

Department for Regional Development - TransportNI

YORK STREET INTERCHANGE

Public Inquiry

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Proof of Evidence:

Environmental Statement

by

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TABLE OF CONTENTS	1.	INTRODUCTION.....	3
	1.1	Introduction	3
	1.2	Scope of Evidence	4
	1.3	Legal basis for the Environmental Statement	2
	1.4	Structure of the Environmental Statement	2
	1.5	Compliance with Legislation	6
	1.6	Consultation	7
	1.7	Summary.....	10
	2.	CULTURAL HERITAGE.....	12
	2.1	Methodology.....	12
	2.2	Findings.....	13
	2.3	Mitigation Measures	14
	2.4	Conclusions.....	15
	3.	ECOLOGY & NATURE CONSERVATION	16
	3.1	Methodology.....	16
	3.2	Findings.....	17
	3.3	Mitigation Measures	20
	3.4	Conclusions.....	22
	4.	LAND USE	23
	4.1	Methodology.....	23
	4.2	Findings.....	24
	4.3	Mitigation Measures	28
	4.4	Conclusions.....	29
	5.	PEDESTRIANS, CYCLISTS, EQUESTRIANS & COMMUNITY EFFECTS.....	31
	5.1	Methodology.....	31
	5.2	Findings.....	31
	5.3	Mitigation Measures	36
	5.4	Conclusions.....	39
	6.	VEHICLE TRAVELLERS	41
	6.1	Methodology.....	41
	6.2	Findings.....	41
	6.3	Mitigation Measures	44
	6.4	Conclusions.....	44
	7.	ROAD DRAINAGE & THE WATER ENVIRONMENT	46
	7.1	Methodology.....	46
	7.2	Findings.....	47
	7.3	Mitigation Measures	50
	7.4	Conclusions.....	51

8.	GEOLOGY & SOILS	53
8.1	Methodology.....	53
8.2	Findings.....	53
8.3	Mitigation Measures	56
8.4	Conclusions.....	57
9.	CUMULATIVE EFFECTS.....	58
9.1	Methodology.....	58
9.2	Findings.....	58
10.	CONCLUSIONS.....	61

1. INTRODUCTION**1.1 Introduction**

- 1.1.1.1 My name is Gareth Coughlin, Associate and Environmental Scientist with URS, the consultants appointed to assist TransportNI Eastern Division's Strategic Road Improvement Team to deliver the York Street Interchange ('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 the Environmental Coordinator for this project, responsible for the EIA of the Proposed Scheme, and subsequent preparation and delivery of the York Street Interchange Proposed Scheme Report: Part 1 Environmental Statement, January 2015 (DRD-YSI-4-04).
- 1.1.1.5 I have been involved in the management and coordination of the EIA of the overall scheme since 2008.
- 1.1.1.6 The EIA of the Proposed Scheme was undertaken, managed and compiled by URS, as part of a TransportNI commission for assessment, preparation and reporting of the York Street Interchange 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 URS was acquired by AECOM in October 2014. Together, AECOM and URS are one of the world's premier, fully integrated infrastructure and support services firms. For the purpose of this Proof of Evidence, any reference to URS may include reference to its former legacy companies, including Scott Wilson.

1.2 Scope of Evidence

1.2.1.1 Mr Spiers has outlined the background to the Proposed Scheme and the Statutory Procedures, and Mr Megarry has addressed the scheme development, up to the publication of Draft Orders and has set the context for the current Environmental Statement (ES) (DRD-YSI-4-04). My evidence will therefore deal only with the January 2015 ES.

1.2.1.2 The ES (DRD-YSI-4-04) adopts the structure set out in the Design Manual for Roads & Bridges (DMRB) Volume 11: Environmental Assessment (DRD-YSI-6-05), which lists ten environmental topics as follows:

- Air Quality;
- Cultural Heritage;
- Ecology & Nature Conservation;
- Landscape 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*' (DRD-YSI-6-08), 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*' (DRD-YSI-6-05).

1.2.1.5 Specialists can be made available for responding to detailed queries on these subjects, if required. Separate Proofs of Evidence have been prepared in relation to Air Quality (Dr. Garry Gray), Landscape & Visual Effects (Mr. Paul Tully), and Noise & Vibration (Mr. Alf Maneylaws).

1.2.1.6 The opening Departmental Statement (DRD-YSI-5-01) has already covered the general topic of 'Policies and Plans'.

1.3 Legal basis for the Environmental Statement

1.3.1.1 The ES (DRD-YSI-4-04) 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 (DRD-YSI-4-04) comprises three volumes in accordance with DMRB 11.2.6 (DRD-YSI-6-05); these are:

- Volume 1 Environmental Assessment (DRD-YSI-4-04B) – 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 and Glossary (Part IV);
- Volume 2 Appendices (DRD-YSI-4-04C) – all supplementary information associated with the document; and

- Volume 3 Drawings (DRD-YSI-4-04D) – figures as referenced within the various chapters of Volume 1 Environmental Assessment.

1.4.1.2 The ES (DRD-YSI-4-04) adopts the following structure:

Volume 1 – Environmental Assessment (DRD-YSI-4-04B)

Non-Technical Summary (DRD-YSI-4-04A)

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 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 (DRD-YSI-6-05).

Volume 2 – Appendices (DRD-YSI-4-04C)

- Scheme Description;
- Consultations;
- Air Quality;
- Cultural Heritage;
- Ecology & Nature Conservation;
- Landscape & Visual Effects;
- Noise & Vibration;
- Pedestrian, Cyclist, Equestrian and Community Effects;
- Vehicle Travellers; and
- Road Drainage & the Water Environment.

Volume 3 – Drawings (DRD-YSI-4-04D)

- Introduction;

- Strategic Need for the Proposed Scheme;
- 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 and 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 (DRD-YSI-4-04) 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 (DRD-YSI-4-04) 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 (DRD-YSI-4-04).

Table 1: EIA Directive environmental factors and respective technical chapters from the ES (DRD-YSI-4-04).

EIA Directive Environmental Factors:	Covered in the York Street Interchange ES under:
Population and Human Health	Air Quality Landscape & Visual Effects Land Use Pedestrians, Cyclists, Equestrians & Community Effects Noise & Vibration Regulatory & Policy Framework
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
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 a Communications Plan, developed in line with TransportNI's brief for the York Street Interchange scheme and their '*Communications Guidelines for Major Works Projects*' document and '*Good Practice Communications Guide*'.

1.6.1.2 As set out in the Communications Plan, 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 (DRD-YSI-4-04), the following statutory and non-statutory bodies were consulted:

- Belfast City Council - Chief Executive's Department;
- Belfast City Council - Development Department;
- Belfast City Council - Health & Environmental Services Department;
- Belfast City Council - Parks & Leisure Department;
- Belfast Education & Library Board;
- Department for Regional Development - Cycling Unit;
- Department for Social Development – Belfast City Centre Regeneration Directorate;
- Department of Agriculture and Rural Development – Countryside Management Branch;
- Department of Culture, Arts and Leisure – Inland Fisheries Group;
- Department of Enterprise, Trade and Investment - Geological Survey of Northern Ireland;
- Department of the Environment - Air & Environmental Quality Unit;
- Department of the Environment - Planning and Local Government (Belfast Metropolitan Area Plan Team);
- Department of the Environment - Planning and Local Government (Divisional Planning);
- Department of the Environment - Planning and Local Government (Tree Preservation Orders);
- Department of the Environment - Strategic Planning Division (Minerals Development, Management & Compliance);
- Depaul Ireland (Stella Maris);
- National Trust;
- Northern Ireland Bat Group;

- Northern Ireland Environment Agency - Built Heritage (Historic Buildings Unit);
- Northern Ireland Environment Agency - Built Heritage (Historic Monuments Unit);
- Northern Ireland Environment Agency – Environmental Protection (Industrial Pollution and Radiochemical Inspectorate);
- Northern Ireland Environment Agency - Environmental Protection (Marine Assessment and Licensing Team);
- Northern Ireland Environment Agency - Environmental Protection (Waste Management Unit);
- Northern Ireland Environment Agency - Environmental Protection (Water Management Unit);
- Northern Ireland Environment Agency - Environmental Protection (Conservation, Designations & Protection);
- Northern Ireland Environment Agency - Natural Heritage (Development Management Team);
- Northern Ireland Tourist Board;
- Royal Society for the Protection of Birds;
- Statutory Advisory Councils to the Department of the Environment;
- Sustrans Northern Ireland;
- Ulster Angling Federation;
- Ulster Wildlife Trust;
- Wildfowl & Wetlands Trust; and
- Woodland Trust.

1.6.1.3 The Communications Plan also identified a range of key stakeholders for consultation as part of the general Stage 3 Scheme Assessment process, not specifically as part of the EIA process. Various forms of communication were utilised as part of this consultation including letters, meetings and presentations. Some of the responses received from these stakeholders included information of relevance to the ES, and as such have been considered within the EIA

as necessary and where allowable (i.e. when not breaching confidentiality). Stakeholders engaged as part of the general Stage 3 Scheme Assessment who provided information of relevance to the EIA included:

- Belfast Harbour Commissioners;
- Department of Agriculture and Rural Development – Rivers Agency;
- Department for Social Development - Housing Division;
- Forum for Alternative Belfast;
- Helm Housing;
- Northern Ireland Housing Executive;
- Northern Ireland Water;
- Police Service of Northern Ireland – Crime Prevention Unit;
- Police Service of Northern Ireland – Traffic Management Unit;
- Translink; and
- Various Affected Landowners.

1.6.2 **Public Consultation Event – June 2011**

1.6.2.1 A two-day public consultation event was held on the 1st and 2nd June 2011 in the Ramada Encore Hotel, Belfast to launch a period of public consultation on the scheme options that ran from 1st June 2011 to 30th June 2011. Representatives from TransportNI and the Project Team, were present to answer questions and to provide assistance to members of the general public. Questionnaires were made available to the public as part of the public consultation event to provide an opportunity for the public to express their views on the four scheme options. Alternatively, representations could be made by letter or email directly to TransportNI.

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 8.0 through to 17.0 (DRD-YSI-4-04B).

- 1.7.1.2 Chapter 18 of the ES (DRD-YSI-4-04B) 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 measures (where appropriate) to mitigate adverse impacts, thus allowing for the overall significance of effect to be rated. At the end of the chapter, a Schedule of Environmental Commitments is given, which provides 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 considered the 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 (DRD-YSI-4-04). As previously mentioned, separate Proofs of Evidence have been prepared in relation to Air Quality, Landscape & Visual Effects and Noise & Vibration, and therefore have been excluded from this summary.

2. CULTURAL HERITAGE

2.1 Methodology

- 2.1.1.1 The assessment of cultural heritage within the study area reviewed the three subtopics of archaeological remains, historic buildings, and historic landscapes (that represents the historic townscape of Belfast City Centre (north) within which the Proposed Scheme would be located). In accordance with the DMRB 11.3.2.3 (DRD-YSI-6-05), 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.
- 2.1.1.2 The study area was determined with reference to the DMRB 11.3.2 (DRD-YSI-6-05), which in general encompassed an area 300m from the Proposed Scheme boundary, though the extent of this area varied in order to assess potential impacts on setting of all designated heritage assets that could be affected.
- 2.1.1.3 Previous studies and sources of information were utilised, including a number of recent and historical exploratory ground investigations that have been undertaken within the Proposed Scheme footprint, some of which has been the subject of targeted archaeological monitoring. Information gathered consisted of a desk-based study of information held by Northern Ireland Environment Agency (NIEA) – Monuments and Buildings Record (MBR). This identified heritage constraints, such as the presence of statutorily designated Archaeological Sites, Listed Buildings, Historic Parks, Gardens and Demesnes, Battlefield Sites, Defence Heritage Sites, 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.
- 2.1.1.4 Historic maps, including Ordnance Survey (OS) maps of the area, historic city maps from 1791 to the present day, and the Goad Insurance maps (1897-8) were reviewed at The Public Records Office of Northern Ireland (PRONI). Historic aerial photographs from the 20th Century were also reviewed at PRONI. In addition, the online databases of Irish excavation reports were reviewed.

2.1.2 Fieldwork

2.1.2.1 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.

2.2 Findings

2.2.1.1 The Proposed Scheme would have a Minor Adverse Impact on two assets of Medium value (Area of Archaeological Potential & buried palaeo-environmental remains), a Major Adverse Impact on a Low value asset (19th Century and later activity from watching brief observations) and Moderate Adverse Impact on a Low value asset (Demolished remains of Belfast City (north)). The impact on each of these assets is a direct result of the landtake that is required for the Proposed Scheme. Where archaeological/buried environmental remains survive, they would be destroyed by the groundworks for the Proposed Scheme, including the excavation of shallow and deep cuttings, the excavation required for new or widened embankments, piling for new structures (bridge piers), the installation of retaining walls, and the excavation of channels for drainage or groundwater control. The area of buried palaeo-environmental remains would also be impacted by works that affect and change the existing groundwater table, such as piling required for motorway structures, and would lead to a deterioration of the condition and state of preservation of the buried remains.

2.2.1.2 The Proposed Scheme would impact on the setting of ten historic building assets (four high value and six medium value). In all cases, these would be either Negligible or Minor Adverse. 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. The setting for these buildings would be affected by the Proposed Scheme, but has already been affected by the existing road network.

2.2.1.3 The Proposed Scheme would impact 15 historic landscape elements (setting impacts and impacts to buried and upstanding remains), which includes two high value, nine low value and four negligible value assets. Impacts would range from Negligible to Major Adverse. The site of bonded store (Mitchell & Co. Ltd) on Great George's Street (Negligible Value), the site of Engineering Works on Great George's Street (Negligible Value) and the memorial to those killed and injured in the bombing of McGurk's Bar (Low Value) would all experience Major Adverse impacts as a result of the landtake/works required for the Proposed Scheme. A terrace of 4 houses on Garmoyle Street (Low Value) would experience a Moderate Adverse impact due to temporary and long-term impacts upon setting. The majority of the remaining historic landscape elements would experience Negligible impacts.

2.3 Mitigation Measures

- 2.3.1.1 During the construction phase, 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 when necessary to inform construction supervision staff and site operatives of archaeologically sensitive areas.
- 2.3.1.2 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).
- 2.3.1.3 The Archaeological Mitigation Programme would commence prior to the start of the main construction works.
- 2.3.1.4 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 (monitoring of geotechnical works, geotechnical investigations) or where there is potential for archaeological remains to be discovered (within defined areas of archaeological potential). The results of these intrusive trenching or test pit investigation works would inform decision making on further mitigation recording that may be appropriate. Geoarchaeological assessment would also be carried out.
- 2.3.1.5 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 geoarchaeological 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.
- 2.3.1.6 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.
- 2.3.1.7 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.

2.4 Conclusions

2.4.1.1 The assessment has concluded that there would be no physical impact as a result of the Proposed Scheme on any buildings of historic interest (designated and non-designated assets), but there would be impacts on the setting of a number of these that are in close proximity to the Proposed Scheme; and a number of archaeological assets would be impacted. Taking into consideration the existing road layout and the nature of the Proposed Scheme, impacts would arise from the construction of new road elements (i.e. M2 to Westlink, M3 to Westlink, Westlink to M3, Westlink to M2).

2.4.1.2 Overall, the assessment has found that four archaeological assets, ten historic buildings and fifteen historic landscape assets would be impacted by the Proposed Scheme. The Proposed Scheme design has avoided impacts where possible and minimised adverse effects, however, the overall significance of effect on the cultural heritage assets is Slight Adverse. There would be no impact on high value archaeological assets.

3. ECOLOGY & NATURE CONSERVATION

3.1 Methodology

- 3.1.1.1 The assessment was undertaken in accordance with the requirements of DMRB 11.3.4 (DRD-YSI-6-05) and supplemented by IAN 130/10 '*Ecology and Nature Conservation: Criteria for Impact Assessment*' which provides guidance on the criteria for the assessment of the potential impacts of road projects on nature conservation resources. The assessment has also been supported using survey guidance devised by the Joint Nature Conservation Committee (JNCC), NIEA – Natural Heritage, British Trust for Ornithology (BTO) and the Institute for Ecology and Environmental Management (IEEM), etc.
- 3.1.1.2 The study area for the field surveys covered the Proposed Scheme including adjacent areas likely to be affected by the road construction. These were undertaken by suitably experienced ecologists who reviewed existing ecological evidence and conditions between the Westlink (from North Queen Street Bridge), the M3 Lagan Bridge and Duncrue Street junction on the M2. The study area extended further afield where necessary, in order to identify important habitats, wildlife corridors or the assessment of potential impacts on designated ecological sites, such as the Natura 2000 sites in Belfast Lough and beyond.
- 3.1.1.3 Consultation was undertaken with; Centre for Environmental Data and Recording (CEDaR) Biological Records; Department of Agriculture and Rural Development (DARD); Department of Culture, Arts and Leisure (DCAL) – Fisheries Operations & Technical Support; Department of the Environment (DOE): Planning and Local Government - Tree Officer; the National Trust; NIEA – Natural Heritage; Northern Ireland Bat Group; Royal Society for the Protection of Birds (RSPB); the Ulster Angling Federation; the Woodland Trust; Ulster Wildlife Trust (UWT); and the Wildfowl and Wetlands Trust (WWT).
- 3.1.1.4 A desktop study was undertaken, gathering ecological evidence based on previous surveys of the area, website-based research for ecological records and knowledge, and information from a data request from the CEDaR. The *Habitas* website was also reviewed for information on priority habitats and species within Northern Ireland, and for information on designated sites and protected species occurring within the study area. A range of specialist surveys were also undertaken.
- 3.1.1.5 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. A survey

for invasive non-native species listed in Schedule 9 Part II of the Wildlife (Northern Ireland) Order 1985 (as amended) was undertaken as part of this 'extended' Phase 1 Habitat Survey. These surveys were undertaken in August 2013 and February, August, and December 2014.

3.1.1.6 A specific Bat survey was also undertaken using NIEA specific survey requirements, in July and August 2013. Trees and buildings scheduled for demolition were surveyed from the ground for bat roost potential, and suitability and signs were searched for. The results were used to grade locations as having negligible, low, medium, high or confirmed bat roosting potential, in accordance with Bat Conservation Trust guidelines. Activity surveys were also undertaken, with transects around the entire area being walked, with particular attention given to key corridors of mature vegetation and structures with potential for roosting sites.

3.1.1.7 A specific breeding bird survey using adapted British Trust for Ornithology (BTO) Common Bird Census (CBC) methodology was carried out during June and July 2013. This identified the value of the survey area for nesting birds and the potential use of the study area in the breeding season, especially for those birds of high conservation concern. A wintering bird survey was scoped-out at an early stage, as the habitat was not considered important to over-wintering birds.

3.2 Findings

3.2.1.1 The operational phase of the Proposed Scheme would have negative impacts on the majority of species. In general, in the short-term, the loss of natural habitat and the conversion 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 site 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. birds) especially in the short-term, although most birds in the area will already be habituated to large traffic volumes and would become habituated to the new arrangement within a relatively short period of 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.

Operation Impacts	Nature of Impact
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.
Spread of non-native invasive species	Future scheme maintenance work, such as hedge cutting and grass cutting, could cause the spread of Japanese knotweed. This would be a permanent direct impact.
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.

- 3.2.1.2 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 unnecessarily as part of site clearance works to provide temporary access roads or additional space for site compounds or construction purposes.
- 3.2.1.3 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.
- 3.2.1.4 Whilst limited evidence of protected mammal activity has been observed within the York Street 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.
- 3.2.1.5 Construction would involve the act of 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 shown 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 direct impact.
Artificial lighting	Construction lighting could displace sensitive protected species and provoke other behavioural changes. The impacts would be seasonally and spatially dependent. This would be an indirect temporary (but possibly prolonged) indirect impact.
Spread of invasive non-native species	Construction traffic movements, especially transport of topsoils, could lead to seeds of Himalayan balsam or other invasive species being spread, leading to the growth of new plants. This would be a permanent direct impact.

3.2.1.6 Due to the proximity and hydrological link of the Proposed Scheme to the existing Belfast Lough and Belfast Lough Open Water Special Protection Areas (SPAs) and Belfast Lough Ramsar site boundaries, a Habitats Regulations Assessment (HRA) (DRD-YSI-7-04) was undertaken in tandem with the ecological assessment. Both a Stage 1 Screening Assessment and a Stage 2 (Appropriate Assessment) were undertaken in accordance with the requirements of the Habitats Directive 92/43/EEC.

3.2.1.7 The Stage 2 Appropriate Assessment undertook a thorough examination of potential impacts and concluded that there would be no significant effects resulting from the Proposed Scheme

on the conservation objectives and selection features of Belfast Lough SPA (Wintering redshank) and Belfast Lough Open Water SPA (Wintering Great-crested grebes). The Appropriate Assessment concluded that residual adverse effects on the integrity of the Natura 2000 sites with Proposed Scheme implementation will not remain.

3.3 Mitigation Measures

3.3.1.1 A number of general principles should be adopted. A suitably experienced ecologist should oversee all works during the Construction Phase and ensure that satisfactory mitigation measures are put in place and ensure that all construction works are carried out adopting good practice at all times in relation to ecological issues. This role is termed as the Ecological Clerk of Works (ECoW). The ECoW should 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 requirement of NIEA.

3.3.1.2 An Environmental Management Plan (EMP) has been prepared which would ensure that work practices and management practices relating to the Proposed Scheme would take cognisance of the environment at all times. This plan would be carried forward by the contractor and developed further to become the CEMP. In conjunction with the ECoW, a Habitat Management Plan would be prepared as part of the CEMP outlining how natural habitats would be managed through the construction and operation phases of the Proposed Scheme.

3.3.1.3 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 should have the specific approval of the ECoW to ensure that no ecological constraints exist.

3.3.2 Designated Ecological Sites

3.3.2.1 Although there is currently no direct hydrological drainage link between the site and the Inner Belfast Lough ASSI, Belfast Lough Ramsar, Belfast Lough SPA, and Belfast Lough Open Water SPA, it is proposed that the majority of surface water drainage would be diverted into Belfast Harbour untreated via the Gamble Street Combined Sewer Overflow (CSO). 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 (DRD-YSI-4-04).

3.3.3 **Natural Habitats**

3.3.3.1 The overall landscape planting objectives should attempt to mitigate and compensate for the mosaic of semi-natural and artificial 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 (DRD-YSI-4-04), which should be incorporated into landscape planning, including incorporation of existing trees where possible, and creation of natural habitat with new planted areas between road links.

3.3.4 **Invasive Species**

3.3.4.1 The ECoW should undertake further pre-construction surveys to identify the locations of any non-native invasive species within the Proposed Scheme footprint and ensure mitigation measures are carried out where required. An Invasive Species Management Plan should be developed, and ensure great care is taken when working close to the identified area of invasive species to prevent the spread of live plants or viable seeds.

3.3.5 **Bats**

3.3.5.1 The ECoW should undertake pre-construction surveys on any semi-mature / mature trees to be felled and any buildings to be demolished for the likelihood of bat presence. Further prescriptive measures have been outlined in Sub-Section 10.7 of the ES (DRD-YSI-4-04), specifically for bats.

3.3.6 **Protected species**

3.3.6.1 A pre-construction survey for protected species should be undertaken prior to any vegetation clearance. This would establish the current status of these species on the site and whether any further mitigation is required.

3.3.7 **Breeding Birds**

3.3.7.1 A pre-construction breeding bird survey should be undertaken prior to any vegetation clearance. This would establish if the breeding bird population has changed, as well as the presence of protected or rare species which may require further mitigation measures.

3.3.7.2 All vegetation clearance work should be undertaken outside of the bird breeding season, from March to August, (though not limited to that period). Any vegetation clearance undertaken within the bird breeding season must be approved by the ECoW who should make a detailed check of any suitable vegetation for nests prior to vegetation / tree removal.

3.3.7.3 Landscaped planted areas should be created to provide bird species with multiple nesting opportunities across the site. A range of bird box styles should be provided throughout the planted areas. The planting plan should include seed and berry-rich plants and those that would provide nectar for bees and insects.

3.3.8 **Biodiversity enhancement**

3.3.8.1 TransportNI is charged under The Wildlife and Natural Environment 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 the ES. A suitably experienced ECoW should oversee any enhancement works and provide advice on any specifics. Specifics of siting and types of enhancement to be employed can only be confirmed following the production of detailed plans of the Proposed Scheme. An ecologist should assist in the preparation of these plans to ensure that ecological issues can be incorporated at an early stage.

3.4 **Conclusions**

3.4.1.1 Overall, the Proposed Scheme has a relatively low effect on the ecological value and conservation status of the area, its habitats and its species. Typically, urban species adapted to live in such environments were found and as such, are not considered as particularly sensitive.

3.4.1.2 Following the consideration of a HRA (DRD-YSI-7-04), a Statement to Inform the Appropriate Assessment was prepared (January 2015), and it was concluded that there would be no significant effect on the integrity of any designated sites with implementation of the Proposed Scheme.

3.4.1.3 Evidence of protected species was limited to bats and birds. The Proposed Scheme would result in the loss of several common habitats and loss of locally important features such as scrub and trees. However, extensive landscape planting to include tree and shrub mixes is planned around the Proposed Scheme footprint would mitigate these losses. A range of other habitat compensation and biodiversity enhancement measures should be implemented, as outlined in the ES (DRD-YSI-4-04). These include; the creation of new habitats throughout the site, tree-lined road links, retention of mature trees where possible, and the provision of boxes for birds and bats.

3.4.1.4 Overall, the residual effects on the ecology and nature of the site are considered either Minor Adverse or Negligible.

4. LAND USE

4.1 Methodology

4.1.1.1 Under guidelines laid down in DMRB 11.3.6 (DRD-YSI-6-05), 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.

4.1.1.2 The impact of the loss of properties and associated landtake was included in the assessment, which also covered the effects of private land loss (i.e. gardens, driveways, open space, brownfield land, hardstanding etc.), taken in part or in whole. To take account of the impact upon development land and planning applications, the Proposed Scheme was plotted on a map of land use planning policy designations/zonings contained within the Belfast Metropolitan Area Plan (BMAP) 2015 (DRD-YSI-1-09). This identified potential landtake from areas designated for future development, and the degree of impact assessed. The assessment of potential effects on planning applications focused specifically on direct physical impact upon sites, in order to establish whether the Proposed Scheme would preclude or restrict development potential. To establish any relevant constraints or factors that should be taken into account regarding impacts upon community land, Belfast City Council – Parks & Leisure Department was consulted. In terms of waterway restoration projects, the steps taken were to confirm that the information obtained at Stage 2 was still valid and undertake any new consultations with the relevant interested parties as required.

4.1.1.3 The effects on agricultural land was scoped-out of the assessment due to the urban nature of the area.

4.2 Findings**4.2.1 Demolition of Private Property**

4.2.1.1 Two government and two commercial properties would be demolished to accommodate permanent elements of the Proposed Scheme. Three of these are located between Nelson Street and Corporation Street and at time of ES publication were in use by; Driver & Vehicle Agency (DVA) Road Transport Licensing Division, TransportNI Eastern Division Section Office, and Focus Security Solutions. They would be lost to accommodate the alignment of the link between M2 and Westlink, with the DVA and TransportNI properties also potentially affected by a private access off Nelson Street which would serve residual lands.

4.2.1.2 The fourth property to be demolished is Jack Kirk Automobile Engineer (off Shipbuoy Street), lost in its entirety to accommodate the link between M3 and Westlink, and the private access lane to the pumping station from Corporation Street.

4.2.1.3 Though a local effect, demolition of any property is considered significant; thus predicted losses are assessed as having a Major Adverse impact.

4.2.2 Potential Private Land Loss

4.2.2.1 Thirteen plots would be affected in terms of private land losses which includes hardstanding, property boundaries, surface level car parking, vacant brownfield land, open space, grassed/treed areas, private access lanes, amenity planting and rough ground to accommodate various permanent elements of the Proposed Scheme.

4.2.2.2 Four plots would experience Major Adverse impacts, these are; Corporation Street Car Park; Northside Park & Ride; vacant brownfield land between Nelson Street, Great George's Street, Nile Street and Shipbuoy Street; and Great George's Street Car Park, between Westlink southbound and northbound carriageways. The losses of land experienced would essentially preclude or significantly affect current usage. No specific mitigation measures/accommodation works are proposed to alleviate the losses of land, other than opportunities to merge some plots with adjacent residual severed plots to potentially create land with development potential.

4.2.2.3 A plot of vacant brownfield land between Nelson Street and Corporation Street would experience a Moderate Adverse impact and an area at Yorkgate Business Park (Galway House) would experience a Minor Adverse impact. It is not expected that the continued use of these lands would be precluded or significantly affected when considering the mitigation measures/accommodation works proposed.

4.2.2.4 Seven plots would experience Negligible impacts, including land at the DVA Weighbridge, Nelson Street Trade Centre, Cityside Retail Park, grassed area at Molyneaux Street, the former Police Service of Northern Ireland (PSNI) Station at North Queen Street, Lancaster Street Car Park and New Lodge between 70-80 Victoria Parade and the Westlink. In these cases, the impact rating is either as a result of very minor expected losses and/or mitigation measures/accommodation works proposed to reduce the impact.

4.2.3 **Potential Effect on Planning Applications**

4.2.3.1 Several extant planning applications for various forms of development within the study area, at varying stages in the planning process would be directly affected by the Proposed Scheme.

4.2.3.2 The only development proposals which would be lost in their entirety, and thus experience a Major Adverse impact are four advertisement applications for light boxes/display panels. As these do not contribute to the development of the area, their loss is not considered particularly significant.

Two applications would be subject to Moderate Beneficial impacts as a result of changes to the layout of Great George's Street, significant reduction in the volume of traffic that would use this road with scheme implementation, and increased space for streetscape improvements. The remaining directly affected applications would be either subject to Minor Adverse or Negligible impacts, as the Proposed Scheme is unlikely to preclude or sterilise their development potential.

4.2.3.3 As the existing road network would be extensively modified to accommodate the Proposed Scheme, indirect impacts would be experienced throughout the wider road network, in terms of traffic redistribution and access amendments. With the extensive separation of local and strategic traffic and associated freer flowing traffic conditions, it would be expected that this would be of benefit to some applications with regards to their transport assessments. There would however, be cases where traffic redistribution would cause greater pressure on local routes (i.e. Corporation Street, Frederick Street).

4.2.4 **Potential Loss of Development Land**

4.2.4.1 No designations, policies, proposals or zonings for development land within Belfast City Centre, Belfast Harbour Area, or Outer Belfast City (North Belfast) would be adversely affected by the Proposed Scheme. DOE Planning confirmed that they have no concerns regarding potential implications associated with the Proposed Scheme on proposals within BMAP (DRD-YSI-1-09). Even though the Proposed Scheme would cut through an area of land

zoned in the Plan as 'Existing Employment', between Corporation Street and Nelson Street, this is not deemed to be a constraint to the Proposed Scheme or to the overall plan zoning.

4.2.4.2 Land that would be affected by the majority of links has been left un-zoned as 'white land'. This is land which is deemed suitable for development but not zoned for a specific purpose, and which may be suitable for a range of uses. It provides a development land reserve, which can be zoned later as required and as infrastructure becomes available.

4.2.4.3 Although not directly affected, an area of land on Great George's Street which has been zoned for social housing (CC 04/02) would also be subject to beneficial impacts as a result of changes to the layout of Great George's Street, with a significant reduction in the volume of traffic that would use this road with scheme implementation and increased space for streetscape improvements.

4.2.4.4 A large proportion of the land between Great George's Street, North Queen Street, Frederick Street and York Street is designated as a 'Protected City Centre Housing Area' (CC 21/13). There would be very minor modification to the existing Great George's Street/Thomas Street junction, resulting in a Negligible impact on this designated area.

4.2.4.5 Cityside Retail Park on York Street is zoned as a retail District Centre (BT 010/6). A new signalised junction arrangement on York Street would result in loss of the existing access to this site, a roadside sign, boundary railings, amenity planting and a number of car parking bays. The impact would be Negligible, as the retail park would be connected to a new signalised junction and the Proposed Scheme would not inhibit the potential for strengthening the role of these traditional local shopping areas.

4.2.4.6 The Belfast Harbour Area, which has been designated as a major area of existing employment/industry, would be directly affected by the scheme elements east of the M2 resulting in the loss of active commercial properties, and land which may impact upon the future viability of these properties as employment locations. Nevertheless, as noted above, DOE Planning confirmed that they have no concerns regarding the loss of land from this area.

4.2.5 **Potential Loss of Community Land**

4.2.5.1 Although there are four areas of community land (public open space / other recreational areas) located in close proximity to the existing junction arrangement, none would be subject to direct impacts as a result of the Proposed Scheme.

4.2.6 Potential Loss of Woodland Areas

4.2.6.1 Some pockets of maturing amenity woodland planting associated with the existing road network would be lost, though this has little bearing on the assessment of land use impacts. It is confidently assumed that no Tree Preservation Orders (TPOs) would be directly affected by the Proposed Scheme.

4.2.7 Effects on restoration proposals for abandoned waterways

4.2.7.1 There would be no direct impact upon the proposal to re-open the Lagan Navigation and open-up the Lagan Corridor between Belfast and Lough Neagh.

4.2.8 Construction

4.2.8.1 The assessment of construction-related land use impacts focused on loss of property or land as a result of temporary works. This includes any areas of temporary landtake required for works such as services/utilities diversions, drainage, compounds/storage areas, and temporary traffic management.

4.2.8.2 Two properties would be demolished due to the phased temporary traffic management measures; a vacant office unit at 151-153 York Street, and The Pathways Project at 141-149 York Street. Both would be lost in their entirety to accommodate the temporary partial realignment of York Street and major signalised junction which is required to facilitate through movements along this route whilst York Street overbridge is constructed.

4.2.8.3 During the construction works, new buildings would be erected to accommodate plant and materials. The siting of these would be determined by the appointed contractor within the lands made available for the Proposed Scheme. These would be removed upon scheme completion.

4.2.8.4 Traffic Management is also likely to result in the greatest amount of temporary private land loss during the construction phase. The variation in the spatial extent of the temporary road layouts, lane reconfigurations, signalised junctions, etc. would be particularly land-hungry and have a significant impact upon the schedule of plots/properties predicted to experience private land loss. In addition to this, an area of private land beyond the permanent landtake area would also be affected by temporary traffic management measures.

4.2.8.5 The private car park adjacent to Philip House, at the junction of Little York Street and Great George's Street would be lost in its entirety to accommodate the temporary partial realignment of York Street and a major signalised junction which is required to facilitate through movements along this route whilst York Street overbridge is constructed. There are currently

no proposals to mitigate the loss of surface level car parking at this site; however if this land is deemed surplus to requirements post scheme implementation, it may be sold back to the original owner at the then market value, with scope to reinstate to its former use.

4.2.8.6 With regards to York Street, several services would require diversion as part of the proposed works, to avoid the new diaphragm walls installed as part of the underpasses which would be conveyed beneath the new York Street bridge structures. It is proposed to construct a new services culvert through which the diverted services would be routed (potentially temporarily). However during the construction phase, this would result in the temporary loss of Lancaster Street Pay & Display Car Park at the junction of York Street and Great George's Street.

4.2.8.7 As part of the road drainage measures/diversions, temporary chambers/structures and trench excavation would require temporary loss of land from Corporation Square Pay & Display Car Park and the private car park which serves the Royal Mail Sorting Office at Tomb Street. The losses of land would be minor and unlikely to significantly affect the continued usage of these areas over the course of the construction period.

4.3 Mitigation Measures

4.3.1.1 For those properties which would be subject to demolition and associated landtake, there are no specific mitigation proposals other than monetary compensation for the landowner's loss.

4.3.1.2 Specific mitigation proposals have been addressed on an individual basis throughout Sub-Sub-Section 12.6 of the ES, for those properties, plots, planning applications, zonations and designations which would be subject to loss of land, though continued or future usage would not be adversely affected to the extent that the property/land would be lost or usage precluded.

4.3.1.3 Following scheme opening, TransportNI would carry out a review of land vested for construction of the new road; if this exceeds the land required by TransportNI for its present and future responsibilities, any surplus land may be sold back to the original owner or others at the then market value. Further to this, TransportNI currently owns the majority of private land that would be affected by the Proposed Scheme. On this basis, there is significant scope for surplus land to be made available for disposal post scheme implementation.

4.3.1.4 During construction, mitigation measures would include the location of construction compounds in areas which would least disturb the existing land use, and the reinstatement of land used for temporary construction. Temporary access arrangements would be provided as

appropriate in consultation with landowners to minimise disruption to adjacent land and other activities.

- 4.3.1.5 The CEMP shall be prepared to mitigate potential impacts and maintain continued access and operation of land. This would include surveys of existing ground and drainage conditions and reinstatement proposals for any land utilised by way of third party agreement during construction; and a programme for provision and procedures of accommodation works to be adopted.

4.4 Conclusions

- 4.4.1.1 A total of six properties (two government, three commercial and one community) would be demolished (including associated landtake). Four would be lost to accommodate permanent elements associated with the Proposed Scheme, and two properties would be lost as a result of phased construction works. Though a local effect, the significance would be at best 'Large Adverse' for those properties demolished. Nevertheless, in the context of the areas affected (i.e. Belfast City Centre, Belfast Harbour Area, and Outer Belfast City (North Belfast)), the overall effect associated with these losses would be of minor significance on a city-wide basis.
- 4.4.1.2 A total of thirteen plots would be subject to private land loss impacts in order to accommodate various permanent elements of the Proposed Scheme. Furthermore, it is expected that three plots would also be subject to private land loss impacts as a result of temporary works during the construction phase. For the majority of properties affected, the significance of effect would be Neutral as a result of either negligible losses or minimal disruption to continued usage of these lands. Nevertheless, adverse effects associated with private land loss would be experienced with this scheme, though offset to some degree by the opportunity to combine severed parcels of residual lands into larger plots and making these available for potential future development.
- 4.4.1.3 Only four planning applications would be lost in their entirety to accommodate the Proposed Scheme, however as advertisement applications, these are of low value and do not contribute positively to the development of the area. Two applications would be subject to a moderate/large beneficial effect as a result of changes to the layout of Great George's Street and a significant reduction in the volume of traffic that would use this road with scheme implementation and the remaining directly affected applications would be subject to either Slight Adverse or Neutral effects.
- 4.4.1.4 No areas of community land or designations, policies, proposals or zonings for development land would be adversely affected by the Proposed Scheme, thus there would be a 'Neutral'

significance of effect with the implementation of the Proposed Scheme. There are four areas which may be made available to future development as part of surplus land disposal. The potential development of this land would be a significant benefit to the area, as this land would remain underutilised until post scheme completion.

- 4.4.1.5 There would be no direct impact upon the proposal to re-open the Lagan Navigation and open-up the Lagan Corridor between Belfast and Lough Neagh, therefore the significance of effect would be 'Neutral'.

5. PEDESTRIANS, CYCLISTS, EQUESTRIANS & COMMUNITY EFFECTS**5.1 Methodology**

5.1.1.1 The assessment into pedestrian, cyclist, equestrian and community activity was undertaken in accordance with the requirements of DMRB 11.3.8 (DRD-YSI-6-05). As much of the assessment was undertaken at Stage 2, the steps taken included: refining information on important community facilities used by the local community which may be affected by the Proposed Scheme; verifying the earlier assessment of changes in journey length/time, amenity and community severance, allowing for any subsequent modifications to the Proposed Scheme design and refinement of traffic data; and attaining views of relevant interested parties (e.g. community groups, cycling groups, angling groups etc.) on the implications of the Proposed Scheme.

5.2 Findings**5.2.1 Proposed Road Network - Local Vehicle Movements**

5.2.1.1 Due to the complexity of providing grade-separation within a confined urban environment and attempting to achieve minimum DMRB standards for highway design (i.e. vertical and horizontal alignments), the intersection of some key links would be modified, realigned, diverted and/or permanently stopped-up. As the existing York Street junction area forms the northern gateway to the City, significant volumes of traffic merge and diverge at this point from a wide variety of links. Hence, there is the potential for both beneficial and adverse impacts on vehicle movements (both strategic and local) when accessing community facilities.

5.2.1.2 With scheme implementation, significant mixing of strategic and local traffic would still occur, however would take place through a much improved highway environment. Whilst the benefits of these changes are obvious for the strategic road user, local vehicle movements (i.e. users of the local network of city roads) would also experience benefits, due to the reduction in strategic traffic interaction, leading to freer flowing conditions through junctions which are currently at-grade, signalised, heavily-trafficked and congested (i.e. along York Street). The flow of local traffic through the interchange would become more regulated and the safety of the highway environment would improve for the vehicle user. However, even though some roads would not be subject to physical alteration, they would be subject to traffic redistributive effects as a result of proposed changes to other parts of the existing road network, altering routes taken to complete desired journeys.

- 5.2.1.3 The strategic network would be enhanced such that it could safely and efficiently cater for longer-distance movements of people and freight to, from and between different parts of the Belfast Metropolitan Area (BMA).
- 5.2.2 **Community Facilities**
- 5.2.2.1 Six community facilities would be lost in their entirety to accommodate the Proposed Scheme. Within the confines of the existing junction arrangement, three community facilities (Northside Park & Ride, Great George's Street Car Park and Jack Kirk Automobile Engineer) would be lost to accommodate underpass elements and/or York Street overbridge.
- 5.2.2.2 Three community facilities would also be lost within the northern fringe of Belfast City Centre. The Pathways Project Building on York Street would be demolished to accommodate the temporary realignment of York Street and a major temporary signalised junction which is required during the construction of York Street overbridge. The memorial to those killed and injured in the bombing of McGurk's Bar and mock-up mural/sculpture of the original bar would be removed as part of the works to widen North Queen Street Bridge. Corporation Street Car Park would be lost to accommodate the alignment of the pumping station access, resulting in the severance of this plot and the loss of the main access to the car park and a significant number of parking bays.
- 5.2.2.3 A number of community facilities would also experience direct land loss or access impacts, however their continued usage during the operational phase is unlikely to be significantly affected. There would be Minor Adverse Impacts to three facilities within the North Belfast area to accommodate the Proposed Scheme. The new signalised junction arrangement at Cityside Retail Park would result in loss of the existing access to this site, however, from a community usage perspective; this impact is likely to be beneficial as an access from the mall would be connected to a new signalised junction. This would provide an all-movements junction, where access is currently limited to left-in/left-out. Similarly, Galway House retail units, which although unoccupied at time of ES publication, would also benefit from the same all-movements junction. Very minor loss of land is expected from an open space grassed area immediately adjacent to New Lodge Playground to accommodate online widening of the Westlink and North Queen Street Bridge. Lancaster Street Car Park would be temporarily closed during the construction phase, but would be subject to negligible impacts with implementation of the Proposed Scheme. Modification to the layout of York Street and left-turn lane to Great George's Street would result in the severance and stopping-up of the access to this car park. A new access to this car park would be provided from Great George's Street.

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- 5.2.2.4 A number of retail units on the west side of York Street, would experience indirect impacts where the provision of a dedicated cycling lane would result in the loss of the layby/on-street parking.
- 5.2.2.5 No community facilities would be lost within the Belfast Harbour (Greater Clarendon/Sailortown) area to accommodate the Proposed Scheme; however the Stella Maris Emergency Hostel on Garmoyle Street would be subject to minor indirect adverse impacts, including air, visual and noise impacts which would have some measurable change in the amenity of this community resource.
- 5.2.3 **Public Rail Network**
- 5.2.3.1 From an operational perspective, Belfast to Larne/Londonderry rail services and Yorkgate Station would be unaffected as a result of changes to the existing road layout associated with the Proposed Scheme.
- 5.2.3.2 In terms of potential impacts upon proposals for the future development of the rail network within the study area, the full planning application submitted at Yorkgate Station to provide a second staircase from the east platform down the embankment to the footway at Dock Street would be unaffected by the Proposed Scheme. It is also envisaged that the Proposed Scheme would not prejudice the possibility of twining the single track line between Yorkgate Station and Gamble Street.
- 5.2.4 **Public Bus Network**
- 5.2.4.1 As a clear need to substantially improve the quality of public transport services in delivering a modern, integrated transport system for the BMA has been identified within the Belfast Metropolitan Transport Plan (BMTP) (DRD-YSI-1-07), the reduction in strategic traffic interaction, resultant freer flowing traffic conditions, and inclusion of a southbound bus lane on York Street would be of benefit (especially in terms of journey ambience, frequency and reliability). However, in a meeting held on 1st May 2014, Translink have alluded to its success ultimately being determined through micro-simulation, which amongst other things (i.e. route taken, traffic flows and speeds) would consider the effects of traffic light sequencing through the bus lane upon service efficiency, on the basis that priority would not be given to buses at the signalised junctions. Nevertheless, it is recognised within the BMTP (DRD-YSI-1-07), that the degree of priority given to buses will need to be monitored as part of the wider implementation of the Plan.

- 5.2.4.2 There are a number of bus services utilising the wider road network, which although are not directly affected by the Proposed Scheme, would be affected by the traffic redistributive effects associated with changes to the existing road network. The effects associated with this are likely to be adverse from a journey time and reliability perspective. Nevertheless, the impact upon efficiency of services would be determined by micro-simulation, undertaken by Translink.
- 5.2.4.3 Connectivity to services would not be adversely affected, as any lost serviced bus stops would be appropriately relocated as part of the Proposed Scheme and in consultation with Translink.
- 5.2.4.4 The Proposed Scheme would not have a direct impact upon the 'Belfast on the Move' project, nor would the traffic redistributive effects be perceptibly felt beyond the road network within the study area.
- 5.2.4.5 As there is no current proposal for Belfast Rapid Transit (BRT) to service the study area to the north of the City Centre, no impact can be expected. However, if in the future it was proposed to extend the BRT network through this area, the Proposed Scheme would not prejudice the possibility of this happening.
- 5.2.5 **Pedestrians**
- 5.2.5.1 In terms of amenity and relief from existing severance, the benefits associated with grade-separation of strategic links between the Westlink and M2/M3 (beneath York Street overbridge) would be significant, as pedestrians would no longer be in direct interaction with strategic through traffic within the interchange via signalised junction arrangements. As such, the reduction in pedestrian/vehicle interaction, waiting times and overall traffic volume would provide substantial relief from existing severance and improvements in amenity. However along York Street, the greatest disbenefit would take place at Henry Street, as although the pedestrian access to York Street would be maintained via a section of existing footway adjacent to Cityside Retail Park, it would have to divert around a new retaining wall structure. This would create new severance and reduced amenity.
- 5.2.5.2 The existing layout of North Queen Street and Corporation Street (including existing pedestrian provision) would remain unchanged with the Proposed Scheme, thus there would be no change in journey length for pedestrians. However, the traffic redistributive effects as a result of proposed changes to other parts of the existing road network would result in an increased volume of traffic utilising these roads, potentially hindering movements, reducing

amenity and increasing the perception of severance and the time taken to complete journeys (particularly when crossing).

5.2.5.3 East/west pedestrian movements within the study area would also be further inhibited by implementation of the Proposed Scheme, with the loss of the dedicated footway beneath the Lagan and Dargan bridges, between Corporation Street and Nelson Street/Great George's Street, and the complex pedestrian crossing arrangement at the Dock Street/Nelson Street junction arrangement.

5.2.5.4 Carr's Glen/Waterworks (BT 147/01) and North Belfast/South Belfast/Lagan Valley Regional Park (BT 147/09) community greenways would be unaffected by the Proposed Scheme in terms of continuity, though would be subject to changes in amenity (i.e. proximity to traffic and visual intrusion associated with new overhead structures).

5.2.6 Cyclists

5.2.6.1 In line with TransportNI's requirements, a specific scheme objective with regards to provision for NMUs was to maintain access for cyclists. Where technically and economically feasible, this has largely been reflected in the Proposed Scheme design.

5.2.6.2 The only existing formal cycle facility in the vicinity is National Cycle Network (NCN) Route 93, which runs immediately adjacent to Duncrue Street, Whitla Street and Garmoyle Street (via a shared use footway/cycleway) before proceeding through the Greater Clarendon/Sailortown area and out at Donegall Quay. Although this route would not be directly affected by the Proposed Scheme, it would be subject to beneficial impacts associated with traffic redistributive effects due to proposed changes to other parts of the existing road network.

5.2.6.3 The northbound bus lane along Corporation Street would be maintained as part of the scheme and remain available for use by cyclists.

5.2.6.4 In terms of new cycling provision, an additional with-flow cycle lane of 1.5m width is proposed for cyclists heading northbound along York Street, with the provision of Advanced Stop Lines at signalised junctions. In the southbound direction on York Street, two-way running to provide a new bus/cycle lane would be reintroduced. The southbound bus/cycle lane would be provided from the new signalised junction at the connection with the York Street to M2 on-slip and would terminate at Great Patrick Street.

5.2.6.5 Overall, dedicated cycling provision with the Proposed Scheme throughout the study area would be enhanced over existing conditions. Furthermore, the road improvements associated

with the Proposed Scheme (particularly in relation to the separation of strategic and local traffic) would result in significant safety benefits, reduction in severance, and improvements in journey time and ambience for cyclists. The Proposed Scheme would also increase the route options available to cyclists, opening a new corridor to the City Centre via York Street.

5.2.6.6 With scheme implementation, none of the strategic links between Westlink, M2 and M3 would incorporate cycling provision, as these links would be designated as 'Special Roads' and would not have automatic rights of way to all road users.

5.2.7 Equestrians

5.2.7.1 There would be no impact on equestrian facilities within the study area.

5.3 Mitigation Measures

5.3.1 Operation

Local Vehicle Movements

5.3.1.1 Overall, the Proposed Scheme would introduce a significant improvement to the strategic and local road network, for the majority of local residents and strategic road users. The design of the road itself would 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.

Community Facilities

5.3.1.2 As previously discussed, there are a significant number of community facilities within the immediate study area, which would experience adverse, negligible and beneficial impacts with scheme implementation. Whilst it would not be possible to eliminate adverse impacts at all community facilities, in the majority of cases, the proposed mitigation measures would significantly reduce impacts on potential future community usage associated with the Proposed Scheme.

5.3.1.3 Careful consultation with the local community would be required in connection with the treatment of the memorial façade to the McGurk's Bar bombing currently in place. In such instances, arrangements would normally be made to carefully remove the memorial and make it available for owners to re-site. Although not proposed as part of the Proposed Scheme, potential relocation of the memorial would be a matter for future consultation with victims' representatives and TransportNI.

Public Rail and Bus Network

- 5.3.1.4 As there would be no impact on the public rail network, no mitigation is proposed.
- 5.3.1.5 In general, bus services would experience benefits as a result of the Proposed Scheme. The separation of local and strategic traffic and the removal of signalised junctions would benefit the journey time reliability and reduce journey times for these services.
- 5.3.1.6 Bus service efficiency throughout the study area for Metro, Ulsterbus and Goldline services is also likely to be enhanced by provision of the dedicated bus lane on York Street and the inclusion of this has been welcomed by key stakeholders. Bus priority measures will assist in the improvement of quality of public transport services and the delivering of a modern, integrated transport system for the BMA. Any lost serviced bus stops would be appropriately relocated to new routes where feasible.
- 5.3.1.7 There are no proposals to mitigate the loss of Northside Park & Ride as part of this scheme.

Pedestrian & Cyclist Facilities

- 5.3.1.8 Footways are provided on all surface streets, with existing widths maintained and where possible (within the constraints of the site) enhanced. An additional with-flow cycle lane of 1.5m width is proposed for cyclists heading northbound along York Street, with the provision of Advanced Stop Lines at signalised junctions. In the southbound direction on York Street, two-way running of a form to provide a new bus/cycle lane would be introduced.
- 5.3.1.9 At all junctions, provision would be made for non-motorised users in accordance with Department for Transport (DFT) Local Transport Notes and Traffic Advisory Leaflets. Accordingly, dropped kerbs and tactile paving is proposed at all controlled and uncontrolled crossing points, with pedestrian guardrail provided where considered necessary to control movements. At proposed signalised junctions, puffin crossings would be implemented in line with DMRB guidance. A new, modern road lighting system for the safety of motorised and non-motorised road users would be incorporated. The provision of additional lighting under proposed bridge structures would continue to be considered as part of future design development.
- 5.3.1.10 Footway provision has been fundamental to the Proposed Scheme layout along York Street. Since the publication of the Non-Motorised User (NMU) Context Report (DRD-YSI-3-05) (before the ES publication), the footway width has been increased from 2m to 3m. This width of footway has either been maintained or introduced along York Street and there are only two

locations at which the footway drops below this. The first of these is at a pinch-point between the dedicated southbound bus lane and the Yorkgate Business Park, and the second is near the junction with Great Patrick Street to make space to accommodate the proposed 1.5m northbound cycle lane.

5.3.1.11 The widths of the footway and the cycleway are constrained to 3m and 1.5m respectively. This is due to the physical constraints of the existing built environment along York Street, and the necessity to keep the width of the York Street Bridge to a minimum in order not to impede the headroom of the underpasses passing beneath it. Additionally, within this constrained width, there is the need to provide 3/4 lanes of traffic, 2 footways, a cycleway, and a contraflow bus-lane. Efforts have been made to make the footway and cycleway as wide as possible, but due to these physical constraints, 3m and 1.5m are the maximum that can be accommodated.

5.3.2 **Construction**

5.3.2.1 Road safety is the major concern, although an increase in traffic would also cause a reduction in amenity for non-vehicular road users. All road users would have to exercise greater care than usual to minimise the risk of collisions. Construction traffic would be restricted to designated local roads. Temporary warning signs would be erected as necessary to highlight particular hazards, including site accesses and temporary traffic management measures. Traffic management would be in operation to facilitate safe passage for pedestrians and others, including barriers defining the footpaths and safety zones to prevent construction vehicles encroaching on pedestrian areas. Where appropriate, segregated pedestrian routes would be provided. Traffic management would be closely monitored on site and every effort would be made to ensure the safety of pedestrians and cyclists is maintained.

5.3.2.2 Careful attention to traffic management would minimise the overall level of disruption. The construction contract would require the Contractor to ensure delays to local and strategic traffic are kept to a minimum and full use is made of the available carriageway space. Mitigation measures would include: advanced publicity outlining the traffic management proposals and duration, and giving advance warning of specific traffic management measures; reducing lane widths; efficient phasing of contraflow operations; and adequate advance signing of the works.

5.3.2.3 The construction contract would require the Contractor to maintain at least two-way traffic around the junction during weekday am and pm periods of peak traffic flow.

5.4 Conclusions

- 5.4.1.1 Strategic and local traffic interaction would occur through a much improved highway environment. The flow of local traffic through the interchange would become more regulated and the safety of the highway environment would improve for the vehicle user. However, even though some roads would not be subject to physical alteration, they would be subject to traffic redistributive effects as a result of proposed changes to other parts of the existing road network, altering routes taken to complete desired journeys. The significance of effect associated with traffic redistribution and changes to these routes would be both beneficial and adverse, depending upon the nature of changes experienced by the local road user.
- 5.4.1.2 Six community facilities would be lost in their entirety to accommodate the Proposed Scheme. A number of community facilities would also experience direct land loss or access impacts, however their continued usage during the operational phase is unlikely to be significantly affected. The significance of effect associated with the loss of Northside Park & Ride is considered 'Large Adverse', as is the loss of the Jack Kirk Automobile Engineer workshop.
- 5.4.1.3 The reduction in strategic traffic interaction, resultant freer flowing traffic conditions, and inclusion of a southbound bus lane on York Street would be of benefit to (especially in terms of journey ambience, frequency and reliability) and help improve the quality of public transport services in delivering a modern, integrated transport system for the BMA. However, a number of bus services utilising the wider road network, which although not directly affected by the Proposed Scheme, would be adversely affected by the traffic redistributive effects associated with changes to the existing road network.
- 5.4.1.4 In terms of amenity and relief from existing severance, the benefits associated with grade-separation of strategic links between the Westlink and M2/M3 (beneath York Street overbridge) would be significant, as pedestrians would no longer be in direct interaction with strategic through traffic within the interchange via signalised junction arrangements. The significance of effect for pedestrians is considered to be 'Large Beneficial'.
- 5.4.1.5 With the proposed changes to York Street, the new cycling provision would be an enhancement over existing conditions and the improvements to the junction and surrounding road layout (particularly in relation to the separation of strategic and local traffic) would result in safety benefits, reduction in severance, and improvements in journey time and ambience for cyclists. Overall, the significance of effects to cyclists are considered to be 'Moderate Beneficial' in terms of changes to York Street.

- 5.4.1.6 The construction phase would potentially result in temporary impacts on local vehicle movements. Construction activities may also affect community facilities and local businesses with regards to accessibility and severance or disruption to routes used by pedestrians, and cyclists. Careful traffic management would reduce delays, rat-running, and safe passage of pedestrians and cyclists.

6. VEHICLE TRAVELLERS

6.1 Methodology

6.1.1.1 The Vehicle Travellers assessment includes '*Views from the road*' and '*Driver stress*' and has been undertaken in accordance with the requirements of DMRB 11.3.9 (DRD-YSI-6-05).

6.1.1.2 An assessment of Views from the Road for both the existing junction and the Proposed Scheme was made by a suitably qualified Landscape Architect who also undertook the Landscape & Visual Effects assessment. Views from the Road were assessed taking into account the urban landscape character and quality, and any especially good or bad potential views from the interchange. The extent to which travellers can perceive the landscape through which they are passing varies with the relative level of the road and its surrounding ground, adjacent built form and/or vegetation. As such, there are four categories which are used in assessing travellers' ability to see the surrounding landscape: No View; Restricted View; Intermittent View; and Open View.

6.1.1.3 In terms of Driver stress, an assessment was made of the Proposed Scheme, taking into account the impact on driver stress through design characteristics (i.e. the junction layout and respective forecasted traffic and speed variations). The assessment was carried out in accordance with the method outlined in DMRB 11.3.9.4 (DRD-YSI-6-05), with the use of a three-point descriptive scale for driver stress – 'Low', 'Moderate' and 'High'. The assessment was based on average hourly traffic flows and journey speed, and was made for the worst year (2035) in the first fifteen after the assumed 'Opening Year' (2021) for both the 'Do-Minimum' and 'Do-Something' scenarios. An assessment of the Base Year (2012) was also made to give an indication of driver stress levels under existing conditions.

6.2 Findings

6.2.1 Views from the Road

6.2.1.1 The creation of new routes would result in new sequences of views being opened up to the vehicle traveller. In the short-term, the removal of existing amenity planting would open up views, until mitigation planting provides screening. Conversely, views would be restricted in depressed scheme elements. The general sequence of predicted views from each of the road links associated with the Proposed Scheme, where the traveller would experience a change in the existing view, is provided in Table 4. A discussion of the views from all new links is contained within Sub-Section 15.6 in Volume 1 of the ES (DRD-YSI-4-04B). Link numbers are shown on Figure 4.1 in Volume 3 of the ES (DRD-YSI-4-04D).

Table 4: Predicted views of the surrounding urban landscape

Road	Link Number	View
Westlink - M2	Link 1	OV/RV/NV/OV
M2 – Westlink	Link 2	OV/RV/NV/RV/OV
Westlink - M3	Link 3	RV/NV/RV
M3 – Westlink	Link 4	OV/RV/NV/OV
Westlink - York Street	Link 5	RV/OV
Dock Street – M3 (southbound)	Link 6	RV/IV/RV
Dock Street – M3 (northbound)	Link 6	RV
M3 – York Street	Link 7	RV
M2 – M3	Link 8	RV/OV
Dock Street (eastbound)	Link 10	RV/OV
Dock Street (westbound)	Link 10	RV/OV
York Street (south) – York Street (north)	Link 11	RV/OV/RV
York Street (north) – York Street (south)	Link 11	IV/RV/OV/RV
York Street (south) – M2	Link 15	RV/OV
Nelson Street (northbound)	Link 29	RV/IV/OV/RV
Duncrue Street (southbound)	Link 29	RV/OV/RV

NV = No View; RV = Restricted View; IV = Intermittent View; and OV = Open View.

6.2.1.2 Construction of the Proposed Scheme would result in a large transient alteration in views from the road. 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, more than the depressed elements of the Proposed Scheme. The site clearance may be the most unsightly element viewed from the road.

6.2.2 Driver Stress

6.2.2.1 The Proposed Scheme would have little effect on forecasted stress levels expected on any of the key links throughout the study area. Under the Existing and Do-Minimum scenarios, levels of stress would be 'High' on the strategic road network and North Queen Street, and generally 'Moderate' on the remainder of the local city road network. There are no links predicted to have 'Low' stress. However, the Proposed Scheme would provide a form of stress

containment through the grade-separation of the key strategic links. This would reduce driver stress for both local and strategic road users by separating traffic flows and therefore removing some of the difficulties associated with mixed traffic, such as a proportion of lane-changing manoeuvres.

- 6.2.2.2 Implementation of the Proposed Scheme would result in redistribution of traffic through the road network. This significant separation of local and strategic traffic would mainly be of overall benefit to vehicle travellers, most noticeably on Great George's Street, Garmoyle Street, and the proposed M3 onslip (at the existing Nelson Street).
- 6.2.2.3 Conversely, as a result of the reassignment of traffic throughout the road network, increased traffic loading, and resultant increase in stress, will be anticipated in certain areas, including the North Queen Street/Brougham Street junction. Similarly, with the removal of access to the Westlink from York Street, traffic loading would increase at Clifton Street where traffic can still access the Westlink. This would result in an increase in driver stress, from the 'Do-Minimum' situation where stress is mainly 'Moderate' between Stanhope Street and Carlisle Circus, to a situation with the Proposed Scheme where driver stress is predicted to be predominantly 'High'.
- 6.2.2.4 Pedestrian movements are currently relatively unrestricted in the existing York Street junction area. With implementation of the Proposed Scheme, these movements would be more restricted in terms of direct interaction with traffic, removing a degree of fear (by the vehicle driver) of pedestrians stepping onto the strategic network. Similarly, cyclists would be unable to interact with strategic traffic accessing the Westlink and M2 / M3 motorways, as is currently the situation. This increased safety would benefit both the cyclists themselves as well as vehicle drivers.
- 6.2.2.5 There may be the possibility that reductions in driver stress due to reduced congestion and the partial/full separation of local and strategic traffic may be offset by the complexity of the proposed interchange. Route uncertainty may remain an issue, particularly for the vehicle traveller unfamiliar with the new road layout, although this should be minimised with appropriate advance directional signage on link approaches.
- 6.2.2.6 During the construction phase, additional transient stress for strategic and local traffic would be unavoidable as a balance is required between maintaining the flow of traffic and safely/efficiently constructing the Proposed Scheme. The works would require a number of temporary traffic management phases, which may bring additional associated stress as a result of uncertainty and fear caused by road works. As a result of construction works, driver

stress would be expected to be 'High' throughout the entire road network and indeed on other parts of the road network as drivers seek alternative routes.

6.3 Mitigation Measures

6.3.1.1 In terms of views from the road, mitigation measures should 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; and planting design should consider the conflict between retaining views from the road and screening the road to adjacent properties.

6.3.1.2 The Proposed Scheme design attempts to achieve consistent speeds, provide adequate sight distances, and reduce interaction between local and strategic traffic, as well as between the vehicle and non-motorised user. Adequate signage, including gantries would be installed to service the extension of the route, from the M1 / Westlink as far as Nelson Street. The provision of a cycle lane and shared-use bus lane on York Street itself, separates the traffic and cyclists. All of these measures are forms of mitigation to reduce driver stress.

6.3.1.3 During the construction phase adverse impacts on driver stress would be controlled by ensuring construction traffic uses routes identified in the Contract. Adequate warning should be provided to road users (through both the media and signage) to help reduce driver stress by allowing travellers to be aware of issues in good time, and plan alternative routes if required.

6.3.1.4 These measures, designed to reduce delays to strategic and local traffic, should reduce traffic rat-running on the local road network.

6.4 Conclusions

6.4.1 Views from the Road

6.4.1.1 The Proposed Scheme includes new routes, which would offer a new range of view sequences. The free-flowing traffic system would reduce the number of stationary experiences on the journey and therefore offer a more pleasant sequence of 'flowing' views. It would also reduce the visual intrusion of traffic lights.

6.4.1.2 Vehicle travellers on most of the road links would experience a limited change in view. The loss of existing amenity planting would open views in the short-term, but mitigation planting would offer screening once it has established. Vehicle travellers in the underpasses would experience periods of restricted views and 'no views' to the surroundings. The Proposed

Scheme would increase the number of elevated open views and would improve the vehicle traveller's orientation and visibility of the cityscape, offering views of several landmarks and the city context.

6.4.1.3 Overall, the residual effect on views from the road is considered 'Slight Adverse'.

6.4.2 **Driver Stress**

6.4.2.1 Although the Proposed Scheme would include sub-standard elements and cannot fully address capacity issues associated with the existing junction arrangement, it is expected that full grade-separation would result in an overall Slight Beneficial effect to most vehicle travellers in terms of reduced stress levels.

6.4.2.2 During the construction phase, a heightened sense of driver stress would be experienced; however these effects would be transient. Ensuring construction traffic uses specific routes would control some adverse impacts on driver stress and adequate warning would be provided to road users. Careful attention to traffic management would minimise the overall level of disruption.

7. ROAD DRAINAGE & THE WATER ENVIRONMENT

7.1 Methodology

7.1.1.1 The assessment considered the impacts and effects of the Proposed Scheme on water quality within the coastal waters of Belfast Harbour, with a particular focus on non-conformance with European Union (EU) Water Framework Directive (WFD) objectives as a result of operation and construction of the Proposed Scheme. This was to ensure that:

- the need for avoidance and reduction of impacts on the water environment was taken fully into account in the environmental evaluation; and
- the selection of appropriate means of preventing any significant predicted impact was made through modification of the drainage design, choice of discharge location(s) and/or adoption of runoff treatment methods, with the objective of designing-out potential adverse environmental impacts.

7.1.1.2 The assessment also considered the potential for non-conformance with the Marine Strategy Framework Directive (MSFD) 2008/56/EC.

7.1.1.3 The assessment was undertaken in accordance with:

- DMRB 11.3.10 (DRD-YSI-6-05) – ‘*Road Drainage and the Water Environment*’ (HD 45/09);
- NIEA – Water Management Unit (WMU) Guidance Note ‘*Carrying out a Water Framework Directive (WFD) Assessment on EIA Developments*’ (March 2012) (DRD-YSI-6-01); and
- NIEA – WMU Guidance Note ‘*EIA Scoping Guidance for Road Schemes Likely to Impact upon the Water Environment*’ (January 2012) (DRD-YSI-6-02).

7.1.1.4 This was to ensure that the key areas of assessment (surface water, groundwater, spillage risk 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.

7.1.1.5 The following topics were considered when assessing 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.

7.1.1.6 The assessment methodology for each topic was undertaken in accordance with the procedures detailed in DMRB 11.3.10, Annex 1 (DRD-YSI-6-05).

7.2 Findings

7.2.1 Surface Water

7.2.1.1 No new surface waters (open or culverted) would be directly or indirectly affected by the Proposed Scheme, thus no hydrological, hydromorphological or water quality impacts can be expected in this regard.

7.2.1.2 Stormwater separation has formed the basis of the drainage design for the Proposed Scheme, which would provide a reduction in storm water discharge from the wider scheme area and lessen the frequency of surcharging within the existing NI Water sewerage network. To facilitate a viable method of collecting surface water run-off from scheme elements (particularly underpasses), a centrally located stormwater pumping station would be incorporated to convey discharges to an appropriate outlet.

7.2.1.3 The existing Gamble Street CSO culvert would be utilised to convey discharges from the pumping station through an outfall structure in the quay wall of Belfast Harbour, immediately upstream (south) of Dargan Bridge. In terms of predicted impact, there would be an increase in the volume of runoff from the strategic road network outfalling direct to the Belfast Harbour coastal water body at this point. No modification of the existing outfall point through the quay wall would be required though this is subject to a condition survey. On this basis, there would be no morphological modification (i.e. other than routine maintenance) required to this already heavily modified water body. The capacity to dilute soluble pollutants and achieve sediment dispersal within the harbour at the outfall point would also be considerable, as a result of the through flow effect of the River Lagan and the semi-diurnal tidal cycle.

7.2.1.4 The presence of hazardous substances in bed sediments within Belfast Harbour is a however a contamination issue within this water body and the volume of routine runoff discharging through this outfall may potentially cause disturbance and have an adverse effect upon water quality. Design flow and flow velocity calculations were carried out and determined that the potential disturbance of contaminated bed materials/sediments in Belfast Harbour due to

turbulence caused by storm water discharge in the vicinity of the existing CSO culvert outfall is expected to be Negligible.

7.2.1.5 No protected areas (identified as those requiring special protection under existing National or European legislation, either to protect their surface water or groundwater, or to conserve habitats or species that directly depend on those waters) would be adversely affected by the Proposed Scheme.

7.2.1.6 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 1% (or a return period of 1-in-100 years) at all outfall locations associated with the Proposed Scheme.

7.2.2 **Groundwater**

7.2.2.1 In terms of groundwater impacts, the underpasses would be designed as sealed structures with sufficient load-bearing capacity and flexural strength to prevent flotation or seepage ingress. This approach to the structural design of the underpasses would mean that there would be no requirement to collect and dispose of significant quantities of groundwater.

7.2.2.2 Potential impacts on hydrogeology in the vicinity of the interchange as a result of the scheme elements would be limited mainly to groundwater flow in the fluvial sands and gravels. Changes in hydraulic head within these deposits are considered likely in the vicinity of those parts of the Proposed Scheme that run perpendicular to the inferred direction of groundwater flow.

7.2.2.3 Consideration has also been given to the risk to waterways and groundwater as a result of lateral and vertical migration of contamination (leachate) through permeable strata as a result of disturbance to Made Ground and drift deposits as a result of implementing the Proposed Scheme. Whilst soil leachate results indicate limited leachability of metals/metalloids and ammoniacal nitrogen, a number of exceedances of Water Threshold Value (WTV) were recorded in groundwater samples across the study area in respect of these compounds. While they may be related to soil sources on site, the metal exceedances recorded are relatively marginal, generally within one order of magnitude and are not considered to be significant.

7.2.2.4 There would be no risk of pollution impacts from routine runoff to groundwater within the scheme area as no direct discharges to ground are proposed.

7.2.3 Flooding

7.2.3.1 As the Proposed Scheme would be located within a coastal floodplain, a Flood Risk Assessment (FRA) was prepared.

7.2.3.2 As part of the FRA, a two-dimensional hydraulic coastal and fluvial flood model for Belfast was constructed which confirmed that the Proposed Scheme would be susceptible to flooding for events in excess of a 1-in-50 year return period (2% Annual Exceedance Probability (AEP)).

7.2.3.3 Consideration was also given to the potential impact of the suppressed and elevated links embedded within the design, on the existing floodplain and the flow characteristics of flood waters as they would progress through the site area for various flood events. The outcome of the assessment concluded that the Proposed Scheme would have a neutral impact on existing flood levels during the design 1 in 200 year return period 0.5% AEP event.

7.2.4 Construction

7.2.4.1 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, especially where there are inadequate pollution mitigation measures.

7.2.4.2 Prescriptive mitigation measures must be stringently applied on-site, however any breach or failure in the measures designed to contain/restrict mobilised sediments and/or contaminants from reaching any of surface waters has the potential for Moderate Adverse transient impacts.

7.2.4.3 The Proposed Scheme would involve considerable excavation and filling activities across the site. The road engineering options in relation to the Proposed Scheme may present some potential impacts to the underlying groundwater and existing surface water bodies.

7.2.4.4 Where groundwater is encountered, disturbance of the material during construction works may increase the mobility of contaminants. It is likely that management of groundwater during construction would be limited to the management of small volumes of perched water encountered in made ground and in removing groundwater volumes enclosed by the diaphragm walls. This would be addressed in the CEMP.

7.2.4.5 There would be a risk of groundwater contamination due to accidental spillage, at any location throughout the construction site. Again, while liquids such as oils, lubricants, paints, bituminous coatings, preservatives and weed killers present the greatest risk, 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, oils or hydraulic fluids. Unmitigated, such spillages could seep through the unsaturated zone and contaminate the groundwater. Refuelling of plant on-site would also present a risk to groundwater.

7.2.4.6 Although prescriptive mitigation measures would be stringently applied on-site, any breach or failure in the measures designed to limit contamination of groundwater within the study area has the potential for Negligible/Minor Adverse transient impacts.

7.3 Mitigation Measures

7.3.1 Operation

7.3.1.1 Appropriate management of carriageway surface water runoff would maintain water quality and quantity in existing surface waters and prevent adverse impacts arising. However Petrol Interceptor (PI) tanks and Sustainable Drainage System (SuDS) features are not included as part of the Proposed Scheme, upstream of the pumping station discharge point to Belfast Harbour for reasons of land constraints, topography, ground conditions, excessive cost, complexity and functionality. This has been considered acceptable in light of the vast capacity of the harbour to dilute soluble pollutants and disperse sediments, thus negating the need for further pre-treatment. This approach has been agreed in principle with NIEA – WMU through ongoing consultation. Features of the pumping station would however provide protective measures, as described in Sub-Section 16.7 in Volume 1 of the ES (DRD-YSI-4-04B).

7.3.1.2 Without mitigation, certain flood events could result in flooding of the proposed underpasses making these strategic road links impassable to vehicles for periods in advance of, during and after these flood events. As a result, a number of flood protection measures have been incorporated into the design to prevent inundation. It is proposed that scheme flood retaining walls would be provided and ramp approaches would be sufficiently raised to reduce the risk of flood water ingress to underpasses. Furthermore, a temporary flood barrier is proposed at the connection between the M3 and Nelson Street. New drainage infrastructure would be designed in such a way so as to prevent back flow routes occurring into underpasses during flood events. The storm water pumping station would be designed with resilience measures and protection to reduce risk of failure.

7.3.2 Construction

7.3.2.1 Measures to protect the water environment would be formulated in accordance with best practice guidance, such as Pollution Prevention Guidelines (PPGs) (DRD-YSI-6-03), jointly published by NIEA, the Environment Agency, the Scottish Environment Protection Agency

(SEPA) and Construction Industry Research and Information Association (CIRIA) guidance documentation C648 '*Control of Water Pollution from Linear Construction Projects*' (DRD-YSI-6-18), C532 '*Control of water pollution from construction sites: guidance for consultants and contractors*' (Masters-Williams *et al.*, 2001) (DRD-YSI-6-19) and SP156 '*Control of water pollution from construction sites – guide to good practice*' (Murnane *et al.*, 2002). This documentation comprehensively details issues that present the risk of adverse impacts occurring within the water environment and how to mitigate such impacts.

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

7.3.2.3 A CEMP must include an Erosion Prevention and Sediment Control Plan and this must be submitted to NIEA - WMU prior to commencement of any works. The first aim of this plan should be to minimise erosion by reducing disturbance and stabilising exposed materials. The plan should consider control measures to minimise the release of mobilised sediment which results, despite the erosion control measures. Measures to prevent erosion are more effective than controlling sediment once mobilised.

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

7.3.2.5 The Contractor shall be required to maintain a tidy site as far as practicable and would be required to dispose of materials in a controlled and responsible manner. These measures should assist in reducing the potential for adverse impacts on surface waters arising from construction activities. Areas of hard standing and surface roads shall be swept regularly to prevent the build-up of material which could be washed into watercourses.

7.3.2.6 A discharge consent issued by NIEA under the Water (Northern Ireland) Order 1999, is required for any discharges to the aquatic environment. Any proposed discharges not directly related to construction of the road, such as from wash facilities, would also require separate discharge consent applications.

7.4 Conclusions

7.4.1.1 As the impacts of a specific component or activities associated with the Proposed Scheme would have minimal impact upon the water environment (i.e. from a water quality, hydromorphology and spillage risk perspective), it is unlikely that the Proposed Scheme would

cause deterioration in the Belfast Harbour coastal water body, or prevent it from meeting its WFD objectives.

- 7.4.1.2 There would be no overall risk to groundwater quality, as no discharges of road runoff to the ground are proposed with the drainage design. However, the Proposed Scheme may lead to a change in the local hydrogeological regime, potentially affecting groundwater flow in the fluvial deposits, leading to changes in the hydraulic gradient and increased hydraulic heads that may be transmitted to the overlying deposits.
- 7.4.1.3 The Proposed Scheme would be located in the coastal floodplain and without flood protection measures, the proposed underpasses would be susceptible to flooding for events in excess of a 2% AEP (1-in-50 year) flood event. The impact of the proposed flood protection measures has been assessed for the 0.5% AEP (1-in-200 year) flood event using the InfoWorks RS model. This showed that the proposed York Street Interchange with flood protection measures would have negligible increase in flood levels. As a result, the impact of the Proposed Scheme has been assessed as Neutral under DMRB HD45/09 (DRD-YSI-6-05).
- 7.4.1.4 The significance of effect is considered to be Slight Beneficial in terms of drainage, with a 'Neutral' effect on surface waters, protected areas, and floodplains.

8. GEOLOGY & SOILS

8.1 Methodology

8.1.1.1 The Geology & Soils assessment has addressed the impact on important geological mineral deposits, soils, and the possibility of hazardous materials being exposed. Any sites with educational or scientific interest due to their rarity were also considered. The technical chapter also incorporated information prepared as part of the Ground Investigation Report (DRD-YSI-3-10) and the Preliminary Sources Study (DRD-YSI-3-03) for the Proposed Scheme.

8.1.1.2 The assessment was undertaken in accordance with the requirements of DMRB 11.3.11.7 (DRD-YSI-6-05), and included consultation with the Geological Survey of Northern Ireland and NIEA – Natural Heritage to confirm or update information on the location and nature of any designated or undesignated sites of geological interest and to confirm and update information on solid and superficial geology, and the nature of soils. Consultation was also undertaken with Belfast City Council and NIEA – Waste Management Unit to confirm and update information on any known or potential areas of contaminated land, as well as DOE Planning - Minerals Development, Management and Compliance Unit to confirm and update information on the location of any areas licensed for mineral development.

8.2 Findings

8.2.1.1 The typical ground conditions that are expected to be encountered by the Proposed Scheme have been established by a ground investigation undertaken in 2013. The effect that underlying ground conditions has had upon the Proposed Scheme design is discussed in more detail in Section 4 (Engineering Assessment) of the Engineering, Traffic and Economic Assessment Report (DRD-YSI-3-13).

8.2.1.2 The ground investigation has allowed for an assessment of the extent and nature of contamination within the Proposed Scheme area and checked the validity of historical boreholes, enabling correlation to the new data.

8.2.2 Soils, Engineered Fill and Made Ground

8.2.2.1 Several instances of topsoil were recorded across the area that would be affected by the Proposed Scheme, with thickness ranging from 0.05m to 0.3m. Descriptions generally indicated the material to be a brown sandy clay.

8.2.2.2 Engineered fill would be encountered within the M2 embankment and with a thickness of between 0.1m and 5.5m. Made ground was encountered within all boreholes and trial pits and was variable in thickness from 0.4m to 2.4m. All elements associated with the Proposed

Scheme would result in disturbance to these deposits; however there would be insufficient impact to affect any feature of interest.

8.2.3 **Superficial (Drift) Geology**

8.2.3.1 The ground investigation identified a number of types of drift geology within the scheme footprint. Estuarine alluvium (Belfast Sleafch) was encountered in several exploratory holes, generally at shallow depths, with deposits increasing in thickness towards the Belfast Harbour.

8.2.3.2 Peat deposits were encountered underlying the estuarine alluvium. The material was generally described as a dark brown friable sub-amorphous material, possessing decayed roots and occasional lenses of grey fine sand.

8.2.3.3 Fluvial sands and gravels were also encountered in many exploratory holes across the site. The material typically underlies peat or estuarine alluvium deposits, and is a sandy gravel with occasional silty gravelly sands.

8.2.3.4 Glacial till was encountered in most exploratory holes across the study area. The top of the glacial till was encountered at increasing depth towards the east, with the material typically described as a firm to stiff, to very stiff sandy silty clay, with layers of medium dense brown fine to medium sand or dense grey gravel, and occasional cobbles and boulders.

8.2.3.5 On this basis, the majority of scheme elements (i.e. underpass structures, bridge foundations, embankment support systems, pavement subgrades etc.) would affect a varying superficial geology. As would be expected, the underpass structures associated with links between Westlink and M2/M3 would have the greatest impact upon superficial deposits due to the creation of deep cuttings/excavations. However, as all structures require a solid foundation within competent strata, bored/driven piles and diaphragm walls would be required to provide stability and settlement control, breaching further into the deposits (i.e. into the underlying fluvial sands and gravels/glacial till).

8.2.3.6 The importance of these deposits from a geology and soils perspective is low and is not likely to include any features of particular interest. The impact upon superficial deposits beyond the footprint of the Proposed Scheme (i.e. compression of sediment structures) is likely to be minimal.

8.2.4 **Solid Geology**

8.2.4.1 Bedrock was encountered in many exploratory holes within the footprint of the Proposed Scheme. Depth to bedrock ranged from 1.65m in the western section of the scheme area to a

recorded maximum of 54.7m. As all structures associated with the Proposed Scheme require a solid foundation within competent strata, bored/driven piles and diaphragm walls would be required to provide stability and settlement control. In some locations, piles or diaphragm walls would affect the underlying bedrock, particularly in the vicinity of the proposed North Queen Street bridge widening. It is not expected that bedrock would be encountered to any significant extent by most structures.

8.2.5 Minerals

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

8.2.6 Contaminated Land Risk Assessment (Conceptual Site Model)

8.2.6.1 The contaminated land risk assessment suggested that no potentially significant sources of contamination were identified in the immediate vicinity of the Proposed Scheme. While potential contaminants are present within the made ground typically associated with demolition rubble, these are not present at concentrations which are considered to represent a risk.

8.2.6.2 The marginal increase of areas of hard impermeable surface cover associated with the Proposed Scheme would result in a reduction of surface water infiltration from the existing situation, and would therefore lower the risk of contaminants being mobilised beneath the proposed road infrastructure.

8.2.6.3 While ground investigations have been undertaken, the potential for localised areas of unidentified contamination cannot be discounted. If previously unidentified contamination is encountered during site works, a programme of soil sampling and testing would be carried out.

8.2.7 Designated and Non-Designated sites

8.2.7.1 There would be no designated or non-designated geological sites directly affected within the study area. The closest site is Inner Belfast Lough ASSI to the north-east.

8.2.8 Construction

8.2.8.1 A notional construction sequence for the Proposed Scheme has been developed. This sequence demonstrates that the Proposed Scheme can be built within the constraints of the study area whilst maintaining routes for traffic. However there is significant scope for temporary landtake to occur, as large areas of land could be made available to the appointed contractor beyond the permanent landtake boundary required for the Proposed Scheme. On this basis, there is significant scope for ground disturbance within the indicative works area.

8.2.8.2 Services/utilities diversions, drainage and temporary traffic management measures would have the greatest potential for ground disturbance, however it is expected that this would largely be limited to made ground and engineered fill. Whilst the general sequence of underlying sediments/strata would remain largely unaffected, disturbance of made ground and engineered fill would increase the risk of encountering localised areas of unidentified contaminated land.

8.3 Mitigation Measures

8.3.1.1 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.

8.3.1.2 A 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, codes of good practice as well as best practice guidance for works on or near water.

8.3.1.3 Effects on soil resources would be mitigated by employing high standards of soil handling and management during the construction, and by avoiding the creation of bare areas of permanently exposed soil that would be vulnerable to erosion.

8.3.1.4 Further soil and groundwater sampling is proposed to be undertaken to assess background concentrations prior to commencement of construction works, especially in areas occupied by buildings scheduled for demolition. Soil investigation beneath these areas should be undertaken and risk associated with these assessed prior to the construction phase.

8.3.1.5 Any contaminated materials encountered during the construction would have to be appropriately remediated on-site or disposed of at an appropriately licensed landfill site. In line with NIEA – Waste Management Unit's requirements, if a potentially contaminating source has been identified, a suitable risk assessment and remediation strategy (if required) should be submitted and agreed to mitigate all risks.

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

8.3.1.7 Gas monitoring during construction and maintenance works is also recommended. Where the origin or nature of odours is unknown, care should be taken when working in these areas.

8.4 Conclusions

8.4.1.1 From a geology and soils perspective, there are relatively few key issues with regards to disturbance of soils, made ground, engineered fill, superficial deposits and bedrock. There would be no significant impacts on solid and superficial geology, or on soils of the region. Essentially the removal of some soils and drift material of little importance, gives an overall Neutral significance of effect.

8.4.1.2 There would be no residual effects on designated or non-designated sites of geological or geomorphological interest, or areas of mineral deposits; therefore, the significance of effect would be Neutral.

8.4.1.3 While ground investigations have been undertaken, there is still potential for unidentified contamination to be discovered. If previously unidentified contamination is encountered during site works, a programme of soil sampling and testing would be undertaken to assess the appropriate remediation / mitigation measures.

9. CUMULATIVE EFFECTS

9.1 Methodology

9.1.1.1 The assessment of cumulative effects was undertaken in line with DMRB 11.2.5 (Assessment and Management of Environmental Effects; HA205/08) (DRD-YSI-6-05) and DMRB 11.2.6 (Reporting of Environmental Impact Assessments; HD 48/08) (DRD-YSI-6-05).

9.1.1.2 The DMRB outlines two types of cumulative impact that were considered in the EIA of the Proposed Scheme. These were:

- Cumulative impacts from a single project (i.e. Interaction of Impacts); and
- Cumulative impacts from different projects (in combination with the Proposed Scheme being assessed).

9.2 Findings

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

9.2.1.1 The interaction of impacts arises from the combined action of a number of different environmental topic-specific impacts upon a single receptor/resource (e.g. the removal of vegetation would have a landscape, visual and ecological effect, and an individual residential receptor can be affected by air, noise and visual impacts, etc.).

9.2.1.2 The technical assessments in the ES (Chapters 8 – 17) (DRD-YSI-4-04B) 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. Table 5 outlines the likely significant interacting impacts and chapters where they have been assessed.

Table 5: Interaction of Impacts on the Proposed Scheme

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

9.2.2 Cumulative impacts from different projects

9.2.2.1 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.

9.2.2.2 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;

- Trunk road and motorway projects which have been confirmed (i.e., gone through the statutory processes).

9.2.2.3 Information on planning applications within the study area were obtained from DOE Planning and has been assessed as appropriate. In terms of cumulative impacts from different projects, in general the effect would only be locally significant at worst and would not be a key decision making issue.

9.2.2.4 The relevant road project schemes within 30km of the proposed York Street Interchange scheme were scoped-out of the assessment as there are no likely significant cumulative effects due to the relative distances and that changes in strategic traffic movements with these schemes is unlikely to have a tangible effect upon traffic movements within York Street Interchange. Nevertheless, there were various issues concerning future traffic growth as there is potential for significant developments in and around the York Street Interchange area that may result in additional traffic loading on the strategic and local road network. Although it is difficult to be absolutely sure if and when some of these developments will actually commence, this degree of uncertainty was reflected by testing the Proposed Scheme against a range of traffic forecasts, with four scenarios developed. For the assessment of cumulative effects, it was agreed with TransportNI to test the Proposed Scheme against a 'High Demand' traffic growth scenario, which would better reflect the potential increase in demand if the proposed developments are realised (i.e. as a worst case scenario). Again in terms of cumulative impacts from different projects, in general the effect would only be locally significant at worst and would not be a key decision making issue.

10. CONCLUSIONS

- 10.1.1.1 The ES (DRD-YSI-4-04) summarises the environmental assessment carried out in accordance with National and European regulatory requirements.
- 10.1.1.2 The environmental assessment has been undertaken following the standard methodology set out in the DMRB Volume 11 (Environmental Assessment) (DRD-YSI-6-05).
- 10.1.1.3 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.
- 10.1.1.4 Although there are a number of significant environmental effects which cannot be overcome by appropriate mitigation measures, such as loss of property and private land, visual impact, impact on planning applications and impact on community facilities, when considered against the total benefits of the Proposed Scheme, and with mitigation measures in place, it can be concluded that on balance these impacts overall are acceptable.
- 10.1.1.5 Since completing the Environmental Statement, the scheme has been subject to a sustainability assessment and has subsequently been awarded an 'Excellent' rating under the CEEQUAL sustainability assessment, rating and awards scheme for civil engineering projects at interim stage.