.1.1.1 The assessment of cumulative effects was undertaken in line with DMRB 11.2.5 (Assessment and Management of Environmental Effects; HA205/08) and DMRB 11.2.6 (Reporting of Environmental Impact Assessments). DMRB outlines two types of cumulative impact that were considered in the EIA of the Proposed Scheme. These are: cumulative impacts from a single project (i.e. Interaction of Impacts); and cumulative impacts from different projects (in combination with the Proposed Scheme).

12.2 Findings

12.2.1 Cumulative impacts from a single project (i.e. Interaction of Impacts)

12.2.1.1 The interaction of impacts arises from the combined action of a number of different environmental topic-specific impacts upon a single receptor/resource. The technical assessments in the ES (Chapters 8 – 17) have assessed the likely significant interacting impacts within each chapter. During the assessment process, co-ordination took place between assessment specialists to ensure that interacting impacts were identified, assessed and, where appropriate, mitigated.

12.2.2 Cumulative impacts from different projects

12.2.2.1 Cumulative impacts may arise from the combined effects of a number of different projects, in combination with the project being assessed, on a single receptor/resource. This can include multiple impacts of the same or similar type from a number of projects upon the same receptor/resource.

12.2.2.2 The projects that have been included in the cumulative impact assessment include development projects with valid planning permissions as granted by DOE Planning, and for which a formal EIA was a requirement or for which non-statutory EIA has been undertaken; or Trunk road and motorway projects which have been confirmed (i.e. gone through the statutory processes).

12.2.2.3 Information on planning applications within the study area were obtained from DOE Planning and has been assessed as appropriate. In no instance did this search return a development project with valid planning permission as granted by DOE Planning, and for which a formal EIA is a requirement or for which non-statutory EIA has been undertaken. On this basis, the project team is not aware of any applications which would warrant cumulative assessment.

13. CONCLUSIONS

13.1.1.1 The ES summarises the environmental assessment carried out in accordance with National and European regulatory requirements.

13.1.1.2 The environmental assessment has been undertaken following the standard methodology set out in the DMRB Volume 11 (Environmental Assessment).

13.1.1.3 The gathering of baseline environmental data and subsequent assessment of the potential environmental impacts of the Proposed Scheme have been used to develop appropriate mitigation measures. Many of these mitigation measures are incorporated into the design of the Proposed Scheme and reduce the impacts of the proposal.

13.1.1.4 It is accepted that the Proposed Scheme would have various adverse environmental impacts, however given the nature and scale of the bypass, with mitigation measures in place, it can be concluded that on balance these impacts overall are acceptable and the proposal integrates relatively well into the existing environment.