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<tr>
<td>Author</td>
<td>Catherine Riley (Pell Frischmann)</td>
</tr>
<tr>
<td>Owner</td>
<td>Tony Caccavone (DfT)</td>
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<tr>
<td>Tony Caccavone</td>
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</tr>
<tr>
<td>Bob Mulvee</td>
<td>DfT Sponsor</td>
</tr>
<tr>
<td>Mick Spink</td>
<td>HA Senior Project Manager</td>
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<tr>
<td>Alan Tennant, Nigel Rawcliffe</td>
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</tr>
<tr>
<td>Vanessa Gilbert</td>
<td>Network Operations (Central)</td>
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<td>Richard Bernhardt</td>
<td>NetServ Technical Specialist</td>
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Approvals

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<td><img src="image.png" alt="Signature" /></td>
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A63 CASTLE STREET IMPROVEMENTS - HULL

SCHEME ASSESSMENT REPORT
(OPTIONS SELECTION STAGE)

FEBRUARY 2010

Revision Record

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Prepared for:
Highways Agency
Major Projects National
Lateral
8 City Walk
Leeds
LS11 9AT

Prepared by:
Pell Frischmann Consultants Ltd
George House
George Street
Wakefield
WF1 1LY
Tel: 01924 368 145
Fax: 01924 376 643
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1. INTRODUCTION

1.1. BRIEF

1.1.1. Pell Frischmann Consultants Ltd (PF) has been appointed by the Highways Agency (HA) to investigate options for the improvement of the A63 Castle Street, in Kingston upon Hull. The four key objectives for the scheme are as follows:

- Reduce congestion on this section of the A63
- Reduce journey times to the port of Hull
- Improve safety on this section of the A63
- Reduce severance between the north of the city centre and the south

1.1.2. The study area, which encompasses the project site at Castle Street, is located within Hull city centre close to the Rivers Humber and Hull.

1.1.3. Six scheme options to address the four key objectives were identified and assessed at the Options Identification Stage. The results of this assessment were reported in a Technical Appraisal Report (TAR) (PF, 2008a).

1.1.4. The TAR concluded that two of the six options considered should be taken forward to Public Consultation. In this report these options are known as the Underground and Overground Options, for a more detailed description of the options see Section 3.3. These options had Benefit to Cost Ratio (BCR) scores of 2.124 and 2.138 respectively and both would have a relatively low impact on the environment. The estimated costs of the two options also fall within the current scheme budget set by the Regional Transport Board and are, therefore, affordable.

1.1.5. A Public Consultation exercise was undertaken between 9th March and 5th June 2009. The two sustainable options, Underground and Overground Options, were presented as preferred options. The remaining scheme options, Underground Landbridge, Overground Landbridge, Cut ad Cover Tunnel and Extended Viaduct, were presented as non-preferred options. Public Exhibitions were held as part of the consultation exercise. The results of the Public Consultation are discussed in Section 9 of this report.
1.1.6. The purpose of this Scheme Assessment report is to provide a summary of work undertaken to date, including the TAR and the Public Consultation, to compare the feasible solutions identified and evaluated, to assess the views of locals, affected users and stakeholders and to recommend a preferred route.

1.2. EXISTING PROBLEMS

1.2.1. The study area is located within the city centre of Kingston upon Hull. The scheme is centred along the line of the A63 dual carriageway which runs through a ‘built up’ urban area largely at grade with the surrounding streets. It is one of the busiest sections of road in the whole of the East Riding of Yorkshire, carrying daily flows in excess of those recorded on the M62 within the region. The existing daily flows being around 55,000 to 59,000 Annual Average Daily Traffic (AADT) two way flows.

1.2.2. A feature of the road in this area is the large signalised junction at Mytongate which links the A63 to Ferensway and the city centre of Hull to the north and to the retail and dock areas to the south via Commercial Road. This signalised ‘hamburger’ type junction restricts the through flow of traffic along the A63 and Ferensway and the interconnecting roads.

1.2.3. The A63 creates severance between the main shopping area and transport links to the north of the A63 and the tourist, commercial and recreational facilities and retail parks to the south.

1.2.4. Within the scheme limits the principal bottlenecks are the major signalised junctions at Mytongate and Market Place and the three pedestrians crossing facilities which, as well as having safety problems associated with pedestrians crossing a very busy road at road level, cause significant delays to traffic.

1.3. SCHEME DEVELOPMENT AND ASSESSMENT HISTORY

1.3.1. Development of highway improvements in the area of Castle Street commenced in the early 1990s when Acer Consultants undertook initial Design Works to produce options which would increase the traffic capacity of Castle Street (Acer, 1991). A preferred option was subsequently taken to public consultation in 1992. Following a review of the HA Roads Programme in the mid 1990’s, this design process was halted.
1.3.2. In 1998 “A New Deal for Trunk Roads in England” (DETR, 1998) proposed a number of multi-modal studies to address problems on the trunk road network. The Hull East-West Corridor Multi Modal Study (HUMMS) (Faber Maunsell 2002) was a study of the congestion problems and possible solutions on routes to the Port of Hull. The study, undertaken between 2000 and 2002, considered a number of options for the improvement of transport and infrastructure around Hull, part of which included options for the improvement of the existing road network including the A63 Castle Street. Initially, five options were considered, including tunnel options and on-line improvements.

1.3.3. In August 2002 PF was commissioned to undertake a Feasibility Study of the two preferred options arising from HUMMS (Faber Maunsell 2002).

1.3.4. Entry into the Targeted Programme of Improvements (TPI) Roads Programme was sought in July 2003. Following consideration of the proposals for Castle Street, the Transport Minister decided that the previous brief was too restrictive, and the footprint of land required for the new options in a city centre location was too large. As a result the Minister instructed that a wider review should be undertaken and key stakeholders should be consulted.

1.3.5. In October 2003 the original scheme brief was extended and the Feasibility Study investigated a wider remit of options to identify a preferred option for inclusion into the HA’s TPI. The draft TPI Entry Report was submitted in November 2004 (PF 2004).

1.3.6. The aim of the TPI Entry Report assessment was to consider three levels of scheme provision:

i) A ‘Do Minimum’ Scheme;

ii) A scheme that went some way to meeting the aspirations of Key Stakeholders; and

iii) A scheme that would aid regeneration of the area.

1.3.7. In March 2007, PF was commissioned to compile a Scheme Options Report (SOR) for Castle Street. The objective of the report was to accurately describe the work that had been undertaken with the aim of providing the level of detail that would have been appropriate for TPI Entry under the previous HA
processes. However, to ensure that the report did not preclude any future decision making processes and to ensure that the scheme options were carried forward, the recommendation of a single scheme option was not undertaken.

1.3.8. The SOR reassessed three scheme options that had been developed within the TPI entry report to meet the aims outlined in Section 1.3.6 above. These were:

- Base Scheme: Grade separation of Mytongate Junction;
- Landbridge: Grade separation of Mytongate Junction, 3 lanes Eastbound and 2 lanes Westbound, provision of pedestrian Landbridge; and
- Cut & Cover Tunnel: Grade separation of Mytongate Junction, A63 carriageway carried through cut and cover tunnel.

1.3.9. Following the flooding experienced in Hull in June 2007, PF was requested to expand the options under consideration and include three mirror options which were all situated above the existing ground level. In addition, the provision of three lanes eastbound was included into the base schemes.

1.3.10. The current assessment of the scheme is being undertaken in accordance with the Project Control Framework (PCF). PCF sets out how the Major Projects Directorate of the Highways Agency, together with the Department for Transport, manage and deliver major improvement projects for part of the Roads Programme.

1.3.11. The framework includes a project lifecycle which breaks down the development and delivery of a major project into 7 defined stages within 3 phases:
1.3.12. For every stage of the lifecycle key deliverables (or products) have been defined that need to be produced in order to progress the project to its next stage or phase.

1.3.13. The TAR was the key deliverable for the recently completed Options Identification Stage (PCF Stage 1). The TAR concluded that, based on healthy BCR scores and relatively low impact on the environmental sub-objectives, two of the six options were considered to provide sustainable solutions, which represent good value for money, are affordable, and have the least overall impact on the environment. It was recommended that the two sustainable options be taken forward for Public Consultation.

1.3.14. The two preferred options comprised:

- A63 in cutting at Mytongate Junction (the ‘Underground Option’)
- A63 on flyover at Mytongate Junction (the ‘Overground Option’)

1.3.15. The remaining four non-preferred options comprised:

- An Underground Landbridge option;
- An Underground Cut and Cover Tunnel
- An Overground Landbridge Equivalent option; and
- An Overground Extended Viaduct.

1.3.16. Details of the preferred and non-preferred options are given in Section 3 of this report.
2. EXISTING CONDITIONS

2.1. DESCRIPTION OF LOCALITY

2.1.1. The A63 Castle Street is located to the south of Hull city centre, close to the River Humber, and forms an important part of the main west to east through route linking the M62, Humber Bridge and A15 to the west of the city, with the city of Hull, including developments and docks to the east of the city centre.

2.2. EXISTING HIGHWAY NETWORK

2.2.1. The A63 Castle Street is part of the European Transport Network Route E20. The route runs roughly west-east through Ireland, the United Kingdom, Denmark, Sweden, Estonia and finally Russia. The total length of the route is approximately 1880 km.

2.2.2. The A63 Castle Street is the busiest section of road in the whole of the East Riding of Yorkshire, carrying daily flows in excess of those recorded on the M62 within the region. The existing daily flows are in the region of 55,000 to 59,000 AADT two way flows. A location plan showing the existing street names, limit of works and buildings of interest is given overleaf.
2.2.3. To the north of Castle Street lies the major shopping areas within the city centre; much of which has been pedestrianised. To the south are the Humber Dock and Railway Dock marinas together with several recent developments providing shops, offices, tourist and recreational facilities.

2.2.4. By virtue of its position in the local and regional road network Castle Street attracts large volumes of traffic, with Heavy Goods Vehicles (HGV’s) contributing around 10-15% of the total vehicles. These comprise:-

- Regional traffic from the development and dock areas to the east of the city heading to the M62 and Humber Bridge to the west;
- Local through traffic, in particular, commuters travelling between the western residential areas and their places of work to the east of the city; and
- Local commuter, shopping, business and recreational traffic with destinations in and around the city centre.

2.2.5. Castle Street is approached from the west on the A63 Clive Sullivan Way and Hessle Road. These are both dual two lane, all purpose carriageways with grade separated junctions which form part of the A63. Hessle Road becomes Castle Street close to the western end of the proposed improvement at Mytongate Junction, near Porter Street. To the east Castle Street continues as Garrison Road from its junction with Market St/Queen Street eastwards over the River Hull on Myton Swing Bridge.

2.2.6. East of Myton Swing Bridge the A63 Garrison Road continues to a roundabout at its junction with Mount Pleasant/Hedon Road. To the east of this junction the A63 proceeds as Hedon Road to a roundabout junction with Northern Gateway and
the A1033 Hedon Road; beyond this point the road remains as the A1033 Hedon Road.

2.2.7. The eastbound carriageway of Castle Street provides direct access to a number of side streets that serve the city centre and residential developments. These include Ferensway, Myton Street, Prince’s Dock Street, Dagger Lane, Fish Street, Vicar Lane and Market Place. Prince’s Dock Street and Myton Street provide the principal access to Princes Quay Shopping Centre.

2.2.8. The westbound carriageway provides direct access to Queen Street, Humber Dock Street, Commercial Road and Spruce Road, as well as access into the Holiday Inn Hotel.

2.2.9. At present, traffic congestion occurs at the two major junctions; Mytongate and Market Place/Queen Street. Recent improvements to the Market Place junction in 2007 have mitigated some of the congestion problem by eliminating the north/south movement between Queen Street and Market Place. However, this interim scheme did not remove the traffic signals from the junction and the traffic signals still stop the mainline to allow access from the side roads.

2.2.10. In addition, further vehicular delays are attributable to the signalised pelican crossings near Porter Street, Fish Street and in front of Princes Quay Shopping centre.

2.2.11. There are three bus stops along the route, although at the time of writing they are not in service. Generally, footpaths are immediately adjacent to the main road and in some cases access to both residential and commercial properties is gained directly across the footpath.

2.2.12. The A63 segregates the marinas (Humber Dock and Railway Dock), fruit market and office developments from the city centre and amenities.

2.2.13. Two private accesses would be affected within the limits of the scheme. The first, on the eastbound carriageway, affords access to the eastern end of property number 65 Castle Street. There does not, however, appear to be a direct route past or through the building, the access therefore, is interpreted as being for unloading purposes only. On the westbound carriageway a private access is afforded to the Holiday Inn. The access is a left in/left out arrangement. An
alternative access to Holiday Inn is located to the rear of the hotel via Commercial Road.

2.3. TRAFFIC FORECASTS

2.3.1. To take the scheme forward, it was agreed with the HA’s Traffic, Modelling and Economics Team (TAME) that a new transport model was required. The agreed model specification included a SATURN highway model, CUBE TRIPS/Voyager public transport model, and associated distribution and mode choice models. However, in the interim, and in order to achieve the PCF programme, for the Options Selection Stage, it was agreed that the SATURN highway model linked to DIADEEM to develop variable demand forecasts was an acceptable approach, with the full variable demand model being provided in the Preliminary Design stage.

2.3.2. A full scale data collection exercise was carried out in Autumn 2008 including 24 roadside interview surveys, numerous manual classified counts, automatic traffic counts and journey time surveys. Details of the surveys can be found in the Traffic Survey Report (PF, 2009c). A further programme of public transport surveys was carried out in Spring 2009 in order to develop the CUBE Voyager public transport model. The Report of the Public Transport surveys will be produced in the Preliminary Design Stage, to support the development of the full variable demand model.

2.3.3. The proposed scheme Opening year of 2017 has been modelled as the first of the future years. The Design Year of 2032, 15 years after scheme opening, has also been modelled to provide design flows in accordance with Chief Highways Engineer (CHE) Memo 144/05 requirements.

2.3.4. It has been agreed with HA TAME that growth factors for cars should be based on TEMPRO, whilst the growth factors for commercial vehicles should be based on the latest forecasts from the Department for Transport’s National Transport Model (NTM).

2.3.5. Full details of the traffic forecasting methodology can be found in the Traffic Forecast Report (PF, 2009a)
2.4. ACCIDENTS AND JOURNEY TIME RELIABILITY

Accident Analysis

2.4.1. An accident only analysis has been undertaken using COBA11 Revision 11 and incorporated into the overall scheme economic assessment.

2.4.2. Traffic flows have been taken from the A63 SATURN model developed for the schemes for each opening year, for each of the traffic growth forecasts. Traffic growth rates have been derived using NTM forecasts for all roads within the Yorkshire and Humber area.

2.4.3. The latest complete five-year period of accident records (01/01/2003 to 31/12/2007), supplied to PF by Hull City Council (HCC), have been used in the scheme assessments. The records show there have been 257 Personal Injury Accidents (PIAs) within the confines of the study area. The proportion of Killed or Seriously Injured (KSI) accidents is 10.9%. Table 2.4.1 shows the breakdown of accidents by severity and year.

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<td>Total</td>
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2.4.4. The accident data entered into COBA was separated into accidents on links and accidents at nodes for the Do Minimum scenario. Accident records were not entered by severity, but for the total number of accidents per year for each link and node. The Do Something scenario uses a mixture of default rates and existing rates. The default rates have been used where new links have been added to the network. Other Do Something links have been coded with the same accident rate as in the Do Minimum scenario. The accident benefits (for the core, pessimistic and optimistic forecasts as a result of improving the A63 Castle Street are given in Table 2.4.2 overleaf. Full details of the assessment are given in the Economic Appraisal Report (PF, 2009b).
TABLE 2.4.2 ACCIDENT BENEFITS

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Note – All values are in 2002 prices;
Costs in multiples (£1000s);
Accident benefits are the same for the Underground and Overground scheme options

Journey Time Reliability

2.4.5. Journey Time Surveys were undertaken on a total of seven fixed routes in and around Hull in the period from the 14th October 2008 until 26th November 2008. The surveys involved staff driving at the average speed of the traffic stream in each direction of the survey route during the AM, PM and Interpeak periods. The exact time periods undertaken were between 07:30 and 09:30 in the AM peak and 16:30 and 18:30 in the PM peak. The interpeak surveys were conducted over a selected two hour period between 10:00 and 15:00. The time taken to complete a single run of each survey route was recorded by using a GPS data logger. Full details of the journey time surveys undertaken are given in the A63 Traffic Survey Report (PF, 2009c).

2.4.6. The journey time benefits and vehicle operating costs have been calculated using the computer programme TUBA (Transport Users Benefit Appraisal) in accordance with the WebTAG Guidance. Full details of the benefits are given in the Economic Impact Report (PF, 2009d).

2.4.7. Tables 2.4.3 and 2.4.4 overleaf show the predicted journey time changes in minutes for various key movements through Castle Street in the opening year (2017) and the design year (2032) for the preferred options. The time taken for both eastbound and westbound movements along the A63 is measured between the junction of the A1166 Brighton Street and Garrison Road roundabout.
TABLE 2.4.3 JOURNEY TIMES IN 2017

<table>
<thead>
<tr>
<th>Movement</th>
<th>Do Minimum (time in minutes)</th>
<th>Base Scheme (Time in Minutes)</th>
<th>Journey Time Saving (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM Peak – Eastbound</td>
<td>19:30</td>
<td>16:30</td>
<td>3</td>
</tr>
<tr>
<td>AM Peak – Westbound</td>
<td>19:30</td>
<td>16:30</td>
<td>3</td>
</tr>
<tr>
<td>PM Peak – Eastbound</td>
<td>14:00</td>
<td>12:00</td>
<td>2</td>
</tr>
<tr>
<td>PM Peak – Westbound</td>
<td>14:00</td>
<td>12:00</td>
<td>2</td>
</tr>
</tbody>
</table>

TABLE 2.4.4 JOURNEY TIMES IN 2032

<table>
<thead>
<tr>
<th>Movement</th>
<th>Do Minimum (time in minutes)</th>
<th>Base Scheme (Time in Minutes)</th>
<th>Journey Time Saving (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM Peak – Eastbound</td>
<td>24:00</td>
<td>20:00</td>
<td>4</td>
</tr>
<tr>
<td>AM Peak – Westbound</td>
<td>24:00</td>
<td>20:00</td>
<td>4</td>
</tr>
<tr>
<td>PM Peak – Eastbound</td>
<td>18:00</td>
<td>18:00</td>
<td>0</td>
</tr>
<tr>
<td>PM Peak – Westbound</td>
<td>20:00</td>
<td>14:00</td>
<td>6</td>
</tr>
</tbody>
</table>

2.4.8. As can be seen from the above tables, in most cases the scheme will result in a decrease in the eastbound and westbound journey times along the A63.

2.5. LAND USE

2.5.1. The scheme proposals follow an existing road corridor through an urban area. Land use is heavily influenced by the adjacent docks, the confluence of the River Hull and River Humber together with the associated historic development linked to the docks including distribution, fishing, trading and storage. Land uses within the area include areas of residential, industrial, commercial, retail, leisure and public open space.

2.5.2. Contrasting land uses within the study area include the Princes Quay Shopping Centre, Humber Dock and Railway Dock (marinas), Trinity Burial Ground, the Humber foreshore and ‘The Deep’ aquarium.

2.5.3. Due to the urban nature of the scheme there are a large number of residential; dwellings in the vicinity of the site. Residential dwellings are concentrated to the north side of the A63; to the west of Mytongate Junction and to the east of Prince’s Quay. The properties tend to be medium to high density residential flats in both public and private ownership.
2.5.4. There are also a range of typically urban land uses including employment and retail properties of various sizes from small to very large.

2.5.5. There are a variety of different land uses used by the community within the study area including; two pocket parks fronting the A63 and Trinity Burial Ground (a public urban green space) which borders Mytongate Junction. Other areas of community open space include the three docks; Prince’s, Humber and Railway and the pedestrianised areas surrounding them.

2.6. DRAINAGE

**Overview and Baseline Conditions**

2.6.1. The study area is low lying as the city developed on flat estuarine land located on the banks of the River Humber. Castle Street therefore runs across level ground, between three and five metres above Ordnance Datum (aOD). Castle Street runs parallel to the Humber Estuary, some 400 metres (m) to the south and perpendicular to the River Hull some 300m before this joins the Humber. The original course of the River Hull crossed the Mytongate Junction. There are no topographical features of note.

2.6.2. The drainage in area of Kingston upon Hull is into the Humber Estuary via the River Hull, with Hull itself being located on the floodplain of the River Hull. Spring tides in the Humber Estuary rise to 3.6m aOD. The lower reaches of the River Hull in the vicinity of the site are tidal.

2.6.3. The Environment Agency’s River Basin Management Plan (RBMP) for the Humber River Basin District identifies the Humber Estuary as the largest in the United Kingdom, with a catchment draining one fifth of the area of England. The Humber Estuary is vital to the region’s economy, particularly their contribution to the tourism and leisure industry and the ports, harbours, shipping and associated industries they support.

2.6.4. A Flood Risk Assessment (FRA) (PF, 2009e) has been undertaken for the scheme. Full details of the flooding risk of the site can be found in this report. A summary of the existing flooding conditions in the vicinity of Castle Street is given in Section 2.8.10 Road Drainage and the Water Environment of this report.
Existing Drainage and Pipelines

2.6.5. Examination of the as-built drawings from the Southern Orbital Road Scheme (provided by the HA Maintaining Agent Contractor, MAC) which included Castle Street and Market Place indicate that the road drainage is drained to a surface water storm sewer.

2.6.6. Liaison with the MAC has confirmed that the majority of the storm water sewers are public sewers, however there are likely to be small lengths of private highway drainage in some areas.

2.6.7. It is not known what the existing flows and capacities of the sewers are at present.

2.7. GEOLOGY

2.7.1. The geology along the site has been determined from available geological publications and site observations, together with local borehole information obtained from previous ground investigations. These include the site investigations undertaken by Allied Exploration and Geotechnical Ltd (AEG, 1994) for the improvement of the A63 Trunk Road, Castle Street, Hull.

2.7.2. Existing records have revealed that the study area is underlain by solid rocks of the Cretaceous Period. The superficial deposits overlying the bedrock have been shown to consist of Alluvium over Glacial Till over Glacio-Lacustrine and Head deposits. Made Ground is present along the majority of the study area.

2.7.3. Full details of the Geology underlying the area are available in the Preliminary Sources Study Report (PSSR) (PF 2009f).

2.8. PUBLIC UTILITIES

2.8.1. As the scheme is located in an urban area a significant number of services belonging to a variety of statutory undertakers are present running through, across or in the vicinity of the site, including:

- Yorkshire Water – sewers and water mains;
- Transco – gas mains
- Cable and Wireless;
Yorkshire Electricity;
Kingston Communications; and
British Telecom.

2.8.2. The locations of the services potentially affected by the proposed improvements are shown on Drawing Number W11189/05/01-02 in Appendix A. A summary of the service locations is given in the TAR (PF, 2008a).

2.9. ENVIRONMENT

2.8.1. Introduction

2.8.1.1. An Environmental Assessment has been carried out for the scheme in accordance with the Design Manual for Roads and Bridges (DMRB) (HA, 2008a). The outcome of the Assessment is detailed in the report ‘A63 Castle Street, Environmental Assessment (Options Selection Stage)’ (PF, 2009g).

2.8.1.2. In addition an appraisal in accordance with WEBTAG has also been completed.

2.8.1.3. A summary of the existing environmental conditions within the study area taken from the EAR (PF, 2009g) is provided in the following sections.

2.8.2. Air Quality

2.8.2.1. Across Hull road traffic is identified to be the main source of emissions to atmosphere contributing to local air quality. Within the vicinity of the A63 Castle Street and across the wider city centre, roadside pollutant levels have been monitored by HCC since 2000. This has established that monitored long-term (i.e. annual mean) levels of the road traffic pollutant of concern, nitrogen dioxide (NO₂), are in breach of the UK national air quality standard (AQS) set to protect human health. On 1 August 2005, based on monitored pollutant levels and their assessment of local air quality, an Air Quality Management Area (AQMA) was formally declared for long-term NO₂ levels. To work towards improving air quality within the AQMA, HCC drafted an action plan to set out the Council’s proposals to reduce pollutant emissions.

2.8.2.2. Hull’s AQMA, shown in Figure 2.8.2.1, incorporates the area bordered by the centre line of Rawlings Way to the west, Anlaby Road, Carr Lane, Whitefriargate,
Silver Street and Scale Lane to the north, the River Hull to the east and the River Humber to the south.

FIGURE 2.8.2.1: AIR QUALITY MANAGEMENT AREA

2.8.2.3. During the 2008 air quality assessment (PF, 2008b) a detailed review of monitoring data, as provided by HCC, was undertaken in order to establish baseline conditions along the scheme route and wider city centre. Air quality monitoring is undertaken by HCC at sensitive locations (i.e. roadside, school) within a 50m band of the A63 centre line. This includes continuous monitoring (providing real-time measurements) and the use of NO\textsubscript{2} diffusion tubes (providing monthly measured levels). For 2008, at A63 roadside locations, measured annual mean NO\textsubscript{2} levels were reported by HCC to be in exceedence of the statutory annual mean standard for NO\textsubscript{2}.

2.8.2.4. Air quality monitoring and modelling undertaken by HCC has shown that long term (i.e. annual mean) concentrations of NO\textsubscript{2} are in exceedence of the long term Air Quality Objectives (AQO) at some locations within the study area. However, the monitoring also shows that short term concentrations of NO\textsubscript{2} are below the prescribed AQO for human receptors. No short-term statutory AQO for
ecological receptors exists. As such, the impact of long term pollutant concentrations on human and ecological receptors will be considered within this assessment.

2.8.3. Cultural Heritage

Introduction

2.8.3.1. Hull has a considerable archaeological and historic heritage, and it was included within the English Heritage Urban Archaeological Strategies programme in 1997, although the strategy for Hull has not yet been started.

2.8.3.2. A ‘Cultural Heritage Detailed Assessment’ of the proposed A63 Castle Street Improvements in Hull was undertaken in February-March 2009. The full assessment is detailed in the Environmental Assessment Report, 2009 (PF, 2009g).

Identified Cultural Heritage Assets

2.8.3.3. Hull has a considerable archaeological and historic heritage and archaeological remains present in the study area include:

- Pre-medieval period sites
- Medieval period sites
- Post-medieval period sites

2.8.3.4. A total of 190 archaeological sites have been identified within the 250m wide study corridor. Of these, a large percentage are recorded as demolished post-medieval structures, predominantly public houses, hotels and inns, as well as industrial complexes such as breweries, saw mills, timber yards, warehouses, brass, copper and iron works (or similar), malt houses and a soda water works, a perambulator and cabinet works and a confectionery works. There are no Scheduled Monuments (SM) within the study area.

2.8.3.5. A total of 46 historic buildings or structures have been identified within the 250m wide study corridor. Eighteen of these are Grade II, there are two Grade II* buildings and two Grade I structures. In addition, there are six Locally Listed Buildings as well as several others which are described as being “unlisted
buildings of historic townscape value” in the Old Town Conservation Area Character Appraisals.

2.8.3.6. Two national frameworks currently exist for historic landscape characterisation (HLC), the Countryside Agency’s “National Character Map of England” and English Heritage’s “Atlas of Rural Settlement in England”. Unlike many other parts of the country, no HLC project has yet been undertaken in East Yorkshire or Hull. Twenty four Historic Landscape Characterisation Units (HLCU) have been identified within the study area.

2.8.3.7. There are no Historic Battlefields, Registered Parks and Gardens or areas of National Trust inalienable land within or immediately adjacent to the study area.

Evaluation of Cultural Heritage Assets

2.8.3.8. Using the data gathered by the desk-top research, an initial assessment of the value of each cultural heritage asset identified within the study area has been made. The criteria for assigning the various value grades are outlined in the EAR (PF, 2009g).

2.8.3.9. The grades of value given to the 190 identified archaeological sites, 46 historic buildings and 24 HLCUs are given in the site gazetteers contained in Tables C1 and C2, Appendix C of the EAR (PF, 2009g). For convenience, these values are summarised in Table 2.8.3.1 below.

**TABLE 2.8.3.1: VALUE OF CULTURAL HERITAGE ASSETS**

<table>
<thead>
<tr>
<th>Sub-topic</th>
<th>Assessment of Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very High</td>
</tr>
<tr>
<td>Archaeological Remains (190 assets)</td>
<td>0</td>
</tr>
<tr>
<td>Historic Buildings (46 assets)</td>
<td>0</td>
</tr>
<tr>
<td>HLCUs (24 assets)</td>
<td>0</td>
</tr>
</tbody>
</table>
FIGURE 2.8.3: LOCATION OF CULTURAL HERITAGE ASSETS
2.8.4. Landscape

Introduction

2.8.4.1. Consultation with the HA confirmed that due to the entire urban nature of the scheme corridor, all reference to landscape should be removed from the text, and the process referred to as a townscape assessment. From this point on, the landscape assessment is referenced as townscape assessment.

2.8.4.2. A Townscape and Visual Impact Assessment has been undertaken as part of the EAR (PF, 2009g). The assessment utilised and built on an earlier 2008 ‘Stage 2’ assessment report (PF, 2008b) which assessed six scheme options. The assessment reviewed the previous ‘Stage 2’ assessment following the selection of two preferred options. The Stage 2 assessment process has since been replaced with the DMRB ‘Simple’ assessment stage (HA, 2008b).

2.8.4.3. The study area is typical of an urban area; however the area has the added features of a river front location and a historical core, linked with a number of historic docks. The area contains a variety of land uses including residential (both small and large scale), retail, commercial and public open space. The A63 runs through a section of the Old Town Conservation Area which contains buildings and areas of townscape and historic merit. The city has developed out from this historic core, however, many areas suffered extensive bomb damage during the Second World War and this is seen in the wide-ranging post war styles of buildings. In recent years a number of regeneration initiatives have started to come to fruition in the city centre including the construction of the iconic aquarium ‘The Deep’ (to the east of the study area) and the St. Stephens retail development on Ferensway (to the north of the study area). Modern residential flats and office accommodation have recently been constructed overlooking Humber Dock and the restored lock swing bridges and new areas of public realm.

2.8.4.4. To illustrate the context of Castle Street within the surrounding city centre, an aerial photograph (Figure 2.8.4.1) of the study area is shown below. The red line indicates the townscape study area boundary.
Conservation Areas and Listed Buildings

2.8.4.5. The A63 runs through the Old Town Conservation Area as defined in the Hull Local Plan.

2.8.4.6. The conservation character area appraisal defines what makes the Old Town an “area of special architectural or historic interest”. This appraisal then forms the basis for the formulation of proposals for the preservation or appearance of the area. One of the single most significant features of the Old Town is that the medieval street pattern is still largely intact; except for Castle Street which was added as part of Abercrombie’s post war development plan, broadly following the alignment of the former Mytongate.

2.8.4.7. There are a number of Listed Buildings located in close proximity to the road with the potential to be either directly or indirectly affected by the scheme development, namely:

- Grade I – King William III statue and lamps; and
- Grade II - Humber Dock including north and east walls of tidal basin, Castle Buildings, Earl De Grey public house, Warehouse No. 6 and the Market Place toilets.
2.8.4.8. There are a number of other Listed Buildings within the study area which are not directly affected by the proposals, e.g. Holy Trinity Church, and these are discussed in the EAR (PF, 2009g, Section 5)

**Townscape Character Areas**

2.8.4.9. Townscape character areas are geographically specific areas of a townscape type which have their own individual character or ‘sense of place’. Within the study area twenty three different character areas have been identified. A detailed description of each of the character areas is given in the EAR (PF, 2009g)

2.8.4.10. The character boundaries are shown on Figure 2.8.4.2.
FIGURE 2.8.4.2: TOWNSCAPE CHARACTER BOUNDARIES
Townscape Quality

2.8.4.11. Following consideration of the character of individual townscape areas a judgement has been made regarding the quality of the existing townscape. A summary of townscape quality for each of the character areas is given in Table 2.8.4.1 below.

**TABLE 2.8.4.1: SUMMARY OF TOWNSCAPE QUALITY**

<table>
<thead>
<tr>
<th>Townscape Quality</th>
<th>Townscape Character Areas</th>
</tr>
</thead>
</table>
| High Quality      | 16 – Prince Street and Posterngate  
                      17 – Holy Trinity Church |
| Very Attractive   | 8 – Humber and Railway Dock  
                      9 – Trinity Burial Ground  
                      14 – Nelson Street riverfront  
                      23 – Central Dry Dock/The Deep |
| Good              | 1C, 1D – A63 Castle Street  
                      7 – Princes Quay Shopping Centre  
                      10 – Railway Dock surrounding areas  
                      11 – marina small scale urban housing  
                      13 – Island Wharf riverfront redevelopment  
                      15 – Castle Street small scale urban housing  
                      20 – Marina Court  
                      22 – Central Fruit Market |
| Ordinary          | 1A, 1B, 1E – A63 Castle Street  
                      3 – Large scale leisure and retail  
                      4 – Large scale urban housing with pocket parks  
                      5 – Mixed scale urban housing  
                      6 – Quay West development site  
                      12 – Hull marina boat yard  
                      18 – Market Place east  
                      19 – River Hull wharf frontages  
                      21 – Oldgates development area |
| Poor              | 2 – Light industrial and commercial |

Townscape Sensitivity

2.8.4.12. “The sensitivity of the landscape (townscape) to change is reflected in the degree to which the landscape (townscape) is able to accommodate change (due to the type of development or land use change) without adverse effects on its character. This may be influenced by the extent of existing or new landform and/or existing vegetation or new planting. These and other factors determine
the visibility of the proposed development and therefore influence the extent of its effect on the perceived character and visual amenity of the surrounding landscape.” (Countryside Agency and Scottish Natural Heritage, 2002).

2.8.4.13. Sensitivity (value) of the townscape in the study area has been assessed by determining the ability of the townscape to accept change as a result of the proposed development without detriment to quality or value. Factors that influence the sensitivity of the area to change include the following: the potential for substitution (or replacement) of the characteristics affected; the rarity of the townscape; townscape features; existing land use pattern; layout and scale; views and distribution of visual receptors; the scope for mitigation in character with the area; and the quality and value placed on the townscape.

2.8.4.14. Following consideration of the townscape character and townscape quality of the character areas, a judgement has been made on the townscape sensitivity of the character areas. A summary of townscape sensitivity (value) for each of the character areas is given in Table 2.8.4.2 below.

**TABLE 2.8.4.2 TOWNSCAPE VALUE**

<table>
<thead>
<tr>
<th>Townscape Value (Sensitivity)</th>
<th>Townscape Character Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High</td>
<td>8 – Humber and Railway Dock</td>
</tr>
<tr>
<td></td>
<td>9 – Trinity Burial Ground</td>
</tr>
<tr>
<td></td>
<td>16 – Prince Street and Posterngate</td>
</tr>
<tr>
<td></td>
<td>17 – Holy Trinity Church</td>
</tr>
<tr>
<td>High</td>
<td>7 – Princes Quay Shopping Centre</td>
</tr>
<tr>
<td></td>
<td>14 – Nelson Street riverfront</td>
</tr>
<tr>
<td></td>
<td>15 – Castle Street small scale urban housing</td>
</tr>
<tr>
<td>Medium</td>
<td>4 – Large scale urban housing with pocket parks</td>
</tr>
<tr>
<td></td>
<td>10 – Railway Dock surrounding areas</td>
</tr>
<tr>
<td></td>
<td>13 – Island Wharf riverfront redevelopment</td>
</tr>
<tr>
<td></td>
<td>20 – Marina Court</td>
</tr>
<tr>
<td></td>
<td>22 – Central Fruit Market</td>
</tr>
<tr>
<td></td>
<td>23 – Central Dry Dock/The Deep</td>
</tr>
</tbody>
</table>
### Townscape Value (Sensitivity) vs. Townscape Character Areas

<table>
<thead>
<tr>
<th>Townscape Value (Sensitivity)</th>
<th>Townscape Character Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1A, 1B, 1C, 1D, 1E – A63 Castle Street</td>
</tr>
<tr>
<td></td>
<td>2 – Light industrial and commercial</td>
</tr>
<tr>
<td></td>
<td>3 – Large scale leisure and retail</td>
</tr>
<tr>
<td></td>
<td>5 – Mixed scale urban housing</td>
</tr>
<tr>
<td></td>
<td>6 – Quay West development site</td>
</tr>
<tr>
<td></td>
<td>11 – marina small scale urban housing</td>
</tr>
<tr>
<td></td>
<td>12 – Hull marina boat yard</td>
</tr>
<tr>
<td></td>
<td>18 – Market Place east</td>
</tr>
<tr>
<td></td>
<td>19 – River Hull wharf frontages</td>
</tr>
<tr>
<td></td>
<td>21 – Oldgates development area</td>
</tr>
<tr>
<td>Negative</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Night Time Baseline Character

2.8.4.15. Currently that section of Castle Street within the study area is illuminated with street lighting. It is envisaged that new lighting will also be implemented as part of the scheme proposals. At the time of the assessment, information relating to the proposed lighting strategy was not available. The existing highway is illuminated along its whole length by single column, double sided lighting; columns are located within the central reservation and around the perimeter of Mytongate junction. For the purposes of this assessment it is assumed that this arrangement will continue for either option. It should also be noted that due to the urban nature of the scheme, the extensive street lighting and peripheral lighting presently within the city centre will continue. The lighting proposals for either scheme option should conform with the proposed lighting strategy of the Hull City Council Supplementary Planning Document ‘City Centre Public Realm Design Guidance’.

#### 2.8.5. Nature Conservation

**Introduction**

2.8.5.1. A Nature Conservation Assessment has been undertaken, as part of the EAR (PF, 2009g). The objective of the assessment was to ensure that any adverse impacts of the scheme proposals on the environment are minimised or mitigated and where possible that opportunities for environmental enhancement are considered.
2.8.5.2. There are several areas of green space in the locality, including the Trinity Burial Ground, the Pocket Park (adjacent to William Booth house) and roadside verges.

2.8.5.3. The EAR (PF, 2009g) assessed the impact on sites more than 250m away from the proposed construction area as being of very low significance, as a result, these sites are no longer under consideration. This includes the River Hull Site of Nature Conservation Interest (SNCI) and adjoining habitats. Water Voles (which are protected under the Wildlife and Countryside Act) have been recorded 500m from the project site, and no impacts are predicted on them.

Existing and Baseline Knowledge

2.8.5.4. An assessment has been made on the sensitivity (value) of habitats within the study area. The value given to each habitat follows the WebTAG guidance (DfT, 2004). Most of the habitats that surround the route are amenity grassland strips with areas of scattered scrub, ornamental shrubs and trees.

Clive Sullivan Way to Ferensway/Commercial Road Junction

2.8.5.5. At the western edge of the scheme, starting from the end of Clive Sullivan Way lines of mature trees such as Cherries, Sycamore and poplar are situated on closely mown amenity grassland. Two sections of ornamental hedge are found along this stretch on the northern side. The remainder of the habitat is amenity grassland with fragmented sections of ornamental shrubs and further trees at the front of the retail park. These are considered be of low or negligible ecological value.

Ferensway/Commercial Road Junction

2.8.5.6. The Trinity Burial Ground SNCI lies immediately adjacent to the existing A63, east of the Mytongate Junction. The mature trees at the Trinity Burial Ground are considered to be of medium/lower ecological value. The grassland present is of low ecological value. The site designation as a SNCI has highlighted the value of the site in an inner-city context and the Trinity Burial Ground SNCI is considered to be of medium ecological value.

2.8.5.7. Pocket Park is situated on the western side of this junction and Trinity Burial Grounds are on the eastern side. Pocket Park is made up of mown amenity grassland interspersed with paths, a few shrubs and scattered trees. The traffic
islands in the middle of the junction support some large mature trees including Poplar, Silver Birch and Scots Pine. These features are considered to be of medium/lower ecological value.

2.8.5.8. Several small areas of amenity grassland are situated adjacent to the pavements surrounding the junction, which are of negligible value.

_Ferensway/Commercial Road Junction to Garrison Road_

2.8.5.9. From the junction up to the River Hull, there are areas of pavement alongside fragmented strips of amenity grassland with scattered trees. Areas of native scrub are present and there are extensive areas of ornamental shrubs outside the Princes Quay Shopping Centre and the Magistrates Court. Habitats to the east of the Market Place junction, including the River Hull, are no longer under consideration as there is likely to be no impact on them from either of the proposed routes.

_Bats_

2.8.5.10. The bat roost potential survey detailed in the EAR (PF, 2008b) revealed a number of features with moderate and high bat roost potential. These were mostly mature trees in Trinity Burial Ground and two walls covered with ivy and having many cracks and crevices between the brickwork. The Castle Buildings and Earl de Grey Public House both have high roost potential. Other trees and buildings at the site outside of Trinity Burial Ground are much less mature and were assessed as having low or negligible bat roost potential.

2.8.5.11. Two trees were assessed as having high potential for roosting bats. These were subject to emergence surveys, however, no bats were recorded emerging from either tree. Although no bat roosts were recorded, several common Pipistrelle bats were noted foraging in the vicinity on both survey visits.

2.8.5.12. The bat survey undertaken in 2005 identified a Pipistrelle bat roost within the Castle Buildings on Waterhouse Lane. A common Pipistrelle was recorded roosting in the building on two occasions (possibly the same bat recorded twice). The building appeared to be used by one or very few bats as a non-breeding summer roost. These are considered to be of medium/lower ecological value.
2.8.5.13. Due to the proximity of the Humber estuary the air quality around Castle Street is better than many city centre locations, and a range of common lichens can be found on trees, gravestones and old walls. Lichens are a Hull Biodiversity Action Plan (BAP) species and measures for their mitigation are given in the EAR (PF, 2009g). The impact on the lichen population is slight and specialist surveys of lichens are not required within the project area.

*Humber Estuary*

2.8.5.14. The 2008 EAR (PF, 2008b) excluded the Humber Estuary Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), Special Area of Conservation (SAC) and Ramsar from further consideration within the assessment. This was because there is no likelihood of a significant impact from the scheme proposals leading to a decline in the overall condition of the estuary. The updated EAR (PF, 2009g) noted that the design of the drainage system from the new road should minimise the risk of pollutants overflowing into the estuary.

2.8.6. **Materials**

*Introduction*

2.8.6.1. A DMRB Materials Assessment for the A63 Castle Street improvements has been undertaken by PF as part of the EAR (PF, 2009g) for the HA.

*Geology and Soils*

2.8.6.2. The geology of the surrounding area is outlined in section 2.7 of this report.

2.8.6.3. The soils types within the study area have been identified as Loamy and Clayey soils of coastal mudflats with naturally high groundwater.

2.8.6.4. Given the urban nature of the proposed scheme, there will be limited areas of soils impacted, principally at Trinity Burial Ground and Pocket Park.

*Regionally Important Geological and Geomorphological Sites (RIGS)*

2.8.6.5. RIGS, designated by locally developed criteria, are currently the most important places for geology and geomorphology outside statutorily protected land such as SSSI. The designation of RIGS is one way of recognising and protecting important Earth science and landscape features for future generations to enjoy.
2.8.6.6. The Association of UK RIGS was consulted to identify whether any RIGS were located within the study areas (e.g. within 500m). They confirmed that there are no geological or soils RIGS within the site. However, they noted that there are a number of urban RIGS in the study area that have been designated due to their educational value. The following Urban RIGS are present within 1km of the site boundary.

**TABLE 2.8.6.1: URBAN RIGS IN STUDY AREA**

<table>
<thead>
<tr>
<th>Structure</th>
<th>Location</th>
<th>Designated for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lloyds TSB Bank</td>
<td>On corner of Chapel Street and Paragon Street</td>
<td>Granite with Rapakivi structures</td>
</tr>
<tr>
<td>King William Statue and toilets</td>
<td>Market Place</td>
<td>Various rocks</td>
</tr>
<tr>
<td>Methodist Hall</td>
<td>King Edward Square</td>
<td>Tiberthwaite Tuff</td>
</tr>
<tr>
<td>Festival House</td>
<td>93 St James Street</td>
<td>Fossils in Ironstone</td>
</tr>
<tr>
<td>HSBC Bank</td>
<td>Near War memorial</td>
<td>Granite Pillars</td>
</tr>
<tr>
<td>Williamsons Solicitors</td>
<td>Lowgate</td>
<td>Ashburton “marble”</td>
</tr>
<tr>
<td>Monument Buildings</td>
<td></td>
<td>Granite pillars with xenoliths</td>
</tr>
<tr>
<td>Police Station</td>
<td>Queens Gardens</td>
<td>Tilberthwaite Tuff</td>
</tr>
</tbody>
</table>

**Land Contamination**

2.8.6.7. No contaminated land register entries and notices were identified in the Envirocheck Report (Landmark, 2002).

2.8.6.8. Information on Areas of Potential Concern (APC), due to historical land uses, within the development area and in the area surrounding the site (1km buffer) was obtained from historical Ordnance Survey maps.

2.8.6.9. Much of the area surrounding the proposed development has been heavily industrialised, which would be expected given the history of docklands in the area. Industries have included various works, warehouses, railways and timber yards. In addition the Trinity Burial Ground is present immediately adjacent to Mytongate Junction.

2.8.6.10. The Envirocheck report (Landmark, 2002) did not indicate a significant risk to the development from contaminated land. However a number of potentially contaminating sources have occurred on or in the vicinity of the site. These are sites, where previous uses include timber works, saw mill, metal (brass) works,
warehouses, cattle and pig markets as well as the disused burial ground. The historic and current usage of the central portion of the site as docklands would also give rise to potentially contaminated land. Full details are given in the EAR (PF, 2009g).

2.8.7. Noise

Introduction

2.8.7.1. An assessment of noise for the Castle Street Improvement Scheme was undertaken as part of the EAR (PF, 2009g). This assessment was carried out in order to identify the potential impact of the scheme on identified noise and vibration sensitive receptors, and whether further work will be required in order to fully assess and mitigate against the impacts of the scheme.

2.8.7.2. A summary of the existing conditions is given below. More details are given in the 2009 EAR (PF, 2009g)

Existing and Baseline Conditions

2.8.7.3. It is not necessary for the purposes of noise assessment to undertake a noise measurement survey to establish the existing noise climate. The noise climate surrounding the site and study area is typical of a busy city centre urban environment with a relatively high level of noise from transport, industry, commercial and leisure uses.

2.8.7.4. Consultation with HCC suggested that the major noise issue, as perceived by local residents and suggested by received noise complaints, comes from noise from entertainment premises such as pubs and bars.

2.8.7.5. There are a large number of dwellings and other sensitive receptors within 2km of the project boundary (i.e. the extent of the proposed works) as would be expected from a scheme within an urban environment.

2.8.7.6. During the previous assessment (PF, 2008b) approximately 1000 residential properties were identified as lying within 600m of the proposed scheme.

2.8.7.7. The previous assessment identified the following sensitive receptors (other than dwellings) within 300m of the proposed scheme:
### TABLE 2.8.7.1: SENSITIVE RECEPTORS

<table>
<thead>
<tr>
<th>Location</th>
<th>Grid Reference</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Park 1</td>
<td>509192 428521</td>
<td>Green open space bordered by Melville Street</td>
</tr>
<tr>
<td>Park 2</td>
<td>509114 428437</td>
<td>Green open space bordered by Porter Street and Adelaide Street</td>
</tr>
<tr>
<td>Park 3</td>
<td>509141 428310</td>
<td>Green open space bordered to the north by William Street and the A63 to the south</td>
</tr>
<tr>
<td>Park 4</td>
<td>508760 428509</td>
<td>Green open space bordered to the north by Great Thornton Street</td>
</tr>
<tr>
<td>Myton Centre</td>
<td>509042 428252</td>
<td>Riverside area children and family resource centre bordering William street to the north and the A63 to the south</td>
</tr>
<tr>
<td>Octagon Centre</td>
<td>508839 428394</td>
<td>Conference centre and community fitness centre located on Walker Street</td>
</tr>
<tr>
<td>Playing Field</td>
<td>508738 428360</td>
<td>Playing field located to the west of the Octagon Centre</td>
</tr>
<tr>
<td>Jetty</td>
<td>509666 428485</td>
<td>Public open space to the south of the Princes Quay Shopping Centre bordered to the south by the A63</td>
</tr>
<tr>
<td>Shopping Centre</td>
<td>509628 428509</td>
<td>Princes Quay Shopping Centre</td>
</tr>
<tr>
<td>Naval School*</td>
<td>509744 428514</td>
<td>Hull Trinity House School located on Prince’s Dock Street</td>
</tr>
<tr>
<td>Market Square</td>
<td>509891 428558</td>
<td>Located between North Church side and South Church side to the west of Holy Trinity Parish Church</td>
</tr>
</tbody>
</table>

#### 2.8.7.8. In addition to these previously identified receptors the following schools, hospitals and public open spaces were identified as being within 2km of the project boundary:

- Hull Trinity House School
- Victoria Dock Primary School
- Adelaide Primary School
- Hull College
- Princess Royal Hospital
- Queens Gardens

#### 2.8.7.9. It is understood that three designated areas lie within 2km of the project boundary:

- Trinity Burial Ground SNCI
- River Hull SNCI
2.8.8. Effects on all Travellers

2.8.8.1. An Assessment of the Effects on All Travellers for the A63 Castle Street Improvement Scheme was undertaken as part of the EAR (PF, 2009g). To date no revised guidance is available for 'Effects on all Travellers' therefore following current guidance the assessment was undertaken using the methodology for assessing impacts for vehicle travellers and on pedestrians, equestrians and cyclists. The assessment utilises and builds upon the vehicle travellers and pedestrian, equestrians and cyclists assessments within the 2008 EAR (PF, 2008b).

2.8.8.2. A summary of the baseline conditions encountered during the assessment are given below. More details are given in the 2009 EAR (PF, 2009g)

Existing Rights of Way

2.8.8.3. There are footways on both sides of the A63 except on the south side between St James Street and Spruce Road which has a grassed verge. To the south of the A63, between St James Street and Spruce Road, Waverley Street provides a suitable route for pedestrians.

2.8.8.4. There is a shared pedestrian and cycle route on the north side of Hessle Road, commencing approximately 400m west of Porter Street at Rawling Way and continuing to Ferensway. Further shared pedestrian and cycle routes are provided on the northeast, southeast and southwest sides of the Mytongate junction. On all these shared routes pedestrian and cycle use is segregated by a white line.

2.8.8.5. There are several designated crossing points of the A63, including:

- A63 crossing adjacent to Porter Street - signal controlled, pedestrian only;
- A63 crossing adjacent to Spruce Road/Kingston Retail Park - uncontrolled crossing;
- Mytongate West Crossing - signal controlled, Toucan crossing;
- Mytongate East Crossing - signal controlled, Toucan crossing;
- A63 crossing adjacent to Prince’s Dock West - signal controlled, pedestrian only;
- A63 adjacent to Humber Dock Street - signal controlled, pedestrian only;
- Market Place Junction - signal controlled, pedestrian only; and
- High Street - footway under the A63 prior to the Myton Bridge (European Path E8).

2.8.8.6. There are numerous other points along the route by which the public could gain access to the A63 footways, notably by using the car parks belonging to commercial premises such as Kingston Retail Park.

2.8.8.7. There are no bridleways on the Definitive Map held by HCC.

Pedestrian Flows

2.8.8.8. In order to update existing data new pedestrian counts were undertaken in July 2009, at the previous 2004 survey locations. The following sites along the A63 were included in the pedestrian count and are listed below, together with the total two-way pedestrian flow between 07:00 and 19:00:-

TABLE 2.8.8.1: SUMMARY OF PEDESTRIAN NUMBERS OBSERVED DURING 2009 SURVEYS

<table>
<thead>
<tr>
<th>Crossing Point</th>
<th>2009 12-hr total (no of pedestrians)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Porter Street Crossing</td>
<td>188</td>
</tr>
<tr>
<td>Spruce Road Crossing</td>
<td>18</td>
</tr>
<tr>
<td>Mytongate West Crossing</td>
<td>1133</td>
</tr>
<tr>
<td>Mytongate East Crossing</td>
<td>612</td>
</tr>
<tr>
<td>Prince’s Dock West Crossing</td>
<td>891</td>
</tr>
<tr>
<td>Prince’s Dock East Crossing</td>
<td>1067</td>
</tr>
<tr>
<td>Market Place West Crossing</td>
<td>974</td>
</tr>
<tr>
<td>Commercial Road</td>
<td>678</td>
</tr>
<tr>
<td>Ferensway</td>
<td>1090</td>
</tr>
</tbody>
</table>

Cycle Flows

2.8.8.9. A survey of pedal cycle movements was originally carried out in March 2004. In order to update the data further surveys of cyclists were undertaken at
Mytongate Junction and Market Place as part of the 2008 traffic survey. No additional counts were undertaken for the local access roads due to the very small number of cyclist previously noted (i.e. less than 6).

2.8.8.10. Figures 2.8.8.1 and 2.8.8.2 indicates diagrammatical representation showing the 2008 total movements over a 12-hour period at both junctions.

**FIGURE 2.8.8.1 CYCLE FLOWS AT MYTONGATE JUNCTION**

**FIGURE 2.8.8.2 CYCLE FLOWS AT MARKET PLACE JUNCTION**

**Trip Generators**

2.8.8.11. The current likely generators of pedestrian and cycle traffic across the A63 would appear to be:

- The residential area around Porter Street;
- Paragon Interchange on Ferensway;
The commercial and entertainments area south of Hessle Road, including Kingston Retail Park and the Hull Arena;

City centre shopping and commercial areas in the Prince’s Quay area, including the Princes Quay Shopping Centre;

The Humber Marina area with nearby residential areas;

The mixed residential, shopping and commercial area to the east of Prince’s Quay, including the indoor market;

The commercial and tourist attractions adjoining the River Humber including The Deep; and

Marina Court commercial development area.

2.8.8.12. The Hull City Masterplan and the emerging planning documents contained within the Local Development Framework (LDF) envisage significant changes to areas around the scheme corridor by 2016 that could generate additional pedestrian and cycle traffic. The changes south of the A63 at Humber Quays and The Fruit Market Area would be likely to have the most effect on pedestrians and cyclists crossing the A63 as there are proposals for significant new office, retail, leisure and residential developments, including 450 dwellings at Humber Quays and 400 at The Fruit Market Area.

Desire Lines

2.8.8.13. Being in a busy city centre, desire lines are not clearly defined due to the multitude of pedestrian routes approaching both sides of the A63 from trip generators. The present formal crossing locations on the A63 dictate the pedestrian routes on the approaches to the A63.

2.8.8.14. The higher pedestrian usage at certain existing crossing points suggests that the routes approaching the crossings at Mytongate, Prince’s Dock, Market Place and High Street are linked to the main desire lines. The main desire lines appear to be:

- The A63 itself - Along the whole scheme length using either the north or south footways

- Commercial Road - Between the Mytongate crossings towards Albert Dock
- Ferensway - Between the Mytongate crossings and the Paragon Interchange and city centre
- Waterhouse Lane - Between the Mytongate crossings and the city centre
- Prince’s Dock Street and Humber Dock Street - Linking the various residential, leisure and commercial properties around the marina with the city centre shopping areas
- Queen Street and Market Place - Linking the various residential and commercial properties in the southern area of the old town with the city centre
- High Street - Providing an alternative route to Queen Street and Market Place

2.8.8.15. Pedestrians travelling between Kingston Retail Park and the city centre shopping areas/Paragon Interchange are presumed to use the Ferensway and Waterhouse Lane routes.

2.8.8.16. Other likely pedestrian desire lines, possibly more lightly used, include:
- Porter Street and St James Street - Between the residential areas north of the A63 and the residential/commercial area to the south
- Railway Street - Providing an alternative route to Humber Dock Street and Commercial Road towards the city centre at Prince’s Quay

2.8.8.17. Future developments are likely to generate additional pedestrian and cycle flows to and from the areas south of the A63, although no details of expected flows are presently available.

Traveller Care

2.8.8.18. The main users of the existing travel network at the A63 are vehicle travellers.

2.8.8.19. The en-route facilities for road users are limited to standard directional road signage. There are footways on both sides of the A63 except on the south side between St James Street and Spruce Road which has a grassed verge. There is a shared pedestrian and cycle route on the north side of Hessle Road and further shared pedestrian and cycle routes on the northeast, southeast and southwest sides of the Mytongate Junction. There are several designated at-grade crossing points along the A63.
View from the Road

2.8.8.20. Vehicle travellers presently experience views into the surrounding urban areas whilst travelling along the scheme corridor. At the western end of the study area between Porter Street and Mytongate Junction the road runs at existing ground level through the surrounding townscape.

2.8.8.21. Views are possible to the north of the A63 into the mixed scale residential areas between the verge-side trees. Views to the south of the A63 are intermittent and restricted by verge-side screening vegetation into the light industrial, poor quality townscape areas around Waverley Street. However, views are possible to the south into the Kingston Retail Park area, on the approach to Mytongate Junction. The angle of the carriageway through Mytongate Junction prevents distant views along the carriageway whilst travelling in both an east and west direction.

2.8.8.22. At Mytongate Junction views are restricted, north onto Ferensway and south down Commercial Road by the two wedges of vegetation growing on either side of the throughabout. Views are also restricted by the large number of road signs and barriers in this cluttered area.

2.8.8.23. Between Mytongate Junction and the docks there are open views south of the road towards the large mature trees within Trinity Burial Ground. There are also open views to the north of the carriageway into the retail and derelict areas around Myton Street. The listed Castle Buildings and Earl de Grey Pub are prominent alongside the A63.

2.8.8.24. Between Prince's Dock and Humber Dock the road is in slight cutting providing restricted views to the dock areas on either side of the carriageway. Distant views are possible north to the Prince's Quay shopping centre and south to the masts of the yachts moored in Humber Dock. The red brick listed Warehouse No. 6 to the north of the carriageway by Prince’s Dock Street is a prominent feature.

2.8.8.25. Between Prince's Dock Street and Fish Street the road is at ground level and passes between the surrounding good quality residential and office developments restricting views to along the road corridor only. The residential areas north of the carriageway form a uniform appearance allowing only glimpsed views north along the side roads that link into Castle Street. This contrasts with the open and partly derelict areas to the south of the carriageway.
around Finkle Street. Views south are partially screened by a brick wall but it is still possible to see the upper areas of the Fruit Market warehouses beyond.

2.8.8.26. At the junction between Market Place and Queen Street the built areas alongside the road open out allowing open views north along Market Place towards the listed King William III statue, and south along Queen Street towards the warehouses of the Fruit Market. When travelling east it is possible to see the road rising up towards the Myton swing bridge, and when travelling west towards Market Place Junction, views are channelled along the A63 corridor towards the docks and over the derelict Fruit Market areas.

**Driver Stress**

2.8.8.27. There are no existing facilities (fuel, rest areas, food, etc) present along the short length of highway improvement under consideration. Given the urban nature of the study area and the short length of the scheme this is not considered to be a major issue.

2.8.8.28. Generally, footpaths are present immediately adjacent to the carriageway, along the whole of the proposed route and in some cases access to both residential and commercial properties is gained directly from the footpaths. There are a number of at-grade designated crossing points along the whole length of the scheme which could potentially bring vehicle travellers and pedestrians into conflict. The changing of pedestrian crossing signals also results in an interruption in the flow of traffic.

2.8.8.29. At present Mytongate Junction and its approaches are likely to cause driver stress and uncertainty as a result of the layout of the junction, the low traffic speeds in relation to the design speed of the approach roads, the amount of congestion, particularly during peak periods, and the difficulty in entering the circulatory flow on the roundabout. Drivers approaching the junction from the east wishing to turn right onto Commercial Road are required to enter the left hand lane on the approach to the junction, contrary to normal practice, and go around the roundabout. No right turn is possible from the main A63 carriageway. This may cause confusion and stress to drivers not familiar with the junction. There is also the potential for accidents with drivers attempting to change lanes at the last minute.
2.8.8.30. Drivers faced with the difficulty of merging with the circulatory traffic on the roundabout are likely to fear a potential accident. This fear may be worsened by potential conflict with pedestrians.

2.8.8.31. As well as the major traffic congestion at the Mytongate Junction, the other major junction on the route – Market Place/Queen Street (Market Place Junction) is also problematic and liable to cause driver stress. However, recent improvements to the Market Place Junction have mitigated some of the congestion problems.

2.8.9. Community and Private Assets

2.8.9.1. A Stage 2 DMRB Assessment of Community and Private Assets (PF, 2009g) was undertaken in 2009 for the A63 Castle Street Improvement Scheme. The assessment utilised and built on information from an earlier assessment of Land Use, Community Effects and Policies reported in the 2008 EAR (PF, 2008b).

Land Use

2.8.9.2. Due to the urban nature of the scheme there are a large number of residential dwellings located within the study area, which extends 200m from the centre line of the road. The proposed scheme options comprise an on-line upgrading of an existing road corridor. The layout of the adjacent residential areas is influenced by the alignment of the road corridor through the urban centre which may also impact on the amenity of the residential areas. Residential dwellings are concentrated to the north side of the A63; to the west of Mytongate Junction and to the east of Prince’s Quay. The property ranges from medium to high density residential flats in both public and private ownership.

2.8.9.3. Within the study area there is also a large range of typical urban land uses including business and retail properties of various sizes from small to very large scale.

2.8.9.4. There are a variety of different community land uses within the study area including; two pocket parks fronting the A63 and Trinity Burial Ground (an urban greenspace) which borders Mytongate Roundabout. Other areas of community open space include the three docks, Prince’s, Humber and Railway, and the pedestrianised areas surrounding them.
2.8.9.5. The route of the proposed scheme is highlighted within the Hull City Council Local Plan as ‘Castle Street Scheme’. The Local Plan was adopted in May 2000. Policy M18 states that Castle Street is allocated as ‘a new road and widening scheme’ and that the land required for this will be protected from other development.

2.8.9.6. The City Centre Area Action Plan highlights Strategic Development Areas (SDA) within the study area allocated for redevelopment, these are:

- Area 2 – Fruit Market SDA (CCAAP33); and
- Area 4 – Quay West SDA (CCAAP31).

Community Facilities

2.8.9.7. The proposed scheme is located within Hull city centre and consequently the area surrounding the route of the A63 typically contains local amenities including shops, public houses, schools, church, doctors’ surgeries and public parks.

2.8.9.8. Several schools and tertiary education facilities are located within the vicinity of the scheme, including:

- Adelaide Primary School
- Victoria Dock Primary School
- Hull Trinity House
- University of Humberside – School of Arts
- Goodwin Research Centre
- Children’s Centre

2.8.9.9. Retail facilities are present on either side of the A63 Castle Street. Kingston Retail Park, located immediately south west of the junction at Mytongate, is the main retail area south of the A63.

2.8.9.10. To the north of the A63 lies the city centre of Hull. The two main shopping complexes to the north of the A63 are Princes Quay Shopping centre, which is situated within Princes Dock, and Paragon Shopping centre which is located off Ferensway, immediately north of the railway station.
2.8.9.11. There are four churches in the study area. These are Holy Trinity Church, St Mary's Church, St Nicholas Parish Church and the Salvation Army Citadel, all of which are located to the north of the A63.

2.8.9.12. There is one care home, St James Care Home, which lies close to the site approximately 120m north of the junction of the A63 with Porter Street. Hull Royal Infirmary is located over 800m north west of the site.

2.8.9.13. There are six main recreational areas near the site. These are Hull Arena (ice rink) located approximately 200m south of Mytongate junction, Trinity Burial Ground (Green Open space) located in the south east quadrant of Mytongate Junction, Pocket Park located in the north west quadrant of Mytongate Junction, Humber Dock located immediately south of the site and the Deep which is located on the eastern bank of the River Hull, approximately 100m from the edge of the site.

Policies and Plans

2.8.9.14. There are a considerable number of documents which need to be taken into account when assessing the planning policy background to this scheme, including the Community Strategy and the Local Transport Plan in accordance with the 2004 Planning and Compulsory Purchase Act.

2.8.9.15. Full details of the policy regime can be found in the EAR (PF, 2009g), however a summary of the key issues are given below.

2.8.9.16. From national to the most local policies the intention is to promote the economic regeneration of Hull and to promote the City as a focus for significant development and regeneration. A key element of this is the improvement of access to the docks which necessitates improvements to A63 Castle Street. The Hull Masterplan, which is not, in itself, a planning document but is approved by the City Council, and has formed an input into the new LDF documents, endorses the view that solutions will be needed to improve Castle Street. It is also one of the Masterplan’s three objectives to re-unite the City Centre with its River Humber waterfront.

2.8.9.17. The aims of the A63 Castle Street scheme are: to reduce congestion on the A63, which is the key access to Hull Docks; reduce severance; improve journey times; improve accessibility to the docks, and improve safety. These are also key
ambitions in terms of planning and regeneration policies. It is widely considered that these aims will support a step change in the economic fortunes of the City. It is therefore the case that the regeneration priority and aims for Hull are inextricably linked with and reflected in the transport policies relevant to this road scheme. While transport and regeneration policies are considered separately there is very considerable overlap which is reflected in both sets of policies.

2.8.10. Road Drainage and the Water Environment

Introduction

2.8.10.1. A detailed assessment was undertaken as defined in Volume 11 of the DMRB (HA, 2009). This involved the completion of Method D to assess the risk pollution from accidental spillage for each of the proposed design options. An assessment of Routine Runoff (Method B) was not possible as this stretch of the River Hull is tidally influenced; therefore no meaningful Q95 flow data is available.

Drainage / Hydrology / Surface Water

2.8.10.2. Examination of the as-built drawings from the Southern Orbital Road Scheme, which included Castle Street and Market Place, indicated that road drainage is drained to a surface water storm water sewer. Some lengths of this storm water sewer are likely to drain to waste water treatment works, whilst other lengths are likely to drain to the River Humber however, details are unknown at present. Further drainage assessments will be required.

2.8.10.3. Liaison with the HA MAC confirmed that the majority of the storm water sewers are public sewers, however, there are likely to be small lengths of private highway drainage in some areas. It is not known what the existing flows and capacities of the sewers are at present.

2.8.10.4. The nearest surface watercourses are the Humber Estuary, which is located to the south of the scheme and whose flows are subject to tidal influences, and the River Hull, located to the east of the scheme. The River Hull flows in a southerly direction before converging with the Humber, however, the stretch adjacent to the proposed scheme is also subject to tidal flows.

2.8.10.5. There are no surface abstractions within 1km of the proposed scheme.
River Quality and Fisheries

2.8.10.6. Details of the Water Quality of the River Humber and associated tributaries, as provided by the EA, are summarised in Table 2.8.10.1 below:

**TABLE 2.8.10.1 – RIVER WATER QUALITY WITHIN THE STUDY AREA**

<table>
<thead>
<tr>
<th>Location</th>
<th>General Quality Assessment</th>
<th>Classification of Estuaries Working Party</th>
<th>River Quality Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>River Humber</td>
<td>-</td>
<td>Grade A</td>
<td>RE1</td>
</tr>
<tr>
<td>River Hull</td>
<td>Grade B</td>
<td>-</td>
<td>RE2</td>
</tr>
</tbody>
</table>

2.8.10.7. Data obtained from the EA indicated that there are no fisheries within close proximity to the proposed improvement scheme.

Flooding

2.8.10.8. The site is protected from flooding by the existing River Hull and River Humber flood defences. These protect the City of Hull from flood events arising once in 100 and once in 200 years respectively.

2.8.10.9. The whole site is within the indicative 1 in 100 year flood plain (in the theoretical absence of the existing flood defences), and the eastern half of the site is within the area that was flooded during the 1969 flood event that occurred before the installation of the tidal surge barrier on the River Hull. Surface water flooding during the 2007 floods has been identified in the vicinity of the site.

2.8.10.10. A FRA (PF, 2009e) has been produced for the scheme. Full details of the flooding risk of the site can be found in this report. A summary of the baseline conditions in the vicinity of the site is given in Section 3.10.9 Water Environment of the EAR (PF, 2009g). This FRA report concluded the following:

- Planning Policy Statement (PPS) 25 (CLG, 2006) sets out Government policy on development and flood risk. Its aims are to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas of highest risk. Where new development is, exceptionally, necessary in such areas, policy aims to make it safe, without
increasing flood risk elsewhere, and, where possible, reducing flood risk overall. PPS25 (CLG, 2006) indicates that the site is located within Flood Zone 3a and has a high probability of flooding. PPS25 (CLG, 2006) advice indicates that these areas may be suitable for essential infrastructure such as that which is proposed provided the Exception Test is passed and the FRA justifies that the risk of flooding to the site is sufficiently low. The FRA confirms that the scheme proposals pass the Exception test and full details are provided in the FRA report. The site is protected by flood defences serving the City of Hull. It is highly unlikely that these would be abandoned, and therefore it can be considered that the site would be protected for its lifetime.

- Should a road cutting be included in the final scheme, it will be possible to pump surface water which enters the cutting directly to the Humber Estuary.
- It is recommended that the scheme’s highway drainage system is designed to current standards.
- Emergency traffic diversion and evacuation procedures will be developed as the part of the detailed design of the scheme. This will help to ensure that the detailed development of the scheme is undertaken with the potential risks of flooding taken into account.

### Environmentally Sensitive Areas

2.8.10.11. The study area is not situated within a Groundwater Source Protected Zone and is, therefore, not considered to be of high sensitivity with respect to groundwater.

2.8.10.12. There are three active groundwater abstractions within 1km of the site, none of which are located within the study area. Details of the abstractions are given in the EAR (PF, 2009g).

2.8.10.13. The scheme is not located within any statutory designated areas, however several designations exist on the Humber Estuary and lower reaches of the River Hull into which the A63 drains. These are detailed in Table 2.8.10.2 overleaf.
### TABLE 2.8.10.2: DETAILS THE DESIGNATIONS THAT HAVE BEEN PLACED ON THE HUMBER ESTUARY

<table>
<thead>
<tr>
<th>Designation</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ramsar Site</td>
<td>The Estuary has been designated as a Wetland of International Importance</td>
</tr>
<tr>
<td>SPA</td>
<td>The Estuary has been designated because of its importance to the bird populations which it supports.</td>
</tr>
<tr>
<td>SAC</td>
<td>The Estuary has been designated as an SAC because of its tidal rivers, mud flats, sand flats, lagoons (including saltwork basins), salt marshes, salt pastures, salt steppes, coastal sand dunes, sand beaches, machair, bogs, marshes, water fringed vegetation and fens.</td>
</tr>
<tr>
<td>SSSI</td>
<td>The Humber Estuary is of national importance with a series of nationally important habitats and features of national geological importance.</td>
</tr>
</tbody>
</table>

2.8.10.14. A detailed assessment of the sensitive land uses is given in the EAR (PF, 2009g, Section 7).
3. PLANNING FACTORS

3.1. OPTION CONSTRAINTS

3.1.1. Constraints impacting on the scheme options are:

- The scheme will require the approval from Yorkshire and Humberside Regional Transport Board;
- Castle Street lies within an Air Quality Management Area in Hull and, as such, has more stringent requirements with regards to Air Quality Assessments;
- There is extensive known archaeology along the route of Castle Street which will require extensive advance works to record significant features that will be lost upon completion of the scheme;
- Current advice from HA Network Operations is that two lane running in each direction on Castle Street will be required throughout the construction period;
- All the scheme options are to be online improvements;
- The limit of the scheme options extends only from Porter Street to Myton Swing Bridge;
- Provision needs to be made for local access roads which open on to the A63;
- Demolition of Grade II listed Earl de Gray Public House and Castle Buildings will be required; and
- The avoidance of damage to the upper part of the Grade II listed Humber Dock Wall.

3.2. SCHEME OPTIONS CONSIDERED

3.2.1. At the Options Identification stage, six scheme options were identified and assessed. The results of this assessment were reported in a TAR (PF, 2008a).

3.2.2. The assessment concluded that, based on healthy BCR scores and relatively low impact on the environmental sub-objectives, two of the six options were considered to provide sustainable solutions, which represent good value for money, are affordable, and have the least overall impact on the environment. It
was recommended that the two sustainable options be taken forward for Public Consultation.

3.2.3. The two preferred options were taken forward to Public Consultation. The four non-preferred options were also presented for comparison.

3.2.4. The two preferred options comprised:

- A63 in cutting at Mytongate Junction (the ‘Underground Option’)
- A63 on flyover at Mytongate Junction (the ‘Overground Option’)

3.2.5. The remaining four non-preferred options comprised:

- An Underground Landbridge option;
- An Overground Landbridge Equivalent option;
- An Underground Cut and Cover Tunnel; and
- An Overground Extended Viaduct.

3.2.6. Descriptions of the preferred and non-preferred options presented for Public Consultation are given in Sections 3.3 and 3.4 respectively. An overview of each of the options is presented in Figures 1a to 1b and 2a to 2d respectively in Appendix A. Scheme engineering drawings for the preferred and non-preferred options are given in Appendix A.

3.3. PREFERRED OPTIONS

Underground Option
3.3.1. This option would lower the level of the existing A63 in the vicinity of Mytongate Junction (Ferensway/Commercial Road) by approximately 7m with Ferensway and Commercial Road being raised by approximately 1m and passing over the A63 on a new bridge.

3.3.2. Between Mytongate Junction and Market Place, the eastbound carriageway would be widened to three lanes, with the nearside lane being marked for local traffic only and which, for safety reasons, would be physically segregated from the main eastbound carriageway from Mytongate Junction as far as Prince’s Dock Street. Vehicles wishing to access Myton Street and Prince’s Dock Street from the A63 would do so via the eastbound exit and entry slip-roads. The westbound carriageway would have two lanes, as at present.

3.3.3. The realigned A63 and the westbound exit slip road to Commercial Road would pass through the northern part of the Trinity Burial Ground.

3.3.4. East of Mytongate Junction the A63 would tie back into existing ground level where a pedestrian footbridge would be provided in front of Princes Quay Shopping Centre and the Humber Dock Marina. This bridge would be approximately 7m above existing road level and would allow pedestrians to cross above Castle Street, eliminating the current pedestrian/vehicle conflict caused by the existing signalised crossing.

3.3.5. Currently the junction at Market Place is signal controlled and, as part of previous improvement works, the gap in the central reserve is closed. As part of the Castle Street Improvement scheme it is proposed to remove the existing signalised pedestrian crossings at Market Place and replace them with a new pedestrian footbridge, thereby removing the pedestrian/vehicle conflict at this location. Vehicle movements would be restricted to left in/left out as at present.

3.3.6. In order to construct the eastbound entry slip road, nearside eastbound local traffic lane and improved A63, two Grade II listed properties would require demolition; the Castle Buildings and the former Earl de Grey Public House.

3.3.7. It would be necessary to close the accesses from the A63 to the Holiday Inn Hotel, Spruce Road and Waverley Street, on safety grounds. Alternative access would be provided for the hotel from Commercial Road and access to Spruce Road/Waverley Street is currently proposed via a new road off St James Square/St James Street.
3.3.8. In addition to the pedestrian footbridges opposite Princes Quay and at Market Place, to further improve pedestrian facilities, a footbridge would also be provided near Porter Street, to replace the current signalised pedestrian crossing facility at this location. Pedestrian footways would also be provided along the length of scheme with a replacement cycleway to the north of the A63.

**Overground Option**

![Overground Option Image]

3.3.9. This option would raise the level of the existing A63 in the vicinity of Mytongate Junction (Ferensway/Commercial Road) by approximately 8m with Ferensway and Commercial Road being lowered by around 1m and passing beneath the A63 bridge.

3.3.10. Between Mytongate Junction and Market Place, the eastbound carriageway would be widened to three lanes, with the nearside lane being marked for local traffic only and which, for safety reasons, would be physically segregated from the main eastbound carriageway from Mytongate Junction as far as Prince’s Dock Street. Vehicles wishing to access Myton Street and Prince’s Dock Street from the A63 would do so via the eastbound exit and entry slip-roads. The westbound carriageway would have two lanes, as at present.

3.3.11. The realigned A63 and the westbound exit slip road to Commercial Road would pass over/through the northern part of the Trinity Burial Ground.

3.3.12. East of Mytongate Junction the A63 would tie back into existing ground level where a pedestrian footbridge would be provided in front of Princes Quay Shopping Centre and the Humber Dock Marina. This bridge would be
approximately 7m above existing road level and would allow pedestrians to cross above Castle Street, eliminating the current pedestrian/vehicle conflict caused by the existing signalised crossing.

3.3.13. Currently the junction at Market Place is signal controlled and, as part of previous improvement works, the gap in the central reserve is closed. As part of the Castle Street Improvement scheme it is proposed to remove the existing signalised pedestrian crossings at Market Place and replace them with a new pedestrian footbridge, thereby removing the pedestrian/vehicle conflict at this location. Vehicle movements would be restricted to left in/left out as at present.

3.3.14. In order to construct the eastbound entry slip road, nearside eastbound local traffic lane and improved A63, two Grade II listed properties would require demolition; the Castle Buildings and the former Earl de Grey Public House.

3.3.15. It would be necessary to close the accesses from the A63 to the Holiday Inn Hotel, Spruce Road and Waverley Street on safety ground. Alternative access would be provided for the Hotel from Commercial Road and access to Spruce Road/Waverley Street is currently proposed via a new road off St James Square/St James Street.

3.3.16. In addition to the pedestrian footbridges opposite Princes Quay and at Market Place, to further improve pedestrian facilities, a footbridge would also be provided near Porter Street, to replace the current signalised pedestrian crossing facility at this location. Pedestrian footways would also be provided along the length of scheme with a replacement cycleway to the north of the A63.

3.4. NON-PREFERRED OPTIONS

Underground Landbridge Option
3.4.1. As with the preferred Underground Option this option would consist of lowering the A63 in the vicinity of Mytongate junction to pass below Ferensway and Commercial Road. East of Mytongate junction the A63 would remain in cutting passing beneath a 25m wide pedestrian landbridge in front of Princes Quay Shopping Centre. The landbridge would be approximately 2.5m above adjacent ground level.

3.4.2. Between Mytongate Junction and Market Place, the eastbound carriageway would be widened to three lanes with the nearside lane marked for local traffic only. The westbound carriageway would have two lanes, as at present.

3.4.3. Pedestrian footbridges over the A63 would replace the current signalised pedestrian crossing facilities at Porter Street and Market Place. There would be no direct access from the A63 to the Holiday Inn Hotel, Spruce Road or Waverley Street. Alternative means of access would be provided.

Cut and Cover Tunnel

3.4.4. As with the preferred Underground Option this option would consist of lowering the A63 in the vicinity of Mytongate junction to pass below Ferensway and Commercial Road. East of Mytongate Junction the A63 would continue at a low level before entering a tunnel between Myton Street and Finkle Street, and then rising to tie into existing levels just west of Myton Swing Bridge.

3.4.5. Within the tunnel the A63 would be a dual carriageway. Above the tunnel a single carriageway Local Access Road would be constructed between Ferensway and Market Place, and would link with the local roads that presently connect to the A63. The Market Place Junction with the A63 would be closed.
with the exceptions of the eastbound entry onto the A63 and the westbound exit onto Queen Street.

3.4.6. A pedestrian footbridge would be provided over the A63 at Porter Street. There would be no direct access from the A63 to Spruce Road or Waverley Street. Alternative means of access would be provided.

Overground Landbridge Equivalent

3.4.7. As with the preferred Overground Option this option would consist of raising the level of the existing A63 in the vicinity of Mytongate Junction to pass over Ferensway and Commercial Road. East of Mytongate Junction the A63 would remain on flyover passing over a 25m wide pedestrian walkway in front of Princes Quay Shopping Centre. The walkway would be approximately 1.5m below adjacent ground level.

3.4.8. Between Mytongate Junction and Market Place, the eastbound carriageway would be widened to three lanes with the nearside lane marked for local traffic only. The westbound carriageway would have two lanes, as at present.

3.4.9. Pedestrian footbridges over the A63 would replace the current signalised pedestrian crossing facilities at Porter Street and Market Place. There would be no direct access from the A63 to the Holiday Inn Hotel, Spruce Road or Waverley Street. Alternative means of access would be provided.
Overground Extended Viaduct

3.4.10. As with the preferred Overground Option this option would consist of raising the level of the existing A63 in the vicinity of Mytongate Junction to pass over Ferensway and Commercial Road. East of Mytongate Junction the A63 would continue on a viaduct, tying into existing levels just west of Myton Swing Bridge.

3.4.11. On the viaduct the A63 would remain as a dual carriageway. Below the viaduct a single carriageway Local Access Road would be constructed between Ferensway and Market Place and would link with the local roads that presently connect to the A63. The Market Place Junction with the A63 would be closed with the exceptions of the eastbound entry onto the A63 and the westbound exit onto Queen Street.

3.4.12. A pedestrian footbridge over the A63 would be provided at Porter Street. There would be no direct access from the A63 to Spruce Road or Waverley Street. Alternative means of access would be provided.
4. CONSEQUENCES OF THE “DO-NOTHING” SCENARIO

4.1. REQUIREMENT FOR THE SCHEME

4.1.1. The A63 is a key route of both local and strategic importance and is part of the E20 Trans European Route shown in Figure 5.1. It is a vital link between the M62 motorway, Humber Bridge and A15, as well as Hull and the docks to the east of the city.

**FIGURE 5.1 – E20 TRANS EUROPEAN ROUTE**

4.1.2. The current daily traffic flow on the Castle Street section of the A63 is very high (in the region of 55,000 to 59,000 AADT), with traffic flows in excess of those on the M62 motorway through Humberside. This level of flow is forecast to increase over the next twenty years, with predicted flows of around 100,000 AADT by the design year of 2032.

4.1.3. The location of the ports to the east of the city centre, results in substantial levels of HGV traffic passing along Castle Street in order to access these areas. This predominantly long distance traffic therefore interacts with local city centre movements along the Castle Street section of the A63.

4.1.4. Such large volumes of traffic, including both local and strategic traffic, combined with Myton Swing Bridge and a significant proportion of HGVs, results in a
bottleneck forming at the Castle Street section of the A63 and at the Mytongate and Market Place/Queen Street junctions at either end.

4.1.5. The completion of the Hedon Road dualling scheme and opening of a grade separated interchange at Melton, means that the Castle Street section of the A63 is the last remaining major bottleneck along this corridor.

4.1.6. The Hedon Road improvement scheme was carried out by the Highways Agency between spring 2001 and autumn 2003.

4.1.7. The 2001-2006 Local Transport Plan (LTP) Delivery Report suggested that the Hedon Road improvement scheme has significantly benefited the Port of Hull since its completion. “All of these measures but especially the Hedon Road Improvement Scheme have helped the port to record growth in the last two years with total tons handled up from 10.5 million in 2003 to 13.4 million tons in 2005 with projections for the rate of increase to continue for the next few years as further transport capacity is released”.

4.2. IMPORTANCE OF INTERNATIONAL GATEWAYS – PORT OF HULL

4.2.1. The Port of Hull has a very strong influence on transport within the study area. It is the largest generator of freight traffic in the study area. Annually, more than 12 million tonnes of freight, which represents 15% of all UK port traffic, passes through the Port to or from overseas destinations. In addition, over 1 million passengers travel to or from the port annually.

4.2.2. The vast majority of freight is distributed by the road network, the only exceptions being relatively small volumes of bulk materials movements which use rail or inland waterway. In total, around 65% of the freight which comes into the port and is brought inland by road has a destination within the Yorkshire and Humber Region. The only other destination which accounts for more than 10% is the North West. Of this road traffic some 82% utilises the A63 to travel to its destination, with the remaining 18% heading north via the A1079 (Ferensway).

4.2.3. The Eddington Study (Eddington, 2006) examined the links between transport and the UK’s economic productivity, growth and stability and reported on the importance of International Gateways, of which the Port of Hull is one, and the inter-urban road network between them. The study outlined that access to the
Port of Hull from the strategic road network was via local/urban roads leading to congestion, pollution and noise for local residents.

4.3. LOCAL POLICIES

City Masterplan

4.3.1. The City Centre Masterplan, entitled “The Renaissance of Hull City Centre - A Masterplan to Guide Planning and Investment” was produced on behalf of Citybuild by Roger Tym and Partners in late 2003.

4.3.2. The plan sets out seven strategic objectives:

- Create a unified and compact City Centre
- Re-unite the City Centre with its River Humber waterfront
- Create a concentration of prime offices
- Provide for a sustainable City Centre population
- Create a strong retail circuit and provide for the fourth retail anchor needed to achieve it
- Create a lively River Hull corridor within the compact City Centre
- Bold gestures – in new architecture and public realm, art and facilities – to lift the heart, transform the image and rejuvenate the economy

4.3.3. In delivering these objectives the Masterplan identifies 5 SDAs for regeneration within the city centre area:

- Albion Square
- Quay West
- Humber Quays
- Fruit Market
- East Bank

City Centre Area Action Plan

4.3.4. In 2005 HCC produced a series of documents reviewing its own planning policies, in support of the City Centre Masterplan. These were produced under
the heading “City Centre - Area Action Plan” (AAP) and make up the spatial planning strategy for Hull.

4.3.5. The AAP highlighted the need for improvements to Castle Street both in the short term and long term in order to facilitate the regeneration of the city centre:

4.3.6. The AAP therefore suggests that without improvements to Castle Street the city centre will not be able to regenerate to its full potential.

**Local Transport Plan**

4.3.7. The Local Transport Plan (LTP) sets out the Council’s transportation objectives, policies and proposed transport strategy in the coming years. The current LTP2 for the period 2006 to 2011, prepared by HCC recognises that improvements to Castle Street are vitally important to the future economic growth of Hull.

**4.4. ECONOMIC IMPACT REPORT**

4.4.1. An Economic Impact Report (EIR) (PF, 2008c) was prepared in 2008 to support the Public Consultation and to expand on the appraisal of the A63 Improvements carried out for HUMMS, which did not fully consider the wider economic benefits of the scheme. In this PCF stage the report was updated in order to take into account changes since the public consultation in 2009 and in particular to account for changes to the assessment following the development of a new transport network model. Full details of economic impacts can be found in the 2009 EIR (PF, 2009d) and a summary of its findings are given below.

4.4.2. The EIR considered the wider economic benefits from improvements to A63 Castle Street on Hull. This includes an assessment of the change in accessibility and potential job creation resulting from the improvement scheme. In addition to the potential economic benefits identified in current EIR guidance, the report also considered the effect of reduced severance in stimulating redevelopment, created by the proposed scheme.

4.4.3. In terms of local and regional economic and regeneration policy, the proposed A63 improvements meet the objectives and aims of a number of key stakeholders. These include the City Council, the Regional Development Agency (Yorkshire Forward) and the city’s urban regeneration company Hull
Forward. It is clear that at policy level there is major support and need for the proposed scheme.

4.4.4. In new employment terms it is estimated that both the preferred Scheme Options will generate between 323 and 571 jobs within the City. Based on a job value of £27,000, this equates to benefits ranging from £8,715,600 to £15,420,375.

4.4.5. These forecast employment levels are considered a robust and conservative estimate of future employment generation related to the scheme. It is acknowledged that there is significant weight behind the urban regeneration of Hull and particularly the development of the City centre, to address the poor economic performance of the city in relation to the rest of the UK. This overall regeneration process may generate significant greater levels of employment throughout the study area (estimated at between approximately 20,000 and 40,000 jobs in HUMMS); however, and whilst the A63 improvements clearly benefits and aids this process, most of this employment cannot be related solely to the A63 scheme. The wider benefits in terms of the “knock on” effect and acting as a driver of investment may, therefore, be substantially greater and, whilst far more difficult to quantify, should not be overlooked or underestimated.

4.4.6. The employment forecasts presented are based on the future development sites which will be released by the scheme, notably those around the waterfront area for which the reduced severance and congestion will greatly increase attractiveness and aid development. Based on the results of the business surveys the scheme will also greatly assist existing business, primarily by reducing costs and thus encouraging investment, which should add greater weight and certainty to the regeneration process and forecasts.

4.4.7. The City’s current poor economic performance and existing economic problems suggest that the regeneration process is not only clearly needed but also more likely to be successful and sustainable if the proposals are implemented.

4.4.8. The business surveys and stakeholder meetings undertaken demonstrate a clear support and demand for the A63 scheme. The majority of businesses surveyed considered that the scheme would benefit their operations and encourage investment.
4.5. SUMMARY OF CONSEQUENCES

4.5.1. The proposed Castle Street improvements are located within the heart of the City and this section of the transport network has a very close relationship with the operation of the city and its future expansion and development.

4.5.2. Castle Street is at or near capacity along most of its length. The current daily traffic flow on the Castle Street section of the A63 is very high (in the region of 55,000 to 59,000 AADT) and the level of flow is forecast to increase to around 100,000 AADT by the proposed scheme’s design year of 2032.

4.5.3. The level of traffic on the A63 Castle Street results in significant congestion at the large signalised Mytongate junction resulting in poor journey time reliability. This is a constraint to development within the city of Hull and to attracting business to and the development of the Port of Hull.

4.5.4. The dilemma is that the city centre urgently needs to regenerate and that in doing so will unavoidably create more traffic than the existing junctions can handle. Failure to develop the scheme would therefore have a significant knock-on effect on the economic development of the city of Hull.
5. SUMMARY OF ALTERNATIVE SCHEMES

5.1. INTRODUCTION

5.1.1. Six scheme options were considered at the Options Identification Stage. Two were taken forward to Public Consultation as preferred options and four were assessed to be non-preferred. The decision was based on economic, affordability, value for money, engineering and environmental grounds. A summary of the outcome of the Technical appraisal Process is outlined below.

5.1.2. Descriptions of the Preferred and Non-Preferred Options are given in Sections 3.3 and 3.4 of this report.

5.2. UNDERGROUND OPTION - PREFERRED

Economic Assessment

5.2.1. The Table 5.2.1 represents the current range estimate (November 2009) and BCR for the Underground Option as of PCF Options Selection Stage.

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Range MIN (£m)</th>
<th>Central Estimate (£m)</th>
<th>Range MAX (£m)</th>
<th>BCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underground Option</td>
<td>129</td>
<td>161</td>
<td>192</td>
<td>3.6</td>
</tr>
</tbody>
</table>

Engineering Constraints

5.2.2. Due to the nature of the works disruption will be caused to the local road systems. No direct access from the A63 would be provided to the following:

- Waverley Street;
- Spruce Road; and
- Access to the Holiday Inn Hotel off A63 Castle Street.

5.2.3. Input from an experienced highway construction contractor has been obtained in order to fully understand the key construction effects of each scheme option. The contractor estimated that construction of the Underground option would take 2 years and 3 months excluding pre construction works.
5.2.4. As with the preferred Underground Option, pre-construction works would most likely include archaeological investigations, see EAR Section 5 (PF 2009g) for relevant works and programme periods; clearance of the Trinity Burial Ground; diversion of utility services and demolition of property (see below). Pre-construction works could take up to 8 months to complete.

5.2.5. Demolition of property would be required for this scheme option, as follows:

- Castle Chambers;
- Earl de Grey Public House

5.2.6. A new retaining wall to the northern perimeter of Humber Dock would be needed. At this stage it is assumed that the existing dock wall, also a Grade II Listed Building, would be retained in situ beneath the proposed construction profile.

5.2.7. This option would require extensive excavation to re-locate the A63 at a lower level than at present together with the construction of a new, large overbridge at the Mytongate junction to carry Ferensway over the A63.

5.2.8. Further earthworks would be required to accommodate new slip roads, both east and westbound, connecting the elevated Ferensway to the A63.

5.2.9. New footbridges would be provided at Porter Street and adjacent to Market Place. Additionally, a larger structure, the pedestrian ‘landbridge’, would be constructed immediately west of the ‘Ask’ building; a Grade II Listed Building.

5.2.10. Temporary carriageways would be constructed to maintain two lanes of traffic each way throughout the construction period. Traffic management measures required for this option are given in Table 5.2.2 below.

<table>
<thead>
<tr>
<th>ROAD NAME</th>
<th>TRAFFIC MANAGEMENT</th>
<th>TIME PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>A63 Eastbound</td>
<td>Routeing of traffic from mainline and use of slip roads to Mytongate junction to provide access through works. Increased journey time resulting.</td>
<td>71 weeks</td>
</tr>
<tr>
<td>A63 Westbound</td>
<td>Routeing of traffic from mainline and use of slip roads to Mytongate junction to provide access through works. Increased journey time resulting.</td>
<td>71 weeks</td>
</tr>
<tr>
<td>ROAD NAME</td>
<td>TRAFFIC MANAGEMENT</td>
<td>TIME PERIOD</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Holiday Inn access</td>
<td>To be closed. Alternative access to be constructed prior to closure. Turning on to A63 in narrow lanes considered unsafe and increase congestion.</td>
<td>6 weeks</td>
</tr>
<tr>
<td>Access from city centre to eastbound A63</td>
<td>To be closed at junction. Traffic diverted via Carr Lane and Drypool Bridge.</td>
<td>8 weeks</td>
</tr>
<tr>
<td>Access from A63/Local Access Road to Myton Street and Waterhouse Lane</td>
<td>Closed at junction.</td>
<td>13 weeks</td>
</tr>
</tbody>
</table>

5.2.11. An assessment of construction issues are given in the Construction Feasibility Report (Carillion, 2008).

5.2.12. For this option the number of potential site compounds required would be six.

5.2.13. An estimation of the likely excavated volume and identified importation material volume is given below. The latter would include materials for earthworks, aggregates, concrete and surfacing materials.

- Total Excavation 70,000m³
- Import 45,000m³

5.2.14. The contractor has ranked this scheme third in respect of ‘buildability’.

Environmental Constraints

5.2.15. The Underground Landbridge option would have the following key environmental disbenefits.

- Large adverse heritage impact;
- Demolition of property for temporary construction requirements; and

Scheme Brief

5.2.16. The grade separation of the Mytongate junction and the provision of the eastbound third lane for local traffic between Mytongate junction and Market Place would enable this option to meet the first three scheme objectives of reducing congestion, reducing journey times to the port and increasing safety.
5.2.17. This option would reduce severance by introducing free flow pedestrian movements via new footbridges at Porter Street, adjacent to Prices Quay Shopping Centre and Market Place junction.

5.3. **OVERGROUND OPTION - PREFERRED**

**Economic Assessment**

5.3.1. The Table 5.3.1 represents the current range estimate (November 2009) and BCR for the Overground Landbridge as of PCF Options Selection Stage

**TABLE 5.3.1: RANGE FORECAST ESTIMATES AND BCR (November 2009)**

<table>
<thead>
<tr>
<th></th>
<th>Range MIN (£m)</th>
<th>Central Estimate (£m)</th>
<th>Range MAX (£m)</th>
<th>BCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overground Option</td>
<td>140</td>
<td>166</td>
<td>193</td>
<td>3.5</td>
</tr>
</tbody>
</table>

**Engineering Constraints**

5.3.2. Due to the nature of the works disruption will be caused to the local road systems. As with the two Underground Option no direct access from the A63 would be provided to the following:

- Waverley Street;
- Spruce Road; and
- The Holiday Inn Hotel.

5.3.3. The following properties would need to be demolished for this option:

- Castle Chambers;
- Earl de Grey Public House.

5.3.4. Input from an experienced highways contractor has been obtained in order to fully understand the key construction effects of each scheme option. The Overground option would require a construction period of 1 years 10 months weeks with archaeological pre-construction works in the region of 8 months.

5.3.5. A new retaining wall to the northern perimeter of Humber Dock would be required. At this stage it is assumed that the existing dock wall, also a Grade II
Listed Building, would be retained in situ beneath the proposed construction profile.

5.3.6. This option would raise the level of the existing A63 in the vicinity of Mytongate Junction (Ferensway/Commercial Road) by approximately 8m on a multi span structure of approximately 350m in length with Ferensway and Commercial Road being lowered by around 1m and passing beneath the A63.

5.3.7. New slip roads, both east and westbound, would connect Ferensway/Commercial Road to the A63.

5.3.8. New pedestrian footbridges would be provided at Porter Street, adjacent to Prices Quay Shopping Centre and at Market Place Junction.

5.3.9. Temporary carriageways would be constructed to maintain two lanes of traffic each way throughout the majority of the construction period. Traffic management measures required to construct this scheme option are given in Table 5.3.2 below.

<table>
<thead>
<tr>
<th>ROAD NAME</th>
<th>TRAFFIC MANAGEMENT</th>
<th>TIME PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>A63 Eastbound</td>
<td>Routeing of traffic from mainline and use of slip roads to Mytongate junction to provide access through works. Increased journey time resulting.</td>
<td>47 weeks</td>
</tr>
<tr>
<td>A63 Westbound</td>
<td>Routeing of traffic from mainline and use of slip roads to Mytongate junction to provide access through works. Increased journey time resulting.</td>
<td>38 weeks</td>
</tr>
<tr>
<td>Holiday Inn access</td>
<td>To be closed. Alternative access to be constructed prior to closure. Turning on to A63 in narrow lanes considered unsafe and increase congestion.</td>
<td>6 weeks</td>
</tr>
<tr>
<td>Access from city to eastbound A63</td>
<td>To be closed at junction. Traffic diverted via Carr Lane and Drypool Bridge.</td>
<td>13 weeks</td>
</tr>
<tr>
<td>Access from A63/Local Access Road to Myton Street and Waterhouse Lane</td>
<td>Closed at junction.</td>
<td>13 weeks</td>
</tr>
</tbody>
</table>

5.3.10. An assessment of construction issues are given in the Construction Feasibility Report (Carillion, 2008)
5.3.11. For this option the number of potential site compounds required would be six.

5.3.12. An estimation of the likely excavated volume and identified importation material volume is given below. The latter would include materials for earthworks, aggregates, concrete and surfacing materials.

- Total Excavation 20,000m³
- Import 25,000m³

5.3.13. The contractor has ranked this scheme first in respect of ‘buildability’ i.e. the least complex to construct.

Environmental Constraints

5.3.14. The Overground option would have the following environmental disbenefits.

- Very large adverse heritage impact;
- Demolition of property for temporary construction requirements; and

Scheme Brief

5.3.15. As with the Underground option, the grade separation of the Mytongate Junction and the provision of a dedicated lane, for local traffic movements between Mytongate Junction and Market Place would enable this option to meet the three scheme objectives of reducing congestion, reducing journey times to the port and increasing safety.

5.3.16. This option would reduce severance by introducing free flow pedestrian movements via new footbridges at Porter Street, adjacent to Prices Quay Shopping Centre and Market Place junction.

5.4. UNDERGROUND LANDBRIDGE - NON PREFERRED

Economic Assessment

5.4.1. The Table 5.4.1 represents the current range estimate (November 2009) and BCR for the Underground Landbridge as of PCF Options Selection Stage.
### TABLE 5.4.1: RANGE FORECAST ESTIMATES AND BCR (NOVEMBER 2009)

<table>
<thead>
<tr>
<th></th>
<th>Range MIN (£m)</th>
<th>Central Estimate (£m)</th>
<th>Range MAX (£m)</th>
<th>BCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underground Landbridge</td>
<td>234</td>
<td>283</td>
<td>332</td>
<td>2.1</td>
</tr>
</tbody>
</table>

**Engineering Constraints**

5.4.1.1. Due to the nature of the works disruption will be caused to the local road systems. As with the two preferred options no direct access from the A63 would be provided to the following:

- Waverley Street;
- Spruce Road; and
- Access to the Holiday Inn Hotel off A63 Castle Street.

5.4.2. Input from an experienced highway construction contractor has been obtained in order to fully understand the key construction effects of each scheme option. The contractor estimated that construction of the Underground Landbridge option would take 3 years and 2 months, excluding any necessary pre-construction works.

5.4.3. As with the preferred Underground Option, pre-construction works would most likely include archaeological investigations, see EAR Section 5 (PF 2009g) for relevant works and programme periods; clearance of the Trinity Burial Ground; diversion of utility services and demolition of property (see below). Pre-construction works could take up to 1 year 2 months to complete.

5.4.4. Additionally, given the greater eastward extent of the main cutting with this option, two ‘balancing’ pipes between Humber Dock and Princes Quay would need to be located and possibly diverted in preparation for the subsequent highway construction.

5.4.5. Extensive demolition of property would be required for this scheme option, as follows:

- Castle Chambers;
- Earl de Grey Public House
• Marina Court offices; and
• A selection of bedrooms and the swimming pool at the Holiday Inn Hotel.

5.4.6. A new retaining wall to the northern perimeter of Humber Dock would still be needed. At this stage it is assumed that the existing dock wall, also a Grade II Listed Building, would be retained in situ beneath the proposed construction profile.

5.4.7. The Underground Landbridge option would require extensive excavation to relocate the A63 at a lower level than at present together with the construction of a new, large overbridge at the Mytongate junction to carry Ferensway over the A63.

5.4.8. Further earthworks would be required to accommodate new slip roads, both east and westbound, connecting the elevated Ferensway to the A63.

5.4.9. New footbridges would be provided at Porter Street and adjacent to Market Place. Additionally, a larger structure, the pedestrian ‘landbridge’, would be constructed immediately west of the ‘Ask’ building; a Grade II Listed Building.

5.4.10. Temporary carriageways would be constructed to maintain two lanes of traffic each way throughout the construction period. Traffic management measures required for this option are given in Table 5.4.2 below.

<table>
<thead>
<tr>
<th>TABLE 5.4.2</th>
<th>TRAFFIC MANAGEMENT IMPLICATIONS OF THE UNDERGROUND LANDBRIDGE OPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROAD NAME</td>
<td>TRAFFIC MANAGEMENT</td>
</tr>
<tr>
<td>A63 Eastbound</td>
<td>Routeing of traffic from mainline and use of slip roads to Mytongate junction to provide access through works. Increased journey time resulting.</td>
</tr>
<tr>
<td>A63 Westbound</td>
<td>Routeing of traffic from mainline and use of slip roads to Mytongate junction to provide access through works. Increased journey time resulting.</td>
</tr>
<tr>
<td>Humber Dock Street at junction with A63</td>
<td>To be closed. Access to A63/north of city via High Street. Turning on to A63 in narrow lanes considered unsafe and increase congestion.</td>
</tr>
<tr>
<td>Holiday Inn access</td>
<td>To be closed. Alternative access to be constructed prior to closure. Turning on to A63 in narrow lanes considered unsafe and increase congestion.</td>
</tr>
</tbody>
</table>
5.4.11. An assessment of construction issues are given in the Construction Feasibility Report (Carillion, 2008).

5.4.12. For this option the number of potential site compounds required would be eight.

5.4.13. An estimation of the likely excavated volume and identified importation material volume is given below. The latter would include materials for earthworks, aggregates, concrete and surfacing materials.

- Total Excavation $100,000m^3$
- Import $45,000m^3$

5.4.14. The contractor has ranked this scheme fifth in respect of ‘buildability’ i.e. the second most difficult option.

Environmental Constraints

5.4.15. The Underground Landbridge option would have the following key environmental disbenefits.

- Large adverse heritage impact;
- Demolition of property for temporary construction requirements; and
- Large adverse visual and townscape impact.

Scheme Brief

5.4.16. As with two preferred options, the grade separation of the Mytongate junction and the provision of the eastbound third lane for local traffic between Mytongate junction and Market Place would enable this option to meet the first three
scheme objectives of reducing congestion, reducing journey times to the port and increasing safety.

5.4.17. This option would reduce severance more effectively than the two preferred options through the provision of a 25m wide landbridge in front of Princes Quay. However, the need to ensure vehicular access to Princes Dock Street, i.e. have the road back at ground level at this location, means that the landbridge would need to be approximately 3.5m above adjacent road level, resulting in the need for extensive access ramps on either side.

5.4.18. This option would go slightly further than the preferred options in connecting the city centre to the waterfront for pedestrians and cyclists.

5.5. **UNDERGROUND CUT AND COVER TUNNEL - NON PREFERRED**

**Economic Assessment**

5.5.1. The Table 5.5.1 represents the current range estimate (November 2009) and BCR for the Underground Cut and Cover Tunnel as of PCF Options Selection Stage.

### TABLE 5.5.1: RANGE FORECAST ESTIMATES AND BCR (NOVEMBER 2009)

<table>
<thead>
<tr>
<th></th>
<th>Range MIN (£m)</th>
<th>Central Estimate (£m)</th>
<th>Range MAX (£m)</th>
<th>BCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cut and Cover Tunnel</td>
<td>326</td>
<td>426</td>
<td>525</td>
<td>2.1*</td>
</tr>
</tbody>
</table>

*indicative BCR

**Engineering Constraints**

5.5.2. Due to the nature of the works disruption will be caused to the local road systems. As with the two preferred options no direct access from the A63 would be provided to the following:

- Waverley Street;
- Spruce Road; and
- The Holiday Inn Hotel.

5.5.3. The Cut and Cover Tunnel option would present the greatest engineering challenges and longest construction period of 4 years 3 months, excluding
pre-construction works. The pre-construction works for this option could include extensive archaeological investigations and take up to 1 year 8 months to complete.

5.5.4. Extensive demolition of property would be required for this scheme option, as follows:

- **Castle Chambers**;
- **Earl de Grey Public House**; and
- **Properties along the northern boundary of the A63 between Dagger Lane and Vicar Lane (approximately 21 no. buildings)**.

5.5.5. A new retaining wall to the northern perimeter of Humber Dock would be needed.

5.5.6. The Cut and Cover Tunnel option would require extensive excavation between Waterhouse Lane and Finkle Street. The tunnel would accommodate the A63 dual carriageway with a local service road, to permit local traffic movements running above it at ground level. To the west a new overbridge would still be constructed at Mytongate Junction to carry Ferensway/Commercial Road over the lowered A63.

5.5.7. Further earthworks would be required to accommodate new slip roads, both east and westbound, connecting the Ferensway/Commercial Road to the A63.

5.5.8. A new footbridge over the A63 would be provided at Porter Street.

5.5.9. Temporary carriageways would be constructed to maintain two lanes of traffic each way throughout the majority of the construction period, however there would be a period of approximately 13 weeks where two lane running could not be maintained. Extensive traffic management would be required, summarised in Table 5.5.2 below.

**TABLE 5.5.2 – TRAFFIC MANAGEMENT IMPLICATIONS OF THE CUT AND COVER OPTION**

<table>
<thead>
<tr>
<th>ROAD NAME</th>
<th>TRAFFIC MANAGEMENT</th>
<th>TIME PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>A63 Eastbound</td>
<td>Routeing of traffic from mainline and use of slip roads to Mytongate junction to provide access through works. Increased journey time resulting.</td>
<td>179 weeks</td>
</tr>
</tbody>
</table>
### ROAD NAME | TRAFFIC MANAGEMENT | TIME PERIOD
--- | --- | ---
A63 westbound tie-in at Myton Swing Bridge | Would be reduced to a single lane 24 hours each day. | 5 weeks
A63 eastbound tie in at Myton swing bridge | Would be reduced to a single lane 24 hours each day. | 8 weeks
A63 Westbound | Routeing of traffic from mainline and use of slip roads to Mytongate junction to provide access through works. Increased journey time resulting. | 82 weeks
Humber Dock Street at junction with A63 | To be closed. Access to A63/north of city via High Street. | 198 weeks
Holiday Inn access | To be closed. Alternative access to be constructed prior to closure. | 235 weeks
Access to/from A63 with Princes Dock Street, Dagger Lane, Fish Street, and Vicar Lane for construction of permanent/temporary roads | Closed at junctions | 34 weeks
Princes Dock Street, Dagger Lane and potentially Fish Street (safety reasons) during construction of north tunnel | Closed at junctions | 51 weeks
Access to city from eastbound A63 | To be closed at junction. Traffic diverted via Carr Lane and Drypool Bridge. | 17 weeks
Access from A63/Local Access Road to Myton Street and Waterhouse Lane | Closed at junction. | 27 weeks

5.5.10. An assessment of construction issues are given in the Construction Feasibility Report (Carillion, 2008).

5.5.11. For this option the number of potential site compounds required would be nine.

5.5.12. An estimation of the likely excavated volume and identified importation material volume is given below. The latter would include materials for earthworks, aggregates, concrete and surfacing materials.

- Total Excavation 225,000m³ (most extensive excavation)
- Import 45,000m³

5.5.13. The contractor has ranked this scheme sixth in respect of ‘buildability’ i.e. the most difficult.
Environmental Constraints

5.5.14. The Cut and Cover Tunnel option would have the following environmental disbenefits:

- Very large adverse heritage impact;
- Extensive demolition of property for temporary construction requirements; and
- Large adverse townscape impact.

Scheme Brief

5.5.15. As with the two preferred options, the grade separation of the Mytongate Junction and the provision of a dedicated local access road, for local traffic movements between Mytongate Junction and Market Place would enable this option to meet the three scheme objectives of reducing congestion, reducing journey times to the port and increasing safety.

5.5.16. The reduction in surface level traffic, due to the transfer of the A63 traffic into the tunnel, together with wider footways, would increase the amenity value of the Prince’s Dock area and would reduce community severance in this location.

5.5.17. The Cut and Cover Tunnel option along with the Extended Viaduct option provide the largest reduction in severance of all options considered.

5.6. OVERGROUND LANDBRIDGE - NON PREFERRED

Economic Assessment

5.6.1. The Table 5.6.1 represents the current range estimate (November 2009) and BCR for the Overground Landbridge as of PCF Options Selection Stage

<table>
<thead>
<tr>
<th></th>
<th>Range MIN (£m)</th>
<th>Central Estimate (£m)</th>
<th>Range MAX (£m)</th>
<th>BCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overground Landbridge</td>
<td>227</td>
<td>272</td>
<td>317</td>
<td>2.2</td>
</tr>
</tbody>
</table>
Engineering Constraints

5.6.2. Due to the nature of the works disruption will be caused to the local road systems. As with the two preferred options no direct access from the A63 would be provided to the following:

- Waverley Street;
- Spruce Road; and
- The Holiday Inn Hotel.

5.6.3. The following properties would need to be demolished for this option:

- Castle Chambers;
- Earl de Grey Public House; and
- A section of bedrooms and the swimming pool at the Holiday Inn.

5.6.4. Input from an experienced highways contractor has been obtained in order to fully understand the key construction effects of each scheme option. The Overground Landbridge option would require a construction period of 2 years 6 months weeks with archaeological pre-construction works in the region of 1 year 2 months.

5.6.5. A new retaining wall to the northern perimeter of Humber Dock would be required. At this stage it is assumed that the existing dock wall, also a Grade II Listed Building, would be retained in situ beneath the proposed construction profile.

5.6.6. The Overground Landbridge option would require extensive construction works given the greater scale of structures. The structure carrying the A63 over Ferensway/Commercial Road would extend further east to Princes Dock Street.

5.6.7. New slip roads, both east and westbound, would connect Ferensway/Commercial Road to the A63.

5.6.8. New pedestrian overbridges would be provided at Porter Street and adjacent to Market Place. Additionally, a larger structure, the pedestrian ‘landbridge’ would be constructed immediately adjacent to the Princes Quay multi-storey car park sitting beneath the mainline A63 but spanning over the slip roads.
5.6.9. Temporary carriageways would be constructed to maintain two lanes of traffic each way throughout the majority of the construction period. Traffic management measures required to construct this scheme option are given in Table 5.6.2 below.

**TABLE 5.6.2 TRAFFIC MANAGEMENT IMPLICATIONS OF THE OVERGROUND LANDBRIDGE OPTION**

<table>
<thead>
<tr>
<th>ROAD NAME</th>
<th>TRAFFIC MANAGEMENT</th>
<th>TIME PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>A63 Eastbound</td>
<td>Routeing of traffic from mainline and use of slip roads to Mytongate junction to provide access through works. Increased journey time resulting.</td>
<td>66 weeks</td>
</tr>
<tr>
<td>A63 Westbound</td>
<td>Routeing of traffic from mainline and use of slip roads to Mytongate junction to provide access through works. Increased journey time resulting.</td>
<td>66 weeks</td>
</tr>
<tr>
<td>Access from city to eastbound A63</td>
<td>To be closed at junction. Traffic diverted via Carr Lane and Drypool Bridge.</td>
<td>29 weeks</td>
</tr>
<tr>
<td>Access from A63/Local Access Road to Myton Street and Waterhouse Lane</td>
<td>Closed at junction.</td>
<td>14 weeks</td>
</tr>
</tbody>
</table>

5.6.10. An assessment of construction issues are given in the Construction Feasibility Report (Carillion, 2008)

5.6.11. For this option the number of potential site compounds required would be nine.

5.6.12. An estimation of the likely excavated volume and identified importation material volume is given below. The latter would include materials for earthworks, aggregates, concrete and surfacing materials.

- Total Excavation 20,000m³
- Import 25,000m³

5.6.13. The contractor has ranked this scheme second in respect of ‘buildability’ i.e. amongst the least complex to construct.

**Environmental Constraints**

5.6.14. The Overground Landbridge option would have the following environmental disbenefits.

- Large adverse heritage impact;
Demolition of property for temporary construction requirements; and

Very large adverse townscape and visual impact.

**Scheme Brief**

5.6.15. As with the two preferred options, the grade separation of the Mytongate Junction and the provision of a dedicated local access road, for local traffic movements between Mytongate Junction and Market Place would enable this option to meet the three scheme objectives of reducing congestion, reducing journey times to the port and increasing safety.

5.6.16. This option would reduce severance more effectively than the two preferred options through the provision of a 25m wide pedestrian concourse in front of Princes Quay. However, the need to ensure vehicular access to Princes Dock Street, i.e. have the road back at ground level at this location, means that the concourse (landbridge) would need to be approximately 1m below road level resulting in the need for extensive access ramps on either side.

5.7. **OVERGROUND EXTENDED VIADUCT - NON PREFERRED**

**Economic Assessment**

5.7.1. The Table 5.7.2 below represents the current range estimate (November 2009) and BCR for the Overground Extended Viaduct as of PCF Options Selection Stage

<table>
<thead>
<tr>
<th></th>
<th>Range MIN (£m)</th>
<th>Central Estimate (£m)</th>
<th>Range MAX (£m)</th>
<th>BCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extended Viaduct</td>
<td>312</td>
<td>376</td>
<td>440</td>
<td>2.0*</td>
</tr>
</tbody>
</table>

*Indicative BCR

**Engineering Constraints**

5.7.2. Due to the nature of the works disruption will be caused to the local road systems. As with the two preferred options no direct access from the A63 would be provided to the following:

- Waverley Street;
- Spruce Road; and
5.7.3. The Extended Viaduct option would involve a construction period of 3 years 9 months with archaeological pre-construction work of up to 1 year 8 months likely

5.7.4. Extensive demolition of property would be required for this option:

- Castle Chambers;
- Earl de Grey Public House;
- Residential properties extending from Dagger Lane to Vicar Lane, all to the north of the A63 (21no properties);
- Marina Court offices; and
- The bedroom annex/swimming pool at the Holiday Inn hotel.

5.7.5. A new retaining wall to the northern perimeter of Humber Dock would be required. At this stage it is assumed that the existing dock wall, also a Grade II Listed Building, would be retained in situ beneath the proposed construction profile.

5.7.6. The Extended Viaduct option would require construction of a major overground structure together with remodelling of local access roads and the provision of new slip roads. The A63 would be carried on the new viaduct from Spruce Road as far as the rising approach ramps for the Myton Swing Bridge.

5.7.7. A local access road would be provided beneath the viaduct to accommodate all existing side road junctions with Castle Street. Ferensway/Commercial Road would connect to the A63 via new eastbound and westbound slip roads.

5.7.8. A pedestrian overbridge would be provided at Porter Street.

5.7.9. Temporary carriageways would be constructed to maintain two lanes of traffic each way throughout the majority of the construction period, however there would be a period of approximately 20 weeks where two lane running could not be maintained. The traffic management measures envisaged for this scheme option are detailed in Table 5.7.2 overleaf.
TABLE 5.7.2 TRAFFIC MANAGEMENT IMPLICATIONS OF THE EXTENDED VIADUCT OPTION

<table>
<thead>
<tr>
<th>ROAD NAME</th>
<th>TRAFFIC MANAGEMENT</th>
<th>TIME PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>A63 Eastbound</td>
<td>Routeing of traffic from mainline and use of slip roads to Mytongate junction to provide access through works. Increased journey time resulting.</td>
<td>129 weeks</td>
</tr>
<tr>
<td>A63 Westbound</td>
<td>Routeing of traffic from mainline and use of slip roads to Mytongate junction to provide access through works. Increased journey time resulting.</td>
<td>129 weeks</td>
</tr>
<tr>
<td>A63 Eastbound</td>
<td>Single lane running during completion of spans adjacent to Princes Quay.</td>
<td>19 weeks</td>
</tr>
<tr>
<td>Access from city to eastbound A63</td>
<td>To be closed at junction. Traffic diverted via Carr Lane and Drypool Bridge.</td>
<td>29 weeks</td>
</tr>
<tr>
<td>Local access roads westbound; from Queen Street to Humber Dock Street</td>
<td>Routed south around marina area while spans adjacent to the ‘Ask’ building are completed.</td>
<td>40 weeks</td>
</tr>
<tr>
<td>Local access roads during final realignment of junctions; in particular Market Place</td>
<td>Short duration closures, traffic light signal controls and minor restrictions.</td>
<td>51 weeks</td>
</tr>
<tr>
<td>Access from A63/Local Access Road to Myton Street and Waterhouse Lane</td>
<td>Closed at junction.</td>
<td>14 weeks</td>
</tr>
</tbody>
</table>

5.7.10. An assessment of construction issues are given in the Construction Feasibility Report (Carillion, 2008).

5.7.11. For this option the number of potential site compounds required would be nine, the highest number required by any of the scheme options.

5.7.12. An estimation of the likely excavated volume and identified importation material volume is given below. The latter would include materials for earthworks, aggregates, concrete and surfacing materials.

- Total Excavation 20,000m³
- Import 25,000m³

5.7.13. The contractor has ranked this scheme fourth out of six scheme options in respect of ‘buildability’.

Environmental Constraints

5.7.14. The Extended Viaduct would have the following environmental disbenefits.
- Large adverse heritage impact;
- Demolition of property for temporary construction requirements;
- Very large adverse visual and townscape impact, and
- Slight adverse noise impact.

**Scheme Brief**

5.7.15. As with the two preferred options, the grade separation of the Mytongate Junction and the provision of a dedicated local access road, for local traffic movement, between Mytongate Junction and Market Place would enable this option to meet the three scheme objectives of reducing congestion, reducing journey times to the port and increasing safety.

5.7.16. The reduction in surface level traffic, due to the transfer of the A63 traffic onto the new viaduct, together with wider footways will increase the amenity value of the Prince’s Dock area and will reduce community severance in this location.

5.7.17. The Extended Viaduct option, along with the Cut and Cover Tunnel option provide the largest reduction in severance of all options considered.
6.  ASSESSMENT OF TRAFFIC, ECONOMICS AND COSTS

6.1.  TRAFFIC ASSESSMENT

6.1.1.  In order to carry out the economic, environmental and operation assessments, traffic forecasts have been produced for the two preferred options for the opening year of 2017 and the design year of 2032.

6.1.2.  Traffic forecasts used in the economic assessment are those described in the Traffic Forecasting Report (PF, 2009a).

6.1.3.  The only planned improvements to the highway network in the local area in the Core and Pessimistic Scenarios are the Garrison Road Roundabout Improvements which were implemented in winter 2008/09. These improvements are included in all future network scenarios.

6.1.4.  In the Optimistic Scenario, the Quay West development requires a highway network intervention at the Mytongate junction in the form of one additional lane in each direction and further geometric alterations. This has been included in both Do Minimum 2017 and 2032 Optimistic Scenario networks.

6.1.5.  The forecasts developed for the model utilise the same Do Something network for both the overground and underground scheme options. This is because the two schemes operate in the same manner, and will have the same traffic flows, delays and queues with respect to the forecasting process.

6.1.6.  Current guidance requires forecasts to be based on central growth estimates calculated from the TEMPRO (Trip End Model Presentation Program) and Department of Transport’s National Transport Model (NTM) based factors. These were adjusted to include the ‘most likely’ development related trips; the resulting forecasts are described as the ‘core’ forecasts. In addition to core growth forecasts guidance in WebTAG Unit 3.15.5 paragraph 1.4.13 (DfT, 2009) requires the development of two uncertainty forecasts. This guidance treats uncertainty by considering an upper and lower range of variation around the central forecast provided by TEMPRO and the NTM. This range varies travel demand around the central forecasts by ±2.5% for traffic forecasts one year ahead, rising with the square root of the number of years to ±15% for forecasts 36 years ahead.
6.1.7. The resulting range calculations for the opening and design years from the base year 2008 are as follows:

- Opening Year (2017) range = ±7.50%; and
- Design Year (2032) range = ±12.25%.

6.1.8. These range values were applied to the travel demand matrices to provide pessimistic (low-range) and optimistic (high-range) forecasts. The optimistic forecast included additional levels of development detailed in the Traffic Forecasting Report. The pessimistic forecast assumed the same development levels as the core forecast but reduced in line with the low-range value. These forecasts were assigned to the Do Minimum and Do Something networks to provide traffic forecasts within a variable demand model assignment process. The economic assessment thus considers three traffic forecast levels of pessimistic, core and optimistic.

6.2. ECONOMIC ASSESSMENT

Introduction

6.2.1. The traffic forecasts used in the economic assessment have been based on the A63 SATURN model developed for the improvement scheme. The economic benefits and costs of the improvement scheme have been presented in the relevant WebTAG worksheets. The assessment compares the benefits of each of the preferred scheme options with the costs for each option. The benefits and costs of the improvement scheme are summarised below:

Benefits

- Travel time savings;
- Vehicle Operating Cost Savings;
- Accident Reduction Savings;
- Reliability;
- Carbon Benefit; and
- Maintenance Cost Savings
Costs

- Construction Costs; and
- Construction Delay.

6.2.2. The appraisal has been carried out in accordance with the 2003 Green Book Guidelines with the exception of optimism bias which has been substituted by the HA with the new range estimate methodology. The Do Minimum and preferred scheme options have been modelled using the A63 SATURN model and forecasts produced for the 2017 opening and 2032 design years. Details of the traffic forecasting can be found in the report entitled "Traffic Forecasting Report" reference W11189/VDT/10 dated December 2009 (PF, 2009a).

6.2.3. The scheme estimates used for the economic calculations are the scheme range estimates produced by the HA Commercial Division in November 2009.

6.2.4. The assessment is based on 2002 prices and values and is a 60 year appraisal, with a 3.5% discount rate reducing to 3% after 30 years and is based on the 2003 Green Book guidance.

Transport User Benefits

6.2.5. The journey time benefits and vehicle operating costs have been calculated using the computer programme TUBA (Transport Users Benefit Appraisal) in accordance with the WebTAG guidance.

6.2.6. The results of the TUBA assessment for the core, pessimistic and optimistic growth scenarios are summarised in Table 6.2.1.

**TABLE 6.2.1 – TUBA ASSESSMENT - SUMMARY OF RESULTS**

<table>
<thead>
<tr>
<th>Preferred Option</th>
<th>Present Value of Benefits (PVB)</th>
<th>Net Present Value (NPV)</th>
<th>Present Value of Cost (PVC)</th>
<th>Benefit to Cost Ratio (BCR)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Traffic Forecasts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underground</td>
<td>294,536</td>
<td>199,936</td>
<td>94,600</td>
<td>3.113</td>
</tr>
<tr>
<td>Overground</td>
<td>294,536</td>
<td>196,885</td>
<td>97,651</td>
<td>3.016</td>
</tr>
<tr>
<td><strong>Pessimistic Traffic Forecasts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underground</td>
<td>214,728</td>
<td>121,250</td>
<td>93,478</td>
<td>2.297</td>
</tr>
<tr>
<td>Overground</td>
<td>214,728</td>
<td>118,200</td>
<td>96,528</td>
<td>2.225</td>
</tr>
</tbody>
</table>
### Preferred Option

<table>
<thead>
<tr>
<th>Preferred Option</th>
<th>Present Value of Benefits (PVB)</th>
<th>Net Present Value (NPV)</th>
<th>Present Value of Cost (PVC)</th>
<th>Benefit to Cost Ratio (BCR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimistic Traffic Forecasts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underground</td>
<td>350,901</td>
<td>257,194</td>
<td>93,707</td>
<td>3.745</td>
</tr>
<tr>
<td>Overground</td>
<td>350,901</td>
<td>254,143</td>
<td>96,758</td>
<td>3.627</td>
</tr>
</tbody>
</table>

Cost in multiples (£1000s)

6.2.7. Full details of the assessment can be found in the Economic Assessment Report (PF, 2009b)

**Accident Benefit Assessment**

6.2.8. An accident only assessment has been undertaken using COBA11 Revision 11 and is incorporated into the overall scheme economic assessment. Full details of the can be found in the Economic Assessment Report (PF, 2009b)

6.2.9. The accidents benefits for the core, pessimistic and optimistic forecast levels, as a result of improving the A63 Castle Street, are shown in Tables 6.2.2.

#### TABLE 6.2.2 – ACCIDENT BENEFITS

<table>
<thead>
<tr>
<th>Accident Impact</th>
<th>Forecast Level</th>
<th>Pessimistic</th>
<th>Core</th>
<th>Optimistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Accidents</td>
<td>216.4</td>
<td>215.8</td>
<td>178.2</td>
<td></td>
</tr>
<tr>
<td>Fatal Casualties</td>
<td>0.5</td>
<td>0.4</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Serious Casualties</td>
<td>15.2</td>
<td>15.1</td>
<td>10.8</td>
<td></td>
</tr>
<tr>
<td>Slight Casualties</td>
<td>305</td>
<td>304.9</td>
<td>257.0</td>
<td></td>
</tr>
<tr>
<td>Total Accident Benefits</td>
<td>£6,439</td>
<td>£6,379</td>
<td>£5,023</td>
<td></td>
</tr>
</tbody>
</table>

Notes: All values are at 2002 prices
Cost in multiples (£1000s)
Accident benefits are the same for both preferred scheme options

#### Construction and Maintenance Benefit Assessment

6.2.10. The construction and maintenance benefit assessment has been undertaken using the QUADRO4 (Queues and Delays at Roadworks) computer program. This program is used to assess the journey time benefits, vehicle operating costs and accident benefits during construction and maintenance for the two preferred scheme options, and for the maintenance of the Do Minimum scenario.

6.2.11. The timescales for the construction of the above phases are summarised below:
- **Preferred Underground Option** – Construction time is estimated to be 2 years and 11 months. Two lanes of traffic will be running in both directions throughout the entire construction period. Construction is estimated to finish in July 2017.

- **Preferred Overground Option** - Construction time is estimated to be 2 years and 6 months. Two lanes of traffic will be running in both directions throughout the entire construction period. Construction is estimated to finish in February 2017.

**User Benefits**

6.2.12. The Maintenance Delay result is a comparison between delays during the Do Minimum works and the delay during maintenance work after the implementation of a scheme and is shown in Table 6.2.3.

**TABLE 6.2.3 – MAINTENANCE DELAY SAVINGS**

<table>
<thead>
<tr>
<th>Preferred Option</th>
<th>Core Traffic Forecasts</th>
<th>Pessimistic Traffic Forecasts</th>
<th>Optimistic Traffic Forecasts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Do Minimum (DM)</td>
<td>Do Something (DS)</td>
<td>Maintenance Delay Saving</td>
</tr>
<tr>
<td></td>
<td>Impact</td>
<td>Impact</td>
<td>(DM-DS)</td>
</tr>
<tr>
<td>Underground</td>
<td>£92,905,696</td>
<td>£47,343,624</td>
<td>£45,562,072</td>
</tr>
<tr>
<td>Overground</td>
<td>£92,905,696</td>
<td>£47,343,624</td>
<td>£45,562,072</td>
</tr>
<tr>
<td>Underground</td>
<td>£87,605,232</td>
<td>£43,983,680</td>
<td>£43,621,552</td>
</tr>
<tr>
<td>Overground</td>
<td>£87,605,232</td>
<td>£43,983,680</td>
<td>£43,621,552</td>
</tr>
<tr>
<td>Underground</td>
<td>£98,247,120</td>
<td>£50,818,184</td>
<td>£47,428,936</td>
</tr>
<tr>
<td>Overground</td>
<td>£98,247,120</td>
<td>£50,818,184</td>
<td>£47,428,936</td>
</tr>
</tbody>
</table>

Note - All values are in 2002 prices

6.2.13. The construction delays suffered by consumers, business and private sector providers for each of the preferred options are summarised in Table 6.2.4 overleaf. This table shows that the underground option has higher construction
6.2.14.  **TABLE 6.2.4 - TOTAL CONSTRUCTION DELAY COSTS**

<table>
<thead>
<tr>
<th>Preferred Option</th>
<th>Total Construction Delay Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Traffic Forecasts</strong></td>
<td></td>
</tr>
<tr>
<td>Underground</td>
<td>£2,119,111</td>
</tr>
<tr>
<td>Overground</td>
<td>£2,015,311</td>
</tr>
<tr>
<td><strong>Pessimistic Traffic Forecasts</strong></td>
<td></td>
</tr>
<tr>
<td>Underground</td>
<td>£1,961,138</td>
</tr>
<tr>
<td>Overground</td>
<td>£1,866,223</td>
</tr>
<tr>
<td><strong>Optimistic Traffic Forecasts</strong></td>
<td></td>
</tr>
<tr>
<td>Underground</td>
<td>£2,295,728</td>
</tr>
<tr>
<td>Overground</td>
<td>£2,182,557</td>
</tr>
</tbody>
</table>

Note - All values are in 2002 prices

6.2.15.  The overall benefits of the scheme are the maintenance delay benefits, minus the delay costs. The total benefits for each of the options are shown in Table 6.2.5.

**TABLE 6.2.5: OVERALL BENEFITS**

<table>
<thead>
<tr>
<th>Preferred Option</th>
<th>Total Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core Traffic Forecasts</strong></td>
<td></td>
</tr>
<tr>
<td>Underground</td>
<td>£43,442,961</td>
</tr>
<tr>
<td>Overground</td>
<td>£43,546,761</td>
</tr>
<tr>
<td><strong>Pessimistic Traffic Forecasts</strong></td>
<td></td>
</tr>
<tr>
<td>Underground</td>
<td>£41,660,414</td>
</tr>
<tr>
<td>Overground</td>
<td>£41,755,329</td>
</tr>
<tr>
<td><strong>Optimistic Traffic Forecasts</strong></td>
<td></td>
</tr>
<tr>
<td>Underground</td>
<td>£45,133,208</td>
</tr>
<tr>
<td>Overground</td>
<td>£45,246,379</td>
</tr>
</tbody>
</table>

Note - All values are in 2002 prices

6.2.16.  **Accidents**

A summary of the results obtained from QUADRO for accident impacts during the construction of the preferred scheme options and the maintenance of the completed preferred scheme options are shown in Tables 6.2.6 and 6.2.7 respectively.
TABLE 6.2.6 QUADRO ACCIDENT ASSESSMENTS – CONSTRUCTION

<table>
<thead>
<tr>
<th>Preferred Option</th>
<th>Total Accident Impact</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Fatal</td>
<td>Serious</td>
<td>Slight</td>
</tr>
<tr>
<td>Core Traffic Forecasts</td>
<td>Underground</td>
<td>-0.05</td>
<td>-0.72</td>
<td>-11.77</td>
</tr>
<tr>
<td></td>
<td>Overground</td>
<td>-0.05</td>
<td>-0.71</td>
<td>-11.64</td>
</tr>
<tr>
<td>Pessimistic Traffic Forecasts</td>
<td>Underground</td>
<td>-0.05</td>
<td>-0.71</td>
<td>-11.61</td>
</tr>
<tr>
<td></td>
<td>Overground</td>
<td>-0.05</td>
<td>-0.68</td>
<td>-11.29</td>
</tr>
<tr>
<td>Optimistic Traffic Forecasts</td>
<td>Underground</td>
<td>-0.05</td>
<td>-0.73</td>
<td>-11.94</td>
</tr>
<tr>
<td></td>
<td>Overground</td>
<td>-0.06</td>
<td>-0.71</td>
<td>-11.64</td>
</tr>
</tbody>
</table>

TABLE 6.2.7 QUADRO Accident Assessments – Maintenance

<table>
<thead>
<tr>
<th>Preferred Option</th>
<th>Total Accident Impact</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Fatal</td>
<td>Serious</td>
<td>Slight</td>
</tr>
<tr>
<td>Core Traffic Forecasts</td>
<td>Underground</td>
<td>0.01</td>
<td>0.52</td>
<td>8.82</td>
</tr>
<tr>
<td></td>
<td>Overground</td>
<td>0.01</td>
<td>0.52</td>
<td>8.82</td>
</tr>
<tr>
<td>Pessimistic Traffic Forecasts</td>
<td>Underground</td>
<td>0.04</td>
<td>0.52</td>
<td>8.83</td>
</tr>
<tr>
<td></td>
<td>Overground</td>
<td>0.04</td>
<td>0.52</td>
<td>8.83</td>
</tr>
<tr>
<td>Optimistic Traffic Forecasts</td>
<td>Underground</td>
<td>0.04</td>
<td>0.53</td>
<td>8.84</td>
</tr>
<tr>
<td></td>
<td>Overground</td>
<td>0.04</td>
<td>0.52</td>
<td>8.84</td>
</tr>
</tbody>
</table>

6.2.17. The tables show that both preferred scheme options derive a disbenefit during construction, with the underground option achieving a higher disbenefit than the overground option. During maintenance, both preferred schemes show similar benefits.
6.2.18. The overall accident benefits of the schemes, calculated by combining construction and maintenance accident benefits are shown in Table 6.2.8.

**TABLE 6.2.8 QUADRO Accident Assessments – Construction and Maintenance**

<table>
<thead>
<tr>
<th>Preferred Option</th>
<th>Total Accident Impact</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Casualties</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fatal</td>
<td>Serious</td>
<td>Slight</td>
<td></td>
</tr>
<tr>
<td><strong>Core Traffic Forecasts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underground</td>
<td>-0.04</td>
<td>-0.20</td>
<td>-2.95</td>
<td>-2.26</td>
</tr>
<tr>
<td>Overground</td>
<td>-0.04</td>
<td>-0.19</td>
<td>-2.82</td>
<td>-2.13</td>
</tr>
<tr>
<td><strong>Pessimistic Traffic Forecasts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underground</td>
<td>-0.01</td>
<td>-0.19</td>
<td>-2.78</td>
<td>-2.13</td>
</tr>
<tr>
<td>Overground</td>
<td>-0.01</td>
<td>-0.16</td>
<td>-2.46</td>
<td>-1.87</td>
</tr>
<tr>
<td><strong>Optimistic Traffic Forecasts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underground</td>
<td>-0.01</td>
<td>-0.20</td>
<td>-3.10</td>
<td>-2.38</td>
</tr>
<tr>
<td>Overground</td>
<td>-0.02</td>
<td>-0.18</td>
<td>-2.80</td>
<td>-2.12</td>
</tr>
</tbody>
</table>

**Transport Economic Efficiency**

6.2.19. The TUBA assessments have been run for the underground and overground preferred scheme options. The results are summarised in Table 6.2.9 below.

**TABLE 6.2.9 – TUBA Only Assessments**

<table>
<thead>
<tr>
<th>Preferred Option</th>
<th>Traffic Forecast Level</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pessimistic</td>
<td>Core</td>
<td>Optimistic</td>
<td></td>
</tr>
<tr>
<td>Underground</td>
<td>PVB</td>
<td>214,728</td>
<td>294,536</td>
<td>350,901</td>
</tr>
<tr>
<td></td>
<td>PVC</td>
<td>93,478</td>
<td>94,600</td>
<td>93,707</td>
</tr>
<tr>
<td></td>
<td>NPV</td>
<td>121,250</td>
<td>199,936</td>
<td>257,194</td>
</tr>
<tr>
<td></td>
<td>BCR</td>
<td>2.297</td>
<td>3.113</td>
<td>3.745</td>
</tr>
<tr>
<td>Overground</td>
<td>PVB</td>
<td>214,728</td>
<td>294,536</td>
<td>350,901</td>
</tr>
<tr>
<td></td>
<td>PVC</td>
<td>96,528</td>
<td>97,651</td>
<td>96,758</td>
</tr>
<tr>
<td></td>
<td>NPV</td>
<td>118,200</td>
<td>196,885</td>
<td>254,143</td>
</tr>
<tr>
<td></td>
<td>BCR</td>
<td>2.225</td>
<td>3.016</td>
<td>3.627</td>
</tr>
</tbody>
</table>

Note - All values are at 2002 prices
Cost in multiples (£1000s)
6.2.20. Table 6.2.10 presents the combined results of the TUBA and QUADRO assessments to give economic performance of the two preferred scheme options for the three traffic forecast levels.

### TABLE 6.2.10 COMBINED TUBA AND QUADRO ASSESSMENTS

<table>
<thead>
<tr>
<th>Preferred Option</th>
<th>Traffic Forecast Level</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pessimistic</td>
<td>Core</td>
<td>Optimistic</td>
</tr>
<tr>
<td>Underground</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVB</td>
<td>215,820</td>
<td>338,329</td>
<td>394,894</td>
</tr>
<tr>
<td>PVC</td>
<td>93,447</td>
<td>94,600</td>
<td>93,707</td>
</tr>
<tr>
<td>NPV</td>
<td>122,343</td>
<td>243,729</td>
<td>301,187</td>
</tr>
<tr>
<td>BCR</td>
<td>2.309</td>
<td>3.576</td>
<td>4.214</td>
</tr>
<tr>
<td>Overground</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVB</td>
<td>215,380</td>
<td>338,433</td>
<td>394,616</td>
</tr>
<tr>
<td>PVC</td>
<td>96,528</td>
<td>97,651</td>
<td>96,758</td>
</tr>
<tr>
<td>NPV</td>
<td>118,852</td>
<td>240,782</td>
<td>297,858</td>
</tr>
<tr>
<td>BCR</td>
<td>2.231</td>
<td>3.466</td>
<td>4.078</td>
</tr>
</tbody>
</table>

Note - All values are at 2002 prices Cost in multiples (£1000s)

6.2.21. Table 6.2.11 shows the overall performance of the preferred scheme options with accident benefits included. It can be seen from the table that the benefits from the appraisal outweigh the costs with a BCR ranging from 3.529 to 3.642 in the core traffic growth scenario. The full Analysis of Monetised Cost and Benefits (AMCB) can be found in the Economic Assessment Report (PF, 2009b).

### TABLE 6.2.11 ANALYSIS OF MONETISED BENEFITS AND COSTS INCLUDING TUBA, COBA AND QUADRO ASSESSMENTS

<table>
<thead>
<tr>
<th>Benefit / Cost</th>
<th>Pessimistic</th>
<th>Core</th>
<th>Optimistic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>U’ground</td>
<td>O’ground</td>
<td>U’ground</td>
</tr>
<tr>
<td>Accidents</td>
<td>6,149</td>
<td>6,377</td>
<td>6,189</td>
</tr>
<tr>
<td>Net Consumer Benefits</td>
<td>96,784</td>
<td>96,549</td>
<td>148,997</td>
</tr>
<tr>
<td>Net Business Benefits</td>
<td>119,140</td>
<td>118,941</td>
<td>188,835</td>
</tr>
<tr>
<td>Carbon Benefits</td>
<td>-108</td>
<td>-112</td>
<td>447</td>
</tr>
<tr>
<td>Total Benefits</td>
<td>221,968</td>
<td>221,757</td>
<td>344,518</td>
</tr>
<tr>
<td>Present Value of Costs</td>
<td>93,477</td>
<td>96,528</td>
<td>94,600</td>
</tr>
<tr>
<td>BCR</td>
<td>2.375</td>
<td>2.297</td>
<td>3.642</td>
</tr>
</tbody>
</table>

Note - All values are at 2002 prices, cost in multiples (£1000s)
6.2.22. An alternative presentation of the economic assessment is often quoted which relates to the expenditure of the HA rather than the Treasury. In order to present these results, the indirect tax effect associated with the scheme is removed from the Present Value of Costs (PVC). The overall results for this alternative assessment are presented in Table 6.2.12.

### TABLE 6.2.12 ALTERNATIVE ECONOMIC ASSESSMENT - ANALYSIS OF MONETISED BENEFITS AND COSTS INCLUDING TUBA, COBA AND QUADRO ASSESSMENTS

<table>
<thead>
<tr>
<th>Benefit / Cost</th>
<th>Pessimistic</th>
<th>Core</th>
<th>Optimistic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>U'ground</td>
<td>O'ground</td>
<td>U'ground</td>
</tr>
<tr>
<td>Present Value of Benefits</td>
<td>94,068</td>
<td>97,119</td>
<td>344,518</td>
</tr>
<tr>
<td>Present Value of Costs</td>
<td>221,968</td>
<td>221,757</td>
<td>94,068</td>
</tr>
<tr>
<td>BCR</td>
<td>2.360</td>
<td>2.283</td>
<td>3.662</td>
</tr>
</tbody>
</table>

Note - All values are at 2002 prices
- Cost in multiples (£1000s)

6.2.23. The results of the alternative economic assessments are only marginally different from the main assessments; this is due to the relatively short length of the scheme and thus limited exposure to the impacts that affect indirect tax, e.g. fuel duty.

**Conclusions**

6.2.24. It has been demonstrated that both the Underground and Overground schemes are economically efficient with Benefit to Cost Ratios, for the core traffic forecasts, of 3.642 to 3.529 respectively. The BCRs calculated for the Range Estimates are similar in magnitude for the two preferred options. The pessimistic estimates result in BCRs of 2.375 for the Underground option and 2.297 for the Overground option, and the optimistic estimates result in BCRs of 4.264 for the Underground option and 4.126 for the Overground option.

6.2.25. Based on the Department for Transport ‘Guidance on Value for Money’ both preferred schemes represent high value for money on the basis that the BCR for the core traffic forecasts exceed a value of 2.0. In addition, both schemes in the pessimistic and optimistic traffic forecasts have BCRs that exceed the high value for money guidance criteria.
7. **HIGHWAYS DESIGN DATA**

7.1. **ROAD LAYOUT AND STANDARDS - DESIGN ELEMENTS AND ASSUMPTIONS**

7.1.1. The following design standards have been used and referenced:

- TD9/93 – Highway Link Design;
- TD22/06 – Layout of Grade Separated Junction;
- DB32 – Residential Roads and Footpaths;
- TD42/95 – Geometric Design of Major/Minority Priority Junctions;
- TD41/95 – Vehicular Access to All Purpose Trunk Roads;
- TD27/05 – Cross Sections and Headrooms.

7.1.2. The following Scheme Standards have been assumed:

- Mainline dual 2 lane carriageway at 40mph (as existing), therefore design speed equivalent to 70kph;
- Mainline carriageway desirable max gradient of 4%;
- All other roads including Local Access Road (Tunnel option only) taken as 30mph, therefore design speed equivalent to 60kph; and
- Minor road desirable max gradient of 6% (steeper than 8% is considered a departure).

7.1.3. Refer to Figure 7.1 (below) for more extracted elements of Table 3 - TD 9/93.

**FIGURE 7.1: DESIGN SPEED PARAMETERS (EXTRACTED ELEMENTS FROM TABLE 3, TD 9/93)**

<table>
<thead>
<tr>
<th>DESIGN SPEED</th>
<th>70kph</th>
<th>60kph</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOPPING SIGHT DISTANCE (m)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desirable Minimum</td>
<td>120</td>
<td>90</td>
</tr>
<tr>
<td>One Step below Desirable Minimum</td>
<td>90</td>
<td>70</td>
</tr>
<tr>
<td>HORIZONTAL CURVATURE (m)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum R without elimination of adverse camber and transitions</td>
<td>1020</td>
<td>720</td>
</tr>
<tr>
<td>Minimum R with superelevation of 2.5%</td>
<td>720</td>
<td>510</td>
</tr>
<tr>
<td>Minimum R with superelevation of 3.5%</td>
<td>510</td>
<td>360</td>
</tr>
<tr>
<td>Desirable Minimum R with superelevation of 5%</td>
<td>360</td>
<td>255</td>
</tr>
<tr>
<td>One step below Desirable Minimum R with superelevation of 7%</td>
<td>255</td>
<td>180</td>
</tr>
<tr>
<td>Two steps below Desirable Minimum R with superelevation of 7%</td>
<td>180</td>
<td>127</td>
</tr>
<tr>
<td>DESIGN SPEED kph</td>
<td>70kph</td>
<td>60kph</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td><strong>VERTICAL CURVATURE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desirable minimum crest K value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One step below Desirable minimum crest K value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desirable minimum crest K value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute minimum sag K value</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.1.4. No part of the HA’s Heavy and High Load Network runs along the A63, though Ferensway/Beverley Road is understood to form part of the Heavy Load Network.

7.1.5. Standards for Road Restraint Systems (RRS) are currently under review (June 2007). The guidance that remains suggests that it is the Designer’s choice whether to use RRS on trunk roads with speed limits of less than 50mph. However, it does recommend that RRS be used when high volumes of traffic are present.

7.1.6. The ultimate conclusion was for the use of Vertical Concrete Barriers (VCB) with the corresponding VCB plinths for lighting columns.

Underground and Overground Options

7.1.7. On the 2004 Base Scheme, direct access from Waverley Street was maintained. However, under current proposals, this access would be closed due to safety concerns about its proximity to the slip road. Access to the properties presently served by this junction would in future be via St James Square.

7.1.8. Several junction closures were proposed at the 2004 TPI Entry stage. With the current design no changes to the 2004 work are recommended although an additional junction closure, at Waverley Street, is included. The following junctions with the A63 would be closed:

- Waverley Street;
- Spruce Road; and
- Waterhouse Lane, currently the existing road is closed by bollards. It is proposed to take the footpath across the junction mouth.
8. ENVIRONMENTAL DESIGN DATA

8.1. INTRODUCTION

8.1.1. The results of the Environmental Assessment are presented in the 2009 Environmental Assessment Report (Options Selection Stage), (PF, 2009g). A summary of the assessment results and proposed mitigation from the Environmental Assessment are outlined in the following sections.

8.2. AIR QUALITY

8.2.1. Introduction

8.2.1.1. For air quality the assessment method follows the guidance contained in the Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 Part 1 HA207/07 (May 2007) and the Department for Transport's Transport Analysis Guidance (TAG) Unit 3.3.3 (The Local Air Quality Sub-objective), Unit 3.3.4 (Regional Air Pollution) and Unit 3.3.5 (The Greenhouse Gases Sub-objective).

8.2.1.2. A scoping assessment determined which of the road links across Hull City were predicted to experience a change of either 1000 annual average daily traffic (AADT) movements or 200 AADT heavy goods vehicle (HGV) movements, or a change in daily average speed by 10 km/hr or a change in road alignment by 5m, as a consequence of the scheme. The simple assessment considered the air quality effect of the scheme on all roads identified in the scoping assessment which includes the A63 Castle Street which travels through the Air Quality Management Area (AQMA) designated within the city centre. Hull AQMA is designated for exceedences of the annual mean nitrogen dioxide (NO2) UK Air Quality Standard. Ongoing diffusion tube monitoring at roadside locations along the A63 currently shows exceedences of the UK Air Quality Standard for NO2.

8.2.1.3. The assessment has considered the relative change in air quality at sensitive receptors for scenarios ‘without scheme’ (i.e. do-minimum case) and ‘with scheme’ (i.e. do-something case) in order to predict the effect of the scheme on the relative contribution of road emissions to ambient air quality levels. The assessment has considered a scheme opening year, 2017 and also the worst year within the first 15 years after opening.
8.2.1.4. Although the two preferred Overground and Underground options have identical scheme footprints they differ in their vertical alignment at Mytongate Junction. The Overground option has the A63 carriageway as a flyover at Mytongate Junction whereas for the Underground Option the A63 is in a cutting. The assessment has been undertaken using the DMRB model and as such the changes in vertical alignment at Mytongate Junction have not been considered at this stage.

8.2.1.5. Traffic model forecasts for the scheme options have been provided for the above future years for the ‘without scheme’ and ‘with scheme’ scenarios. It has been confirmed that the traffic forecasts for the two ‘with scheme’ options are alike.

8.2.2. Local Air Quality Assessment

8.2.2.1. The Local Air Quality assessment has focused on the major transport related pollutants of public health concern NO$_2$ and particulates (PM$_{10}$) as previous studies by Hull City Council have indicated those existing and future predicted concentrations of carbon monoxide (CO), benzene and 1,3-butadiene to be well below UK Air Quality Standards. For identified sensitive receptors located along affected routes within the scheme study area DMRB air quality modelling has been undertaken. This assessment indicates a general improvement in air quality between the base year case (2008) and the opening year (2017) do-minimum and do-something scenarios.

8.2.2.2. There are relatively few sensitive receptors in close proximity to the A63 Castle Street. At receptors located at roadside locations within 15m of the road the modelling has predicted a slight increase in both NO$_2$ and PM$_{10}$ concentrations for the do-something scenario as compared with the do-minimum case. Annual mean concentrations of pollutants are predicted to increase at those receptors closest to the A63 by up $1.2 \mu g/m^3$ for PM10 and up to $0.5 \mu g/m^3$ for NO$_2$ as a result of the scheme. This will be associated with the predicted increase in traffic volumes along the A63 as a result of the scheme’s implementation.

8.2.2.3. The concentrations of PM$_{10}$ at these receptors (located within 20m of the A63 alignment) are predicted to remain below the Air Quality Strategy objective $40 \mu g/m^3$ both with and without the scheme.

8.2.2.4. In line with the DMRB methodology, modelled concentrations of NO$_2$ have been verified against local monitoring data collected at 6 locations along Castle Street.
The exercise showed that the model performed well at 5 of the 6 sites, with model predictions within +/-25% of monitored concentrations as required in TG.09. Site 6L was identified as the only site outside the +/-25% variance (28%). It was noted that at 6L the 2008 monitored NO\textsubscript{2} concentration (61 μg/m\textsuperscript{3}) was significantly higher than monitored concentrations elsewhere along A63 Castle Street (ranging from 36 to 47 μg/m\textsuperscript{3}).

8.2.2.5. 6L is located within 1m of the northern carriageway (approximately 14m from the A63 centreline), and is positioned within 50m of the slip road onto Market Place at Market Place Junction. Its kerbside locality and close proximity to Market Place Junction is considered to be a likely contributing factor to the higher concentrations monitored at this location. However, investigation into this variance at 6L has not presented conclusive evidence to rule that 6L is not a representation of existing pollutant levels at this location, and therefore the verification of model concentrations against monitored data was undertaken for 23 sensitive receptors located alongside the northern carriageway of the A63 between Dagger Lane and Vicar Lane.

8.2.2.6. The verification of modelled concentrations against monitored data for site 6L concluded that the model tends to under-predict pollutant concentrations. As such modelled concentrations of NO\textsubscript{2} have been adjusted using an appropriate derived correction factor for site 6L. Applying the adjustments to the modelled NO\textsubscript{2} concentrations results in predicted exceedences of the UK Air Quality Strategy objective of 40 ug/m\textsuperscript{3} in the opening year (2017) do-minimum and do-something scenario, at sensitive receptors located between Dagger Lane and Vicar Lane on A63 Castle Street. However, it is important to note that not including 6L in the verification of modelled NO\textsubscript{2} concentrations against monitored data would result in no exceedences of 40 μg/m\textsuperscript{3} in the scheme opening year 2017.

8.2.2.7. Following the investigation, Golder and the Highways Agency’s Principal Air Quality Specialist concluded that monitored concentrations at site 6L do not align with other monitored concentrations at sites along the A63 Castle Street. It is therefore strongly recommended that a programme of further investigation be undertaken during the Preliminary Design stage of the Development Phase into this anomaly. Additional NO\textsubscript{2} diffusion tube monitoring is recommended to be undertaken for a minimum period of 6 months along the stretch of the A63 between Mytongate Junction and Market Place. It is recommended that triplicate
tubes are located at existing monitoring sites CS7 (Princes Dock Street), 6L (Castle Street Road) and 28L (Castle Street Wall), with an additional 6 to 8 tubes positioned on sensitive receptor facades between Dagger Lane and Vicar Lane. The 6 months additional monitoring data will be used to revisit the verification of DMRB model results. If deemed necessary, detailed dispersion model for this stretch of the A63 will be constructed and modelled for the receptors in the vicinity of 6L.

8.2.3. Regional Air Pollution

8.2.3.1. The changes in total emissions of traffic derived pollutants which will result from the scheme have been calculated for roads affected by the scheme as presented below.

**TABLE 8.2.1: PREDICTED TOTAL EMISSIONS OF POLLUTANTS, YEAR 2017 (TONNES/YEAR)**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Do-minimum Scenario</th>
<th>Do-something Scenario</th>
<th>Change in emissions (%) change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen oxides (NOx)</td>
<td>72.70</td>
<td>69.85</td>
<td>2.85 (- 4.0%)</td>
</tr>
<tr>
<td>PM10</td>
<td>2.38</td>
<td>2.39</td>
<td>0.01 (+0.4%)</td>
</tr>
<tr>
<td>THC</td>
<td>23.59</td>
<td>23.81</td>
<td>0.22 (+0.9%)</td>
</tr>
<tr>
<td>CO</td>
<td>194.17</td>
<td>195.49</td>
<td>1.32 (+0.7%)</td>
</tr>
</tbody>
</table>

8.2.3.2. The predicted changes in total emissions of pollutants in the do-something scenario on the modelled road network compared to the do-minimum scenario are minimal.

8.2.4. Greenhouse Gases

8.2.4.1. Carbon emissions have been estimated for the 'with scheme' and 'without scheme' scenarios for each year of the 60 year appraisal period (2017 to 2077). In the scheme opening year 2017 do-something scenario, it is predicted that for the whole road network assessed, carbon emissions due to the scheme will increase by 393 tonnes when compared to the do-minimum scenario. Over the 60 year appraisal period the increase in emissions due to the scheme equates to a total of 31,169 tonnes Carbon. This is attributed to the scheme increasing the number of total vehicles kilometres travelled throughout the whole road network and a consequent reduction in traffic speeds on the network.
8.2.5. **Summary of Air Quality Assessment**

8.2.5.1. The simple assessment has shown that when compared with the base year 2008, air quality in the 2017 do-minimum scenario will improve and pollutant concentrations at the closest sensitive receptors to the scheme are not likely to exceed current UK Air Quality Strategy Objective for PM$_{10}$. However, the correction of modelled NO$_2$ concentrations using a correction factor derived from the verification of the model against monitoring site 6L predicts exceedences of Air Quality Strategy Objective for NO$_2$ in both the do-minimum and do-something scenarios. In comparing the 2017 do-minimum and do-something the assessment has shown that with the scheme, air quality will slightly worsen at properties located alongside the A63 carriageway by 0.5 μg/m$^3$.

8.2.5.2. It is noted that not including the potentially erroneous monitoring data from site 6L in the verification of modelled NO$_2$ concentrations against monitored data would result in no exceedence of 40 μg/m$^3$ at receptors in the scheme opening year 2017 do-minimum and do-something. Therefore it is strongly recommended that the outlined program of further investigation is undertaken during the Preliminary Design stage of the Development Phase so that the validity of the 6L monitoring data can be assessed.

8.3. **CULTURAL HERITAGE**

8.3.1. **Introduction**

8.3.1.1. Of particular importance to determining the direct impacts on the identified Archaeological Remains will be the depths of excavation required for new foundations and sub-bases of the new carriageways and road structures, especially when at grade. Given the relatively shallow depths of below ground archaeological deposits in most parts of the scheme footprint (estimated and known to about 0.3m below existing ground levels), the worst case scenario, i.e. the removal of all affected archaeological deposits, has been assumed. In addition, further research or archaeological evaluations of individual sites, or within the scheme corridor as a whole, will provide additional information on the scale, extent and importance of the underlying archaeological deposits. It is therefore probable that the impacts of the various scheme options may change (either up or down), as further data on each identified site is collected or as detailed design progresses.
8.3.2. Assessment of Impacts

8.3.2.1. Full details of the Cultural Heritage impact assessment undertaken are presented in the EAR (PF, 2009g).

8.3.2.2. A combination of the magnitude of impact and the value (considered in Section 2.8.3) of each affected asset allows an assessment to be made of the significance of the effects (i.e. the overall effect) on each cultural heritage asset. These significances, which should include the agreed mitigation, can be defined as being Very Large, Large, Moderate, Slight or Neutral, and they can be adverse or beneficial.

8.3.2.3. The predicted value and magnitude of impacts on the affected Cultural Heritage assets for the two preferred options are summarised in Table 8.3.1.

**TABLE 8.3.1: SUMMARY OF IMPACTS**

<table>
<thead>
<tr>
<th></th>
<th>Underground</th>
<th>Overground</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total of affected assets (i.e. Archaeological Remains, Historic Buildings and HLCUs)</strong></td>
<td>73</td>
<td>73</td>
</tr>
<tr>
<td><strong>Values of assets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Medium</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Low</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>Negligible</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td><strong>Magnitude of impacts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major adverse</td>
<td>23</td>
<td>25</td>
</tr>
<tr>
<td>Moderate adverse</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>Minor adverse</td>
<td>28</td>
<td>27</td>
</tr>
<tr>
<td>Negligible adverse</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>No change</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

8.3.2.4. The table above illustrates that the Overground Option has a slightly worse impact, as it has two more Major adverse impacts than the Underground Option. The identified assets that would be affected more severely by the increased visibility of the Overground Option are the Whittington & Cat Public House and the Holiday Inn complex.

8.3.2.5. The various significance of effects on the identified Cultural Heritage assets arising from the two preferred options, and an overall ranking of the options, are summarised in Table 8.3.2.
TABLE 8.3.2: SUMMARY OF SIGNIFICANCE OF EFFECTS

<table>
<thead>
<tr>
<th>Significance of effects</th>
<th>Underground</th>
<th>Over ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total of affected assets (i.e. Archaeological Remains, Historic Buildings and HLCUs)</td>
<td>73</td>
<td>73</td>
</tr>
<tr>
<td>Very large adverse</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Large adverse</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Moderate adverse</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>Slight adverse</td>
<td>41</td>
<td>42</td>
</tr>
<tr>
<td>Neutral</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>Overall Cultural Heritage Effect</td>
<td>Large adverse</td>
<td>Very Large adverse</td>
</tr>
<tr>
<td>Ranking of Option</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

8.3.2.6. The table above illustrates that the Overground Option has a slightly worse impact, as it has one Very Large adverse impact, on the Trinity Burial Ground due to the increased visual impact, and two more Moderate adverse and one more Slight adverse impacts compared to the Underground Option. These additional impacts are outweighed by the one additional Large adverse impact exhibited by the Underground Option.

8.3.3. Initial Mitigation Recommendations

8.3.3.1. The ‘Detailed Assessment’ undertaken within the EAR (PF, 2009) discussed and evaluated the known Cultural Heritage resource within the study area. From baseline information obtained and reviewed, recommendations can be made to mitigate the two proposed scheme options. However, at this stage of the project, when detailed designs have not yet been fully produced, it is difficult to recommend specific mitigation measures for individual sites or assets. Notwithstanding this, general mitigating principles can be applied to the scheme options as a whole, and further design work can be assessed against the existing base-line data as the scheme develops, for example when considering statutory undertakers diversions, additional drainage works and/or landscape proposals. In addition, such further design work may lead to the requirement for differing mitigation and investigative works. The following measures should therefore be considered as being initial recommendations only.

8.3.3.2. Recommended mitigation measures, are contained in EAR (PF, 2009c). The following presents a summary of the main measures to be implemented. It should be noted that Phase 4 and Phase 5 works, which deal with post-
excavation and post-recording works, have not been included in the recommendations at this stage.

8.3.4. **Archaeological Remains**

**Phase 1 Archaeological Evaluation**

8.3.4.1. It is recommended that a programme of archaeological evaluation, comprising Phase 1 trial trenching, is carried out. This would need to target as many identified assets as possible, given the existing site constraints, in order to assess and determine the presence or absence, scale, extent, depth, nature, date, condition and importance of any underlying deposits.

8.3.4.2. The assets that will benefit from Phase 1 evaluation include the former 18th century gaol and the Humber Brass and Copper Works at the Mytongate Junction, and the sites of Warehouse No. 7, the Commercial Hotel, and the Civil War defences located further to the east.

8.3.4.3. It may also be possible to open an area or trench over the site of the former lock between the Prince’s and Humber Docks, to identify which elements of this structure survive intact. It may also be possible to excavate trenches at Trinity Burial Ground in order to obtain a greater understanding and appreciation of the nature and density of human remains, prior to formulating an informed methodology for subsequent excavation. It would also be useful to evaluate several sites which lie within the present A63 corridor at the Mytongate junction. However, at present, this is unlikely to be practicable, although some non-intrusive investigation may be possible, e.g. ground penetrating radar, requiring only a temporary closure of the road.

8.3.4.4. Depending on the depths of construction to the east of the Prince’s Dock Street/Humber Dock Street junction, i.e. within the Old Town, it may be necessary to undertake further trenching work in the wide pavements and verges along Castle Street.

8.3.4.5. Some Phase 1 evaluation works may be required to determine the presence or absence of other archaeological sites not yet identified, especially around the Mytongate Junction.
Other Phase 1 Investigations and Research

8.3.4.6. Further research into the impacts of the scheme on the underlying water table should be considered to identify how the scheme will affect the underlying palaeoenvironmental and other waterlogged archaeological deposits. Also, any geotechnical investigations carried out as part of further scheme assessment work should consider the archaeological implications and potential of the area and any such works should be subject to constant and detailed archaeological monitoring.

Archaeological Excavation within the Old Town

8.3.4.7. For the numerous other archaeological sites within the Old Town, Phase 1 trenching work is not feasible as the impacts lie within or immediately adjacent to the existing A63 Castle Street corridor. In any event, the requirement for additional trenching work will depend on the depth of excavation required for scheme construction.

8.3.4.8. Any strategy will need to consider the previous highway construction works along the A63, in order to determine the level of earlier ground disturbance. Existing “as built” records may also provide further information on the potential survival of sites all along the scheme corridor. It has been previously suggested that ground-penetrating radar may be useful in locating the town’s defences, but sufficient information is now known about their general alignment and form of construction to know what to expect.

8.3.4.9. Should detailed archaeological excavation be shown to be a requirement, the nature and complexity of the medieval and early post-medieval remains within the Old Town means that pre-construction excavation across the full width of the scheme corridor would be the only sensible and practicable option. However, excavating the whole of the affected corridor would be impracticable, and so several priority areas would need to be determined, taking into account those areas previously excavated.

Other Archaeological Investigations

8.3.4.10. For many of the identified “to-be-impacted” archaeological sites, the most appropriate and only available mitigation strategy will be full and detailed archaeological excavation in advance of construction. The scale and extent of
these excavations is not yet known, as it will depend on the precise nature of the impacts and more especially the depth of excavation required for road construction. However, it is considered that there is little potential for in situ preservation with the Underground Option.

8.3.4.11. The underpass under the present Mytongate Junction and further east will require some pre-construction archaeological excavation, for example to record the former 18th century gaol, the Salem Chapel and the other chapel and Lutheran churches, assuming the Phase 1 trenching work shows that significant archaeological deposits survive. For the Overground Option, the positions of the viaduct supports would need to be archaeologically-excavated, although again it is to be hoped that the more important sites could be spanned by the new A63 bridge. The positions of the new Prince’s Quay footbridge supports would also need to be archaeologically-excavated, although the Porter Street footbridge lies outside the area of archaeological interest. Other sites of lesser importance at the western end of the scheme could be recorded through a watching brief and/or a plan/strip/record exercise during the initial stages of construction, depending on whether any previous trenching work had taken place.

Trinity Burial Ground

8.3.4.12. Either of the preferred options would have a significant effect on the Trinity burial ground. An archaeological mitigation strategy has already been suggested for this area, involving the archaeological excavation of part of the impacted area (c.1,430m² and at least 1,000 burials) with the human remains in the rest of the area being cleared by a specialist exhumation contractor (YAT 1994b). This strategy remains basically sound, although more recent advice and regulations will need to be taken into account, e.g. Church of England/English Heritage (2005); Taylor (2008).

8.3.4.13. Until a detailed plan and accurate record of all the plots, monuments and spaces in the Trinity Burial Ground is available, it is difficult to determine the number of potential burials that may be affected by the scheme. Although the monumental inscriptions have been recorded (EYFHS 1998), no detailed or accurate large scale plan showing their positions is available.

8.3.4.14. At this stage, given the present uncertainties regarding the burial ground legislation and the limited knowledge relating to the Trinity burial ground itself,
only a general mitigation strategy for the scheme, such as that outlined above - i.e. that a representative sample, say 10%, of the burials are subject to full and detailed archaeological excavation while the remainder are cleared by a specialist exhumation contractor, can be proposed.

8.3.5. **Historic Buildings**

8.3.5.1. Either of the preferred scheme options would require the complete demolition of two Grade II Listed Buildings, the Castle Street Chambers and the Earl de Grey Public House, and the partial demolition of another, the north wall of the Humber Dock. Given that the demolition of all or parts of a Listed Building is contrary to national and local planning advice and legislation, the full range of options for preservation in relation to the scheme proposals will need to be fully explored. These options can include moving or rebuilding the structure, to ensure either appropriate reuse or for a museum exhibit, or the partial recovery of some of the historic fabric for museum display (HA 2007a, A6/7).

8.3.5.2. There is the potential to move both the Castle Street Chambers and the Earl de Grey Public House buildings further to the north, outside the scheme footprint and into an area which is currently a car park, but whether this is feasible or practicable has not yet been established. Initially, an assessment of the buildings’ surviving special interest is required, after which the various options noted above will need to be discussed and costed before demolition can be confirmed as the preferred option. However, with either of the preferred scheme options, it is accepted that there are no other alternatives for the dock wall, and it is, therefore, recommended that the north wall is fully recorded in situ, carefully dismantled, and then re-erected in its new required position further to the south.

8.3.5.3. The majority of the impacts on the Historic Buildings arise from an increase in visual intrusion. In order to mitigate these impacts, the proposed footbridges will need to be designed to a very high quality and standard, using suitable materials that would either fit in with the local surroundings and character, or perhaps make them notable or “iconic” structures which will add to the diversity of the area. Further to this, appropriate screening and planting would need to be employed to soften these structures, and reduce the long distant visual impact.

8.3.5.4. Appropriate mitigating measures would also need to be undertaken to reduce the, as yet, unquantifiable impacts arising from increased traffic noise, vibration
and pollution to all those structures and buildings which are located along the sides of Castle Street. These impacts have the potential to be significant, and without suitable mitigation may lead to currently in-use historic structures being abandoned.

**Historic Landscapes**

8.3.5.5. As with Historic Buildings, the majority of impacts on the HLCUs arise from an increase in visual intrusion. In most cases, these increased visual impacts could be softened, through high-quality design and using appropriate screening and planting, as noted above.

8.3.5.6. With either of the preferred scheme options, the worst impacts would be at the Trinity burial ground where the underpass and associated infrastructure would cut through the northern part of the unit. The archaeological mitigation measures outlined above would deal with the human remains, but a large number of surviving historic elements would also be affected, for example some of the lamp columns, sections of the boundary walls and many of the gravestones and tombs. These elements should be fully architecturally recorded in situ, and then moved to safe storage prior to appropriate re-erection or replacement within the surviving areas of the burial ground, once the scheme is complete. The fabric of the boundary walls should also be reused in the construction of new boundary walls. The visual impacts arising from the Overground Option would be severe and, as yet, the appropriate level of mitigation has not been determined. It will also be important to ensure that the areas under the overpass and slip roads, which are to be constructed as viaduct or bridge structures, will not generate areas of waste ground. To help mitigate against permanent impacts, access and visitor facilities to the remaining parts of the burial ground should be improved, for example through the provision of seating and proper gates. It is also recommended that an appropriate level of interpretation is mounted to try and encourage a wider public use, understanding and appreciation of the asset. It would also be appropriate to undertake various enhancement works, for example by re-erecting and repairing broken or damaged grave stones, tombs and lamp columns.
8.4. **TOWNSCAPE**

8.4.1. **Introduction**

*Townscape*

8.4.1.1. The significance of the predicted impact resulting from the proposed development will depend upon the magnitude of the impact and the sensitivity of the receptor. For example, highly sensitive areas where the magnitude of change is predicted to be only minor could still result in a moderate significance for example.

8.4.1.2. At this stage of assessment, significance is assessed with the assumption that standard mitigation proposals would be put in place. Where other mitigation measures would be desirable to address the effects of the scheme these are noted, but do not influence the significance score at this stage.

8.4.1.3. A summary of the Magnitude and Significance of the impacts from both preferred scheme options in the opening year, is given in Table 8.4.1.

**TABLE 8.4.1: POTENTIAL SIGNIFICANCE OF TOWNSCAPE IMPACT ON INDIVIDUAL CHARACTER AREAS (OPENING YEAR).**

<table>
<thead>
<tr>
<th>Townscape Character Areas</th>
<th>Value (Sensitivity)</th>
<th>Underground Option</th>
<th>Overground Option</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Magnitude</td>
<td>Significance</td>
</tr>
<tr>
<td>1 - A63, Castle Street</td>
<td>LOW</td>
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<td>Townscape Character Areas</td>
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<td>12 - Hull Marina Boat Yard</td>
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<td>21 - Oldgates Development Area</td>
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<td>23 - Central Dry Dock / The Deep</td>
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### Townscape Character Areas

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<th>Overground Option</th>
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<td><strong>OVERALL SIGNIFICANCE OF EFFECT OF SCHEME OPTION UPON TOWNSCAPE (AT SCHEME OPENING, Year 0)</strong></td>
<td>VERY LARGE ADVERSE</td>
<td>VERY LARGE ADVERSE</td>
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<tr>
<td><strong>OVERALL SIGNIFICANCE OF EFFECT OF SCHEME OPTION UPON TOWNSCAPE (AT Year 15 Summer)</strong>*</td>
<td>MODERATE ADVERSE</td>
<td>MODERATE ADVERSE</td>
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</table>

#### Underground Option

8.4.1.4. The magnitude of the townscape impact is assessed to be moderate adverse and there are a range of townscape sensitivities found throughout the study area. The range of sensitivities produces the range of significance scores as illustrated above. Taking these results into account, and adopting a cautious approach to the overall effect, the significance of impact of the proposed scheme option on the existing townscape is assessed to be **Very Large Adverse**.

#### Overground Option

8.4.1.5. The magnitude of the townscape impact is assessed to be moderate adverse and there are a range of townscape sensitivities found throughout the study area. Taking these results into account as illustrated in the previous table, and adopting a cautious approach the significance of impact of the proposed scheme option on the townscape is assessed to be **Very Large Adverse**.

#### Significance of Impact During Construction

8.4.1.6. Overall, for either of the preferred scheme options there would be a **Very Large Adverse** impact during construction. There would be widespread disruption to the road network with associated construction structures and compound areas impacting on the scale and functionality of the area. Further impacts associated with the construction phase are discussed in the EAR (PF, 2009c).

#### Significance of Impact Fifteen Years After Opening

8.4.1.7. If the proposed mitigation measures, as detailed in the EAR (PF, 2009), are implemented, there is the potential to reduce the significance of the townscape impacts of the scheme on the study area. Proposed urban street tree and shrub planting would mature over a period of time and users would become more
familiar with the appearance of the area. New proposals for development in the surrounding townscape areas should also have taken account of the scheme to help to integrate it into the surrounding townscape. For both of the preferred scheme options there is the opportunity to reduce the overall significance of townscape impact to Moderate Adverse by implementation of appropriate mitigation measures.

Visual Impact

8.4.1.8. Visual impact is the result of a change in view, most likely from residential property, public rights of way, land with public access, roads and offices. Receptors are grouped according to their location, predicted views and type.

8.4.1.9. The least sensitive receptors are likely to be people at their place of work, or engaged in similar activities, whose attention may be focussed on their work or activity and, therefore, be potentially less susceptible to changes in the view. Road users are also included in this category as their experience is transient.

8.4.1.10. A summary of the Magnitude and Significance of the impacts from both preferred scheme options, in the opening year, is given in Table 8.4.2 below

<table>
<thead>
<tr>
<th>Visual Receptor Ref</th>
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Summary of Significance

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### Summary of Significance

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<tr>
<td>Very large adverse</td>
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*Overall Significance of Effects (Yr 0 Winter) with mitigation*

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<th>Overground</th>
</tr>
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</table>

*RANK (Yr 0 Winter 1 = least adverse)*

|                      |             | 1          |

*Predicted Overall Significance of Effects (Yr 15 Summer) with mitigation*

<p>| | | |</p>
<table>
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<tbody>
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### 8.4.1.11. From a visual impact perspective, the significance of impact ranges from Neutral through to Large Adverse. A cautious approach was taken to the overall scoring of the visual impact and the worst case scenario is presented as the overall score. The matrix does not allow for any differential in grades of significance but if the options are ranked according to professional judgement and the relative numbers of moderate and large adverse scores, the Overground Option would be ranked as the greatest adverse visual impact, even though they currently both score the same. By its very nature i.e. external and above surface, the Overground option must be considered as having the greatest adverse visual impact.

### 8.4.2. Mitigation

#### 8.4.2.1. An assessment of mitigation was undertaken as part of the landscape/townscape assessment within the Environmental Assessment Report (PF, 2009). Mitigation measures deal with the townscape and visual effect of the proposed highway improvements. They seek to integrate the development into the surrounding townscape character and screen or ameliorate key views.

#### 8.4.2.2. In addition to optimising the vertical and horizontal alignments, the following mitigation techniques have been proposed to achieve the required objectives:

- Tree and shrub planting;
- Retention of existing vegetation;
- Considerate use of building material to respect the areas heritage and other built style in the area; and
- High quality urban and landscape design within the public realm, including bridges, new public spaces, lighting, seating and shelters.

8.4.2.3. Due to the difference in alignments and layouts of the two preferred scheme options, mitigation will be described independently.

8.4.3. Underground Option

Tree and Shrub Planting

8.4.3.1. Four wedges of land would be created around Mytongate Junction between the slip roads and the A63 in cutting. These areas would be suitable for large specimen tree planting which should help to screen views on a north-south axis and into the cutting from surrounding elevated properties. Planting of this area would help to mitigate the loss of the existing planting on Mytongate Junction.

8.4.3.2. An open area of verge would be created in front of the Great Passage Street pocket park on the old alignment of Mytongate Junction. This area would be suitable for specimen trees and ornamental shrub planting which would act as a buffer to the pocket park.

8.4.3.3. To the southwest of Mytongate Junction, adjacent to Character Area 3 (see EAR (PF, 2009c) for details of this area), new ornamental shrub and tree planting areas are recommended to replace the existing areas lost to the westbound entry slip road. This planting would help form an attractive backdrop to the car parking areas of the retail park whilst screening views into the car park from areas to the north.

8.4.3.4. To the northwest side of the A63, the eastbound exit slip road would encroach into the area bordering William Booth House, William Street and Cogan Street. New areas of verge side planting should be provided in this area to mitigate the effects and provide a buffer to the road. This planting should include a hedgerow to screen low level views surrounded by ornamental shrub planting with trees growing within. The area of William Street pocket park affected by the proposals should be replanted and screened with a brick wall to tie in with the existing wall.
8.4.3.5. In the area around the Porter Street footbridge, it is recommended that vergeside tree planting is implemented around the base of the ramps and steps to the bridge. Once matured this should help to soften the visual impact of the structure and improve its setting.

8.4.3.6. To the southeast of Mytongate Junction around the Trinity burial ground replacement evergreen shrub planting should be provided to the edges to replicate the existing sense of enclosure found within the area. Where large mature trees are lost on the boundary the gaps should be planted with suitable semi mature specimen trees. The internal and perimeter areas of the burial ground could be enhanced through additional areas of seating, pathways, lighting and ornamental shrub planting.

8.4.3.7. To the west of Trinity burial ground, up to Commercial Road, is a large area of grass verge. This area could be planted with a line of large specimen trees besides the footpath which would help to screen views from the south towards the junction. The area has potential to be significantly enhanced and turned into another pocket park, similar to the others in the vicinity, whilst providing green links into the burial ground and connections to Railway Dock.

8.4.3.8. To the northeast of Mytongate Junction the realigned slip road creates an increased area of verge directly in front of the Golf Shop. This area could be planted with specimen trees and shrubs to mirror planting in other areas around the junction. In addition, where sections of the car park vegetation around townscape area 6 are lost, this is recommended be replaced.

8.4.3.9. To the northern side of the Holiday Inn Hotel, subject to agreement with the hotel, vegetation should be planted to mitigate the area of lost verge and planting between the hotel and carriageway. It is recommended to plant a hedgerow inter planted with large specimen trees.

8.4.3.10. Formal style, avenue specimen street tree planting should take place in the area between Humber Dock and Prince’s Dock where the pedestrian footbridge is to be located to try to help to screen and soften the structure, or to frame the structure should the design be iconic. Ornamental shrub planting is recommended around the base of the bridge ramps and steps. The bridge would be highly visible and street/ avenue planting would help to screen sections whilst providing formal structure to the area. The avenue however should be
widely spaced so as to not obstruct views on a north to south axis between the
dock areas and the tree form should be upright.

8.4.3.11. Due to the positioning of the Market Place footbridge a widened footway would
be required on either side of the carriageway. This widened area would present
the opportunity for avenue street tree planting and seating areas in the area
around the footbridge. The tree planting, when mature, would help to screen the
large footbridge structure which would be out of character with the surrounding
townscape areas.

Retention of Existing Vegetation

8.4.3.12. Where possible, existing vegetation along the road corridor should be retained.
All retained trees should be protected during the construction works in
accordance with BS6837:2005 ‘Trees in relation to construction’. Areas of
important shrub planting should also be surrounded by protective fencing.

8.4.3.13. Within the Trinity burial ground the removal of trees may result in the need for
arboricultural works to the remaining inner trees in order to reshape the canopies
that form the new edge of the area.

8.4.3.14. Areas of prominent vegetation to the north of the carriageway around William
Street pocket park, including a line of mature Poplar trees, should be retained,
where possible, in addition to the bank of screening vegetation along Waverley
Street which screen views from Townscape Area 2.

8.4.3.15. In the eastern area of the scheme corridor it is assumed that trees within the
footpath to the west, north and east of the Marina Court offices would be
unaffected by the works. These should be protected during the construction
works.

Building Materials

8.4.3.16. The main engineering features of the Underground Option are Mytongate Bridge,
associated slip roads and cutting to accommodate Castle Street itself. This
structure would be highly visible and this option presents opportunities to either
clad the structure in a different material to the usual concrete e.g. brick/stone
detailing, to provide more vernacular visual references, or use a different form or
materials for the bridge itself e.g. a distinctive metal cable stayed bridge or more
decorative supports/bridge spans. The cutting could also be softened by reducing the gradient of the cutting walls which could be stepped back with terraces containing areas of planting.

8.4.3.17. The three proposed footbridges would be highly prominent and the form, colour and materials that they are constructed from will affect how they relate with the surrounding townscape. Where possible, the design and materials palette should respect local townscape character, or alternatively, provide an iconic set of bridges out of contrasting but complementary materials.

8.4.3.18. Where the perimeter walls of Trinity burial ground are demolished due to the alignment of the scheme corridor the original bricks and coping stones should be retained for reuse in the reinstated wall along the line of the new boundary. This new wall would be essential in re-creating the enclosure and contextual boundary for the burial ground. The materials used within the northern wall to Humber Dock and the associated dock features should also be retained and protected for re-use if possible. This would also include features such as the mooring posts, for relocation in the new design.

8.4.3.19. New streetscape elements should coordinate with the better quality, more recent developments within the dock areas, and include lighting, railings, walls and signs.

High Quality Urban and Landscape Design within the Public Realm

8.4.3.20. The subject of urban design/public realm is covered in more detail within the Urban Design Report undertaken by Golder Associates (UK) Ltd (Golder, 2008). Given the context of the scheme, this report examines the present situation, and assesses opportunities for future urban design as part of the highway proposals including iconic structures. Within the Underground Option, areas of potential include the three pedestrian footbridges and the immediate thresholds, the open area of grass to the west of Trinity burial ground, and the open central areas between the carriageway and Prince’s Dock and Humber Dock.

8.4.3.21. The footbridges along Castle Street would be very prominent structures. Due to the size and the scale of the surrounding townscape, the bridges have the potential to impact negatively on adjacent areas. The impact of such bridges could be mitigated through high quality design that both respects local townscape character and sensitivity, whilst promoting a positive future outlook for
the city and reinforcing the gateway into the city centre. The footbridges should be coordinated, iconic structures with associated streetscape elements that link with the whole scheme and the wider areas of the docks.

8.4.3.22. Two new public spaces could be created in the area between Commercial Road and Trinity burial ground and the A63 and Prince’s Dock/Humber Dock. The green space and public realm could be enhanced to make more of a feature of these areas to divert attention away from the road corridor. These spaces could contain areas of seating and shelter combined with attractive lighting and planting. This new central park area would have great potential spanning the A63, providing a key pedestrian connection between the city centre and the waterfront.

8.4.4. **Overground Option**

*Tree and Shrub Planting*

8.4.4.1. The mitigation proposals for the Overground option are similar to those proposed for the Underground option. With this option the elevated bridge section of the A63 would be the major structure requiring mitigation; as opposed to the cutting sections of the Underground Option.

8.4.4.2. Two wedges of land would be created at Mytongate Junction between the slip roads and beneath the elevated A63. These two areas would be suitable for mitigation and enhancement proposals. Large semi-mature tree planting is recommended for the area to help screen views to the elevated A63 section from areas to the north and south of the carriageway. New planting would also help to mitigate the loss of the existing vegetation within Mytongate Junction. There would also be a large open area of land running directly beneath the viaduct that would be unsuitable for planting but would require further detailed hardscape design to ensure that a viable open space with high quality public realm elements is created.

8.4.4.3. An open area of verge would be created in front of the Great Passage Street pocket park, on the old alignment of Mytongate Junction. This area could be planted with specimen trees and ornamental shrub planting to help to buffer views between the park and the carriageway.
8.4.4.4. To the southwest of Mytongate Junction, adjacent to townscape character area 3, new ornamental shrub and tree planting is recommended to replace the existing areas lost to the westbound entry slip road. This replacement planting would help to form an attractive back drop to the car parking area while screening views into the car park from other character areas to the north.

8.4.4.5. To the northwest side of the A63 the eastbound exit slip road would encroach on the area around William Booth House, William Street and Cogan Street. New areas of verge-side planting should be provided in this area to buffer views to the road. The planting of the pocket park area should include a hedgerow bordered by ornamental shrub planting with large specimen trees growing within.

8.4.4.6. In the area around the proposed Porter Street footbridge it is recommended that verge-side tree planting is implemented around the base of the ramps and steps to the bridge to help to screen the structure and improve its setting.

8.4.4.7. To the southeast of Mytongate Junction, around the Trinity burial ground, replacement, evergreen shrub planting is recommended to replicate the existing sense of enclosure found within the area. Where mature trees are lost at the boundary, the gaps should be in filled with suitable semi mature specimen trees. Tree planting should be focused to the boundary with the westbound exit slip road to screen views between this elevated structure and the burial ground.

8.4.4.8. To the west of Trinity Burial Ground, up to Commercial Road, is a large area of grass verge. Similar to the Underground Option, this area could be planted with an avenue of large specimen trees bordering the footpath which would help to screen / soften views from the south to the elevated bridge structure. The area also has the potential to be turned into another pocket park similar to those in the vicinity while opening out links into the burial ground and the Railway Dock area.

8.4.4.9. To the northeast of the Mytongate Junction an increased area of verge would be created directly in front of the Golf Shop due to the alignment of the slip road. It is recommended that this area is planted with trees and shrubs to complement planting in other areas around the junction.

8.4.4.10. Adjacent to the Holiday Inn Hotel, subject to agreement with the hotel, a new bank of screening vegetation may be required to mitigate the area of lost verge and planting between the hotel and carriageway. Vegetation used should include hedging inter planted with large specimen trees. Planting could be
located across the line of the previous access; which would be removed. The area would also be suitable for a new perimeter boundary wall, constructed from brick to respect the local character and integrated with the nearby walls of Trinity burial ground.

8.4.4.11. Formal style avenue specimen street tree planting is recommended in the area between Humber Dock and Prince’s Dock where the pedestrian footbridge is to be located. Ornamental shrub planting is recommended around the base of the bridge ramps and steps. The bridge would be highly visible; an avenue of tree planting would help to screen/soften views towards the bridge from some areas. The avenue should, however, be widely spaced so as to not obstruct views on a north to south axis between the dock areas, with tall narrow tree species used.

8.4.4.12. A widened footway would be created at either side of the Market Place footbridge where the ramps and steps rise from the footpath. These areas present the opportunity for further street tree planting and seating areas to help to integrate the footbridge into the streetscape. The tree planting, when mature, would also help to screen the large footbridge structure from some viewpoints. Should an iconic bridge design be implemented, which integrated better with the local townscape, the tree planting should be rationalised.

Retention of Existing Vegetation

8.4.4.13. Where possible, existing vegetation along the road corridor should be retained and these proposals are as discussed for the Underground Option.

Building Materials

8.4.4.14. The main structure visible within the Overground Option would be the elevated bridge structure over Mytongate Junction including the elevated westbound exit slip road. The structure would be both large and highly visible although this option presents the opportunity to create an iconic bridge design that would act as a gateway to the city, e.g. a landmark metal cable stayed bridge.

8.4.4.15. The three footbridges along the scheme would be highly prominent; their form, colour and materials would all affect how they integrate with the local townscape areas. Where possible, the design and materials palette should respect local townscape character, or alternatively, provide an iconic set of bridges out of contrasting but complementary materials.
8.4.4.16. The walls of Trinity burial ground should be rebuilt as described for the Underground Option.

High Quality Urban and Landscape Design within the Public Realm

8.4.4.17. The subject of urban design/public realm was covered in more detail within the Urban Design Report undertaken by Golder Associates (UK) Ltd (Golders, 2008). Given the context of the scheme, this report examines the present situation, and assesses opportunities for future urban design as part of the highway proposals including iconic structures. Within this option areas of potential include; the area beneath and around the elevated viaduct, the three pedestrian footbridges, the open area of grass to the west of Trinity burial ground, and the open grassed areas either side of the carriageway between Prince’s Dock and Humber Dock.

8.4.4.18. The open areas beneath the viaduct, particularly the area to the east of Mytongate, present the opportunity for further detailed design to create a high quality, semi-covered, urban green space. The area could also form a key crossing point, linking areas to the north and south of the A63. The strip of land directly underneath the viaduct would be unsuitable for vegetation; however, it could be visually diverse and make a positive townscape contribution through choice of hard materials and lighting e.g. a ‘light wall’ and new areas of seating/shelter. This new park/public square could then be connected into the historic Trinity burial ground and Railway Dock.

8.4.5. The new footbridges would be very prominent elements within the local townscape. Due to their size and the scale they have the potential to impact negatively on the area. This impact may be mitigated through high quality design and materials, that both respect local townscape character and sensitivity whilst promoting a positive design contribution.

8.4.6. Coordination of Mitigation Proposals

8.4.6.1. To ensure that a coordinated approach to materials and design styles is undertaken as part of the mitigation it is recommended that the Hull City Council Supplementary Planning Document (SPD) ‘City Centre Public Realm Design Guidance’ June 2006 is followed.
8.4.6.2. Within this SPD Castle Street is identified as a key transportation corridor. Improved pedestrian crossings are suggested at Market Place, Humber Dock Street and the Trinity burial ground. Three important trails/footpaths cross within the study area; ‘Green Walk’ at Queen Street/Market Place, ‘Inner Dock Walk’ at Humber Dock Street/ Prince's Dock Street and the ‘Outer Walk’ at the Trinity burial ground/Myton Street.

8.4.6.3. The SPD contains recommended materials palettes including; pedestrian surfaces and edging, street furniture, signage, lighting, planting and tree recommendations. Recent public realm works have taken place to either side of Humber Dock which followed the guidelines set out in the public realm design guidance SPD showing how the guide can be used at a practical level.

8.4.7. Iconic Bridge Design

8.4.7.1. Three pedestrian footbridges proposed are proposed; Market Place Footbridge, Porter Street Footbridge and Princess Quay Footbridge and the locations are the same for both preferred scheme options.

8.4.7.2. The footbridges are located at key crossing points on pedestrian and cycle routes. Due to their locations, the surrounding receptors and the topography of the area, the bridges would be highly visible in two sensitive locations; the central docks and Market Place. The Porter Street footbridge offers the potential to be a gateway feature to the city centre when approached from the west whilst the other two bridges could be prominent gateway features within the heart of the Old Town Conservation Area. Due to the historic location of the dock and Market Place footbridge the high quality design of the footbridges is highly significant.

8.4.7.3. It is recommended that non-standard bridge options be considered at the next stage of the assessment process.

8.4.7.4. Within the central area of the scheme and at the Market Place junction there is a significant opportunity to create new public spaces around the bridges at these prominent locations. Through design, there is the opportunity to create spaces for street activities around the A63, integrating the road and removing this barrier from pedestrian movements in the city centre.
8.5. **NATURE CONSERVATION**

8.5.1. **Introduction**

8.5.1.1. The magnitude of impact anticipated to affect each of the features of conservation importance was assessed for the 2008 EAR (PF, 2008b) in the absence of mitigation measures. This took into account both direct loss of habitat and features through land-take, and perceived indirect impacts such as pollution and habitat fragmentation. Mitigation and compensation measures were suggested which would reduce negative impacts, and an assessment of the residual ecological impact on the species and habitats was made taking these measures into consideration.

8.5.1.2. The magnitude of the impact has been assessed using the criteria derived from TAG, 2004. The significance of the impacts was determined using the value of the feature and the magnitude of the impact (HA, 2008).

8.5.1.3. This section assesses the impact of the two preferred options on features of nature conservation importance which have been identified.

8.5.1.4. It also identifies mitigation and environmental compensation measures where they are necessary to the scheme.

8.5.2. **Impact Assessment Summary**

**Trinity Burial Ground**

8.5.2.1. The Trinity burial ground will be affected by both of the preferred options. Both routes would involve the removal of a number of mature trees and substantial sections of wall. Up to 33% (0.4 ha) of the Burial Ground would be lost. The Underground Option would involve the removal of at least eighteen mature trees and relatively large sections of wall. Two of the trees have high bat roost potential and five have moderate bat roost potential. The Overground Option would result in the removal of sixteen mature trees and a slightly shorter length of wall. The effect on potential bat roosts would be the same.
TABLE 8.5.2.1: ASSESSMENT OF IMPACTS ON TRINITY BURIAL GROUND SNCI

<table>
<thead>
<tr>
<th>Route Option</th>
<th>Appraisal category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underground Option</td>
<td>Intermediate negative</td>
</tr>
<tr>
<td>Overground Option</td>
<td>Intermediate negative</td>
</tr>
</tbody>
</table>

Mature Trees

8.5.2.2. A number of mature trees would potentially be lost, depending upon detailed design and landscaping. With both preferred options, mature trees within the Mytongate Junction would be affected. The Underground Option would affect a significant number of mature trees at the Trinity burial ground. The Overground Option would affect a slightly smaller number of trees at the Trinity burial ground.

TABLE 8.5.2.2: MATURE TREES AFFECTED

<table>
<thead>
<tr>
<th>Route Option</th>
<th>No. Mature Trees Affected</th>
<th>Location(s)</th>
<th>Assessment Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underground Option</td>
<td>24</td>
<td>Trinity Burial Ground, Mytongate Junction</td>
<td>Intermediate negative</td>
</tr>
<tr>
<td>Overground Option</td>
<td>23</td>
<td>Trinity Burial Ground, Mytongate Junction, Hessle Road</td>
<td>Intermediate negative</td>
</tr>
</tbody>
</table>

Bats

8.5.2.3. Although no bat roosts have been confirmed within any of the trees or walls, the scheme has the potential to impact upon bat roosts by the removal of mature trees and sections of wall with moderate and high bat roost potential. A bat roost potential plan can be found in Appendix D of the EAR (PF, 2009). Both of the preferred scheme options would impact upon bats reported to roost within the Castle Buildings.

TABLE 8.5.2.3: FEATURES WITH BAT ROOST POTENTIAL IMPACTED UPON

<table>
<thead>
<tr>
<th>Route Option</th>
<th>Trees Requiring Removal</th>
<th>Approx. % of Wall to be Removed</th>
<th>Buildings Requiring Demolition</th>
<th>Appraisal Category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High potential</td>
<td>Moderate potential</td>
<td>Wall 1 Wall 2 Castle Buildings</td>
<td></td>
</tr>
<tr>
<td>Underground Option</td>
<td>2</td>
<td>5</td>
<td>100 15</td>
<td>Yes</td>
</tr>
<tr>
<td>Overground Option</td>
<td>2</td>
<td>5</td>
<td>80 10</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Summary of Ecological Impacts

8.5.2.4. Table 8.5.2.4 provides a summary of the predicted impacts of each of the preferred options.

**TABLE 8.5.2.4: SUMMARY OF IMPACTS FOR EACH ROUTE OPTION**

<table>
<thead>
<tr>
<th>Route Option</th>
<th>Feature</th>
<th>Trinity Burial Ground SNCI</th>
<th>Mature Trees</th>
<th>Bats</th>
<th>Overall Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underground Option</td>
<td>Intermediate negative</td>
<td>Intermediate negative</td>
<td>Intermediate negative</td>
<td>Intermediate negative</td>
<td></td>
</tr>
<tr>
<td>Overground Option</td>
<td>Intermediate negative</td>
<td>Intermediate negative</td>
<td>Intermediate negative</td>
<td>Intermediate negative</td>
<td></td>
</tr>
</tbody>
</table>

8.5.2.5. The significance of the impacts for all features for each of the preferred options is given in Table 8.5.2.5. “Significance” is an assessment of the overall effect on the nature conservation features.

**TABLE 8.5.2.5: SIGNIFICANCE OF IMPACTS FOR EACH ROUTE OPTION**

<table>
<thead>
<tr>
<th>Route Option</th>
<th>Feature</th>
<th>Trinity Burial Ground SNCI</th>
<th>Mature Trees</th>
<th>Bats</th>
<th>Overall Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underground Option</td>
<td>Moderate</td>
<td>Slight or moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Overground Option</td>
<td>Moderate</td>
<td>Slight or moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td></td>
</tr>
</tbody>
</table>

**TABLE 8.5.2.6: SUMMARY OF FEATURES LOST**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Route Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. Mature trees affected</td>
<td></td>
</tr>
<tr>
<td>Trees requiring moving</td>
<td></td>
</tr>
<tr>
<td>Approx. % of wall to be removed</td>
<td></td>
</tr>
<tr>
<td>Amenity Grassland</td>
<td></td>
</tr>
<tr>
<td>Shrub planting</td>
<td></td>
</tr>
<tr>
<td>Lighting impact</td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Underground</td>
</tr>
<tr>
<td>Impact</td>
<td>24</td>
</tr>
<tr>
<td>High Potential</td>
<td>2</td>
</tr>
<tr>
<td>Moderate potential</td>
<td>5</td>
</tr>
<tr>
<td>Wall 1</td>
<td>100</td>
</tr>
<tr>
<td>Wall 2</td>
<td>15</td>
</tr>
<tr>
<td>Bat Foraging</td>
<td>Area reduced</td>
</tr>
<tr>
<td>Area reduced</td>
<td></td>
</tr>
<tr>
<td>Bat foraging</td>
<td>Potential improvement</td>
</tr>
<tr>
<td>Area reduced</td>
<td></td>
</tr>
<tr>
<td>Bat disturbance</td>
<td>Noise reduction</td>
</tr>
</tbody>
</table>
8.5.2.6. The overall significance of the impacts for both preferred options in the absence of mitigation is considered to be moderate adverse.

8.5.2.7. A range of mitigation measures will be incorporated into either of the preferred options which will reduce the significance of the impacts from moderate to slight adverse.

8.5.3. Mitigation, Compensation and Enhancement

8.5.3.1. Given that the overall significance of the impacts for both preferred options is considered to be moderate, a number of measures have been drawn up to mitigate for these losses. The objective of these proposals will be to reduce the significance of the impacts on the nature conservation features. The amount of land available for mitigation is very limited so it is important that any replacement or new areas of habitat are of high quality and are well maintained. The city centre location will also require that they are sufficiently robust to survive in isolation.

8.5.3.2. Mitigation proposals address the impacts on both local and national policies by providing suitable habitat for legally protected species and taking steps to replace mature trees.

8.5.3.3. Measures proposed for ecological enhancement do not form part of the DMRB assessment process but form a series of additional measures which compensate for unavoidable losses and improve existing nature conservation features. Proposals follow the general guidance of DMRB Volume 10 section 4 HA84/01.

Impact Avoidance

Retention of existing features

8.5.3.4. Steps will be taken to protect areas of important vegetation close to the proposed road works. This will include trees which will require protective fencing and grassland areas such as Pocket Park and the open area to the west of the Trinity burial ground.
Timing of Operations

8.5.3.5. Many impacts on wildlife can be reduced or avoided completely by undertaking work at specific times of year. Mitigation methods for protecting birds and bats have been detailed in the EAR (PF, 2008).

8.5.3.6. A programme for post construction monitoring will be drawn up once preliminary designs have been completed. A timetable for surveys and mitigation works is presented in Appendix D of the EAR (PF, 2009g) which includes a draft programme for site monitoring.

Mitigation - Habitats

8.5.3.7. Mitigation proposals have been drawn up for the loss of the following nature conservation features, which form part of the assessment process:

- Mature Trees;
- Bat Roosts;
- Potential Bat Roosts;
- Bat Foraging Areas; and
- Bird Nesting Areas;

Enhancement - Habitats

8.5.3.8. The following options for new habitats will complement existing wildlife areas:

- Habitats to encourage invertebrates;
- Native Hedgerows;
- Wild flower meadow;
- Areas for native shrub and bulb planting; and
- Wetland habitat;

8.5.3.9. These will also further the Hull Habitat Action Plan targets for hedgerows, semi natural grasslands and parks. Full details are given in the EAR (PF, 2009).
Mitigation of Nature Conservation Features

*Mature Trees*

8.5.3.10. The largest loss of mature trees will be across the northern section of the Trinity burial ground SNCI but there will also be losses along either side of Castle Street and on the Mytongate roundabout. Trees can take decades or even centuries to reach maturity, depending upon the species, and the loss of a tree cannot be mitigated for, in the short-term. However, a programme of tree planting of native species of local provenance and ongoing appropriate management would provide replacement in the long-term. It will be possible to replace the 24 mature trees which are to be lost, with suitable semi-mature trees incorporated into the landscape design.

*Bat Roosts*

8.5.3.11. Both of the preferred options will require the demolition of the Castle Buildings. A bat roost has been identified in this building; therefore, if demolition is necessary a licence from Natural England will be required prior to demolition. This will entail the submission of a method statement which details the survey results, assessment of bat population and a proposed mitigation strategy to compensate for the loss of the roost. Further survey may be required to inform the licence application.

*Potential Bat Roosts*

8.5.3.12. The presence of bat roosts within the mature trees of high potential has not been confirmed, therefore, a licence from Natural England is not currently required for removal of these trees. Further surveys are recommended during preliminary design, prior to completion of the Environmental Statement. If bats are found to be present there would be sufficient time to provide suitable mitigation before road construction begins.

8.5.3.13. A methodology for the removal of trees with high bat potential is given in the EAR (PF, 2008) section 7.10.3.1. Mature trees and walls should be retained wherever possible.

8.5.3.14. The EAR (PF 2008) recommended rebuilding sections of wall likely to be lost from the Trinity burial ground. The Overground Option is likely to lead to the loss
of 85m - 90m of old brick wall, while the Underground Option would lead to the loss of approximately 75m.

**Bat Foraging Areas**

8.5.3.15. The small number of bats recorded in the Castle Street area may be due to a lack of foraging habitat rather than to the lack of available roosts. There are plenty of old buildings, walls and over-mature trees suitable for a range of bat species. Existing foraging areas include Pocket Park, Trinity Burial Ground and the patches of amenity grassland areas on either side of the A63; these tend to be small, isolated and intensely managed.

8.5.3.16. In order to create improved habitat for bat foraging and birds, it is proposed that in the locations where roadside grass verges are being replaced, wildflower mixtures are used and the grass is cut after flowering and seeding.

**Areas for Enhancement**

8.5.3.17. Enhancement features fall outside the scope of the nature conservation assessment and go beyond mitigation requirements. The objective for creating new habitats is to compensate for habitat lost due to road widening and to create complimentary new habitats which will provide additional feeding and cover for notable species already recorded in the Castle Street area but which are currently infrequent or rare. Enhancement features must also assist wildlife in moving from one area to another. Sources of food and cover create "stepping Stone" features that facilitate short migration of wildlife between areas of habitat.

8.5.3.18. Areas for enhancement are shown in the Mitigation and Enhancement Plans in Appendix D of the EAR (PF, 2009).

**Monitoring**

8.5.3.19. Under the conditions of a licence for the destruction of a known bat roost, it will be a requirement to monitor any new roost or other mitigation provision, in order to make sure that the mitigation has been successful. The terms of these conditions will be determined at the time of making the application to Natural England and will be based on the survey data current at that time. These conditions must be included in the post construction management plan.
8.5.3.20. Other mitigation for UK and local BAP species should also be monitored after completion to assess the effectiveness of the mitigation and enhancement measures.

8.5.3.21. It is recommended that bird surveys be undertaken for at least two seasons following completion of the roadworks.

8.5.3.22. A detailed monitoring programme should be drawn up once the mitigation and enhancement measures have been incorporated within the final landscape design and post construction management plan.

8.5.4. Summary of Mitigation, Compensation and Enhancement

8.5.4.1. Mitigation proposals have been designed to support UK BAP species, Hull Bap species and Hull BAP habitats. Enhancement proposals may also provide habitat for other Hull BAP species such as elm trees and dragonflies.

8.5.4.2. A summary of potential mitigation and enhancement recommendations is given in the tables below.

**TABLE 8.5.2.7: MITIGATION**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bats</strong></td>
<td>Features with bat roost potential to be retained wherever possible. If removed, to be supervised by licensed bat worker.</td>
</tr>
<tr>
<td></td>
<td>Erect bat boxes on mature trees to be retained.</td>
</tr>
<tr>
<td></td>
<td>Re-build brick wall with bat potential + ivy and other climbing plants.</td>
</tr>
<tr>
<td></td>
<td>Demolition of confirmed roost(s) to be carried out under licence from Natural England.</td>
</tr>
<tr>
<td><strong>Birds</strong></td>
<td>Retain mature trees and other vegetation wherever possible.</td>
</tr>
<tr>
<td></td>
<td>Vegetation removal to take place outside the bird breeding season (March to August) whenever possible. If removal required within the bird breeding season, area must be checked by an Ecologist beforehand.</td>
</tr>
<tr>
<td></td>
<td>Native shrub, hedgerow and species-rich neutral grassland planting on new road verges.</td>
</tr>
<tr>
<td></td>
<td>Bird boxes to be erected on retained mature trees and along re-built wall.</td>
</tr>
<tr>
<td><strong>Other habitats</strong></td>
<td>Retain deadwood for invertebrates</td>
</tr>
<tr>
<td></td>
<td>Plant native trees on new road verges.</td>
</tr>
<tr>
<td><strong>Trinity Burial Ground SNCI</strong></td>
<td>Retain mature trees wherever possible. Plant new trees to compensate for those lost.</td>
</tr>
</tbody>
</table>
8.5.2.8. The above recommendations for mitigation, compensation and enhancement address the impacts highlighted in the overall assessment. There are different opportunities for ecological mitigation and enhancement with both of the preferred options. The Overground Option creates room for a large area of habitat creation including wetland, which will mitigate for areas of bat foraging. The Underground Option has a smaller area available but has sufficient space to plant a number of trees which will have the potential to grow to maturity and compensate for a proportion of the trees lost during construction.

8.5.4.4. In summary, it is predicted for both options that there will be a moderate adverse impact on the Trinity Burial Ground SNCI due to a loss of foraging areas and roosting sites for bat and several mature trees. Bird nesting sites will also be lost.
in the old wall. Other bat foraging areas, bird nesting sites and mature trees along Castle Street will also be lost.

8.5.4.5. Negative impacts will be minimised through retention of existing vegetation and creation of species-rich grassland together with planting new native trees, hedgerows and shrubs. New habitats for invertebrates will provide foraging for birds and bats. Reconstructing an old wall will maintain potential bat roost and bird nesting habitat.

8.5.4.6. Mitigation measures will reduce the overall impact of the scheme from moderate adverse to slight adverse.

8.6. MATERIALS

8.6.1. No significant areas of geological concern, either physical or geomorphological, were highlighted during the Environmental Assessment. There is not anticipated to be any significant impacts on the local geology. The site has already been disturbed by the construction of the existing A63.

8.6.2. The Overground Option would be less at risk from geotechnical constraints than the Underground Option as there is significantly less excavation works and piling with the former.

8.6.3. The improvement scheme is located in an area that has been utilised for numerous industrial purposes. The main areas of potential concern due to historic industrial uses are associated with Trinity burial ground and the adjacent docks. It is anticipated that contaminated land may be encountered at these locations. Any risks can be identified during the proposed PCF Stage 3 site investigation works.

8.6.4. Where the proposed scheme passes over a disused graveyard, the interred remains in this area would be removed by a specialist contractor prior to commencement of construction.

8.6.5. The presence of Made Ground beneath the A63 Castle Street has been identified in previous site investigations. To date the investigations have proved that the material is variable in both depth and composition. Limited chemical testing has identified isolated areas of elevated determinants but generally the Made Ground has not been found to be significantly contaminated.
8.6.6. The PSSR (PF, 2009f) has recommended that it would be prudent to undertake further contamination testing in the vicinity of the burial ground and across the whole of the proposed development for both Human Health and Waste Acceptance Criteria (WAC) assessment. Any material found to be contaminated beyond acceptable levels for end users of the site, will be required to be removed in accordance with the WAC and Waste Acceptance Procedures.

8.6.7. With any of the scheme option is ultimately decided upon, any waste arisings which are destined for landfill will need to be properly managed, stockpiled and classified before they leave site. The method for dealing with waste arisings will be detailed in the Site Waste Management Plan produced for the scheme.

8.6.8. Table 8.6.1 provides a ranking of the scheme options based on the assessment findings.

### TABLE 8.6.1: OVERALL SUMMARY SCORES

<table>
<thead>
<tr>
<th>Route Option</th>
<th>Comment</th>
<th>Overall Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underground Option</td>
<td>Highest volume of material excavated and most piling works. Higher risk of pollution to environment due to more material (and therefore potentially more contaminated material) being removed.</td>
<td>2</td>
</tr>
<tr>
<td>Overground Option</td>
<td>Significantly lower volume of material excavated, less piling works.</td>
<td>1</td>
</tr>
</tbody>
</table>

8.7. **NOISE**

8.7.1. The two preferred scheme options each indicate varying changes in the road traffic noise for the local community compared with the Do Minimum case.

8.7.2. An overview of the net changes in noise level for each preferred scheme option is summarised in Table 8.7.1. The net change is the number of properties experiencing an increase in noise level minus the number of properties experiencing a decrease or no change in noise level. A negative number therefore indicates that more properties experienced a decrease or no change in noise level than an increase.
TABLE 8.7.1: SUMMARY OF THE VARIATION OF THE NUMBER OF PROPERTIES EXPERIENCING A CHANGE IN NOISE LEVEL

<table>
<thead>
<tr>
<th>Route Option</th>
<th>Year Opening</th>
<th>Long Term (+15 Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overground Option</td>
<td>-1535</td>
<td>-735</td>
</tr>
<tr>
<td>Underground Option</td>
<td>-1509</td>
<td>-617</td>
</tr>
</tbody>
</table>

8.7.3. The overall noise impacts of the preferred options are summarised in Table 8.7.2.

TABLE 8.7.2: SUMMARY OF THE OVERALL NOISE IMPACTS FOR THE PREFERRED OPTIONS

<table>
<thead>
<tr>
<th>Route Option</th>
<th>Year Opening</th>
<th>Long Term (+15 Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overground Option</td>
<td>Minor beneficial to negligible adverse</td>
<td>Minor beneficial to minor adverse</td>
</tr>
<tr>
<td>Underground Option</td>
<td>Negligible beneficial to minor adverse</td>
<td>Negligible beneficial to minor adverse</td>
</tr>
</tbody>
</table>

8.7.4. One of the purposes of the simple assessment is to determine whether a detailed assessment needs to be undertaken. HA213/08 (HA, 2008c) advises that if any of the following criteria are met then a detailed assessment should be carried out:

- An increase in noise level of 1 dB(A) or more at any dwelling within the study area as a result of the project in the baseline year;
- An increase in noise level of 3 dB(A) or more at any dwelling within the study area during the first 15 years as a result of the project; or
- The level of vibration at a dwelling is predicted to rise above a level of 0.3 mm/s or an existing level above 0.3mm/s is predicted to increase.

8.7.5. The simple assessment has shown that, under both preferred options none of the above criteria are met. Consequently, a detailed level of assessment is not necessary.

8.8. EFFECT ON ALL TRAVELLERS

8.8.1. The current traffic flow along the A63 results in severance along the length of Castle Street between the city centre of the north and the waterfront area to the south of the road. Both preferred options include very similar `improvements to
the A63, with the result that some journey patterns would be disrupted together with increased flow which could potentially create new severance.

8.8.2. The opportunity exists to develop improved crossing facilities along Castle Street, in particular at Porter Street, Mytongate Junction, Princes Quay and at Market Place; primarily by the provision of overbridges to offer safer crossing points for pedestrians. The proposed footbridges at Porter Street, Princes Quay and at Market Place form an integral part of both preferred options bringing the additional benefit of improved amenity for users through segregated crossing and the prospect of an elevated view of the surrounding townscape. It is acknowledged, however, that the use of the overbridge at Mytongate Junction would incur a detour. For both preferred options a combined wide footpath and cycleway would be provided between Ferensway and Commercial road with at grade signalised crossings on the slip roads.

8.8.3. The road improvements to the A63 will help to ease traffic congestion to the same extent with both preferred options.

8.8.4. As a result of improved roads and signage, driver stress would be reduced. The construction period for each of the two preferred options is different. The Overground Option has the shortest construction period (94 weeks). It can, therefore, be concluded that driver stress for this scheme will be the lowest of the two preferred options.

8.8.5. Overall, the works to improve the A63 would be expected to fulfil their intended purpose and improve road capacity and safety, particularly at peak periods, resulting in a reduction in driver stress.

8.9. COMMUNITY AND PRIVATE ASSETS

Land Use

8.9.1. For both preferred options, the Grade II Listed Castle Buildings and Earl de Grey Public House are the only buildings proposed to be demolished.

8.9.2. For both preferred options, a large area of the Trinity burial ground would be lost to the alignment of the scheme proposals. This would significantly and permanently reduce this area of public open space within the city centre.
8.9.3. Humber Dock would also be affected due to the demolition of the historic dock wall and the relocation of the wall southwards into the dock by approximately 15m would reduce the volume and area of the historic dock. The new dock wall would also lead to the reconstruction of the public areas to the south of the carriageway as discussed in the mitigation section (section 8.3.3).

8.9.4. Overall, the impact on land allocated for development would be minimal. For the Fruit Market SDA the main impact would be on the area required for the base of the footbridge at Market Place. The main impact on the Quay West SDA would be the loss of the Grade II listed Castle and Earl de Grey Buildings, which would not affect the functioning of the SDA.

8.9.5. A summary of the overall assessment score for both of the preferred options is given in Table 8.9.5.1 below.

TABLE 8.9.5.1: LAND USE – SUMMARY OF OVERALL ASSESSMENT SCORE

<table>
<thead>
<tr>
<th>Option</th>
<th>Overall Assessment Score</th>
<th>Land Allocated for Development / Significance</th>
<th>Order of Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underground Option</td>
<td>2 Listed Buildings – Very Large Adverse&lt;br&gt;North wall to / and area of Humber Dock – Large Adverse&lt;br&gt;Loss of south eastern corner of William Street Pocket Park – Slight Adverse&lt;br&gt;Trinity Burial Ground, approx one third area lost – Large Adverse</td>
<td>Fruit Market SDA – Slight Adverse&lt;br&gt;Quay West SDA – Slight Adverse</td>
<td>= 1st</td>
</tr>
<tr>
<td>Overground Option</td>
<td>2 Listed buildings – Very Large Adverse&lt;br&gt;North wall to / and area of Humber Dock – Large Adverse&lt;br&gt;Loss of south eastern corner of William Street Pocket Park – Slight Adverse&lt;br&gt;Trinity Burial Ground, approx one third area lost – Large Adverse</td>
<td>Fruit Market SDA – Slight Adverse&lt;br&gt;Quay West SDA – Slight Adverse</td>
<td>= 1st</td>
</tr>
</tbody>
</table>

Note: 1 = least adverse impact

Community Effects

8.9.6. No direct impacts on community facilities and associated rights of way are expected as a result of the scheme.

8.9.7. An assessment of the change in severance at existing crossing points along the A63 as a result of the improvement scheme is summarised in Section 8.8 of this report.
Planning Policies

8.9.8. It should be noted that, in principle, a decision has already been taken in statutory development plans that improvements to the A63 should be given the highest priority. It is a first priority scheme in the approved Regional Spatial Strategy (2008) and land for this road scheme including any land required for road widening has been allocated and protected for this purpose in the Adopted Local Plan for the City. The more recent, but so far unadopted, Local Development Framework documents all make the assumption that the A63 will be improved. Therefore, in principle the high level planning policy framework supports either of the preferred options.

8.9.9. The above mentioned development plans demonstrate that support for improvements to the A63 Castle Street at national, regional and more local levels is very strong. However, while a roadline is protected in principle in the adopted Local Plan for the City it is not possible to differentiate between the options on the basis of broad transportation or economic development considerations as it has been assumed in the Plan that this would be a matter for detailed investigation at a later date. However, it is possible that one option may score better than the other in terms of other more detailed transportation policy and policies relating to the environmental aspects of this assessment.

Design Mitigation and Enhancement Measures, including Monitoring

8.9.10. For both preferred scheme options mitigation for the loss of private property would apply to the Castle Buildings and Earl De Grey Public House only. Options for the specific mitigation of these listed buildings are summarised in the Cultural Heritage Assessment (Section 8.3) and also referenced in the Townscape Effects Assessment (Section 8.4). Options include amending the alignment of the road to avoid demolition or carefully demolishing and reconstructing further back from the carriageway.

8.9.11. The loss of part of the existing dock wall and construction of a new north dock wall to Humber Dock for both preferred options presents the opportunity for further enhancement of the area. There is the potential to create new areas of public realm to connect with the proposed footbridge over Castle Street at Prince’s Dock and to link with the adjoining areas north and south of the carriageway. The design of these areas is discussed in the mitigation sections of
the Townscape Effects Assessment (Section 8.4) and the Urban Design Report (Golders, 2008).

8.9.12. No mitigation is required for Community Effects.

8.9.13. The policy compliance and assessment with regard to the specific environmental aspects is contained within the respective specialist environmental sections of the EAR (PF, 2009g). These sections also deal with the mitigation measures proposed for each of the specialist environmental areas.

8.10. ROAD DRAINAGE AND THE WATER ENVIRONMENT

Accidental Spillage Risk

8.10.1. On traffic carrying roads there is the potential for the pollution of watercourses and groundwater supplies from accidental spillages of harmful chemicals and materials as a result of road traffic accidents.

8.10.2. Accident risk is translated into a pollution incident using a risk reduction factor, based on emergency services response times, which determine whether a serious spillage will cause a pollution incident.

8.10.3. The accidental spillage calculations have been undertaken using traffic data for the baseline conditions, as well as the do something and do minimum scenarios for the opening and design years 2017 and 2032 respectively. The calculation sheets are provided in the EAR (PF, 2009g). The results are summarised in Table 8.10.1.

**TABLE 8.10.1: METHOD D CALCULATION RESULTS**

<table>
<thead>
<tr>
<th>Opening Year</th>
<th>Assessment Scenario</th>
<th>Emergency Service Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&lt; 20 minutes</td>
</tr>
<tr>
<td>Baseline</td>
<td>Current Conditions</td>
<td>0.31 %</td>
</tr>
<tr>
<td>2017</td>
<td>Do Something</td>
<td>0.10 %</td>
</tr>
<tr>
<td></td>
<td>Do Minimum</td>
<td>0.32 %</td>
</tr>
<tr>
<td>2032</td>
<td>Do Something</td>
<td>0.11 %</td>
</tr>
<tr>
<td></td>
<td>Do Minimum</td>
<td>0.32 %</td>
</tr>
</tbody>
</table>
8.10.4. The proposed improvement scheme is situated within 1km of Environmentally Sensitive Sites associated with the River Humber. Method D guidance within HA 45/09 (HA, 2009) states that where the proposed scheme is situated in close proximity to an Environmentally Sensitive Area ‘a higher standard of protection will be required such that the risk of a serious pollution incident has an annual probability of less than 0.5%’.

8.10.5. When applying an emergency service response time of 20 minutes (applicable for urban sites, such as the location of the preferred scheme options) all proposed scenarios achieve an annual probability of less than 0.5%. The results clearly show that by undertaking the proposed improvement scheme the risk of pollution from a serious pollution event decreases, i.e. the annual probability of a serious pollution incident is lower for the do something scenario when compared with either the baseline or the do minimum scenarios.

8.10.6. Considering the assessment results, the magnitude of impact is considered to be negligible; therefore, the overall impacts on both the groundwater and surface water attributes of this site are neutral for both proposed options.

**Design Mitigation and Enhancement Measures, Including Monitoring**

8.10.7. It is proposed that a new drainage pipe be laid from the A63 running beneath Commercial Road and discharging into the Humber Estuary, in front of Albert Dock. This is likely to increase the road runoff into the water environment, which is currently thought to discharge to surface water sewers and sewerage treatment.

8.10.8. An assessment of the impacts of routine runoff has not been possible due to a lack of Q95 flow data, however the results of the accidental spillage calculations (Method D) indicate an acceptable pollution risk of less than 0.5%. The calculations indicate that the proposed scheme will have a benefit by reducing the accidental spillage risk when compared to the current situation and the do minimum scenarios. In addition, the overall significance of potential impacts has been assessed as being Neutral. These results do not indicate the requirement for drainage mitigation. However, all drainage issues associated with the scheme will be addressed during the detailed design stage.
9. SUMMARY OF PUBLIC CONSULTATION

9.1. INTRODUCTION

9.1.1. The report on the 2009 Public Consultation for the A63 Castle Street scheme is a key product required by Stage 2 of the PCF. It sets out to explain the nature of the choices presented to the public and the manner in which the consultation was undertaken. It analyses the views and representations received, both locally and non-locally, summarises the findings and makes recommendations for further actions.

9.1.2. A summary of the Report on Public Consultation (PF, 2009h) is given in the following sections.

9.2. CONSULTATION ARRANGEMENTS


9.2.2. Public Exhibitions were held as follows:

- The Deep: Thursday 2nd April 2009 (2 pm – 8 pm)
  - Friday 3rd April 2009 (10 am – 8 pm)
  - Saturday 4th April 2009 (10 am – 4 pm)
- The Royal Hotel: Friday 8th May 2009 (10 am – 8 pm)

9.2.3. A special exhibition preview event for invited stakeholders and local dignitaries was held at The Deep on the evening of Wednesday 1st April 2009, prior to the first public attendance day. The local press were invited to attend the opening of the exhibition at The Deep on the afternoon of 2nd April 2009.

9.3. CONSULTATION MATERIAL

9.3.1. Public Consultation leaflets, accompanied by a questionnaire, were produced describing the preferred options for the A63 Castle Street Improvement scheme and providing details of the forthcoming exhibitions. The questionnaire requested the respondents to indicate their preferred option and to grade how successful the two preferred options were at resolving Castle Street’s key problems. It also asked for respondent’s opinions on the type of pedestrian
crossing facilities that should be provided. Space was provided on the questionnaire for respondents to provide their name and address and to make additional comments.

9.3.2. Letters, accompanied by the Public Consultation leaflet and the executive summary of the Technical Appraisal Report, were sent to organisations and key stakeholders informing them of the exhibitions and inviting them to attend and comment on the proposals. The list of organisations and key stakeholders contacted is included in Appendix C of the Report on Public Consultation (PF, 2009h) and included emergency services, local councils, government agencies, members of parliament, members of the European parliament and environmental groups.

9.3.3. Approximately 132,000 consultation leaflets and questionnaires were distributed between 9th March 2009 and 1st April 2009 as follows:

- 84,500 hand delivered to households and local businesses;
- 36,800 delivered as an enclosure within the local free paper;
- 200 directly mailed to transport / other businesses associated with the port;
- 2,500 deposited at pre-determined points at libraries, community centres and council offices where they would be available to the general public throughout the consultation period; and
- 8,000 delivered to P&O and ABP at the Port of Hull for distribution to HGV drivers in the weeks preceding the Public Exhibition.

9.3.4. A scheme page was set up within the Highways Agency's website. Details of the website were given on the Public Consultation leaflet and could be accessed at http://www.highways.gov.uk/A63castletstreet.

9.3.5. Initially, details of the scheme, a copy of the Public Consultation leaflet and an on-line questionnaire, which could be completed and submitted electronically, were uploaded to the website. The website was updated in April 2009 to announce details of the additional public exhibition day and again in May 2009 to include more detailed information on both the preferred and non-preferred options.

9.3.6. The Public Exhibition comprised a display of nineteen large posters that:
• Explained the purpose of the exhibition;
• Described the background to the scheme;
• Showed 3D drawings and text describing the preferred options;
• Outlined the main economic, safety and traffic aspects of the two preferred options;
• Explained the environmental impact of the two preferred options;
• Compared the key engineering features for the two preferred options;
• Described the four non-preferred options with reasons for non-preference;
• Outlined what happens next; and
• Invited comments from the public.

9.3.7. Photographs showing the exhibition layout at The Deep are included below.

9.3.8. An animated 3D visualisation was also shown for the two preferred options.

9.4. EXHIBITION PUBLICITY

9.4.1. A notice giving details of the exhibitions was released to the press by the COI on 9th March 2009.

9.4.2. Further publicity about the exhibition was provided with advertisements in the Hull Daily Mail and the Yorkshire Post, which ran on Wednesday 23rd March 2009. The papers also included short articles about the scheme encouraging readers to attend. The Yorkshire Post interviewed the HA at the opening of the
Public Exhibition. An article about the scheme was included in the April edition of Hull City Council’s free paper, ‘Hull in Print’.

9.4.3. Radio adverts were broadcast on Viking FM & KCFM in the week running up to the exhibition.

9.4.4. Two interviews were given on 9th March 2009 at the start of the consultation period. The first was a live interview for Radio Humberside and the second was a pre-recorded interview for KCFM. Another pre-recorded interview was also given to KCFM on 2nd April 2009.

9.4.5. In order to advertise the additional exhibition date a two page A5 flyer was printed and distributed to households, businesses and deposit points as outlined in 9.3.3. Details were also placed on the HA’s road projects website on the A63 Castle Street page (http://www.highways.gov.uk/roads/projects/22760.aspx).

9.4.6. In the week running up to the additional exhibition further publicity about the exhibition was provided with advertisements in the Hull Daily Mail and the Yorkshire Post.

9.5. RESPONSE TO THE PUBLIC CONSULTATION

9.5.1. Attendances at the exhibitions were as follows:

<table>
<thead>
<tr>
<th>Exhibition Preview for Hull City Councillors</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Deep, Wednesday 1st April</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public Exhibitions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The Deep - Thursday 2nd April 2009</td>
<td>102</td>
</tr>
<tr>
<td>The Deep - Friday 3rd April 2009</td>
<td>166</td>
</tr>
<tr>
<td>The Deep - Saturday 4th April 2009</td>
<td>168</td>
</tr>
<tr>
<td>The Royal Hotel – Friday 8th May 2009</td>
<td>108</td>
</tr>
<tr>
<td>Total (excluding preview)</td>
<td>544</td>
</tr>
</tbody>
</table>

9.5.2. Approximately 132,000 consultation leaflets were distributed during the consultation period and 544 members of the public attended the exhibition, representing around 0.5% of the target audience. The level of attendance at the exhibitions was generally in line with expectations.
9.5.3. Feedback forms, comments sheets and a ballot box were provided at the exhibition for visitors requesting further information or to provide comments on the scheme. A total of 144 feedback forms and 30 comment sheets were received requesting further information and providing comments on the scheme. Overall, 26% of the exhibition visitors gave feedback on the exhibition and 13% of the visitors made comments on the scheme or requested further information.

9.5.4. By the end of the consultation period a total of 1503 completed questionnaires were received, with 1469 completed by hand and 34 submitted on-line via the HA’s A63 website. The total number of questionnaires returned (1503) represents 1.1% of the leaflets distributed. In addition, 786 respondents (52%) provided additional comments on the scheme. The total number of comments received in proportion to the total number of questionnaires returned is considered to represent a good response for a consultation of this type.

9.5.5. Fifteen members of the public also submitted their views by letter or e-mail.

9.6. SUMMARY OF QUESTIONNAIRE RESPONSES

Question 1

9.6.1. Question 1 asked respondents to include their name and address, or alternatively, just their postcode to enable the location of the response in relation to the scheme to be determined.

9.6.2. For the purposes of this consultation ’Local’ was defined as an area within 500m of the A63 Castle Street Improvement Scheme. This area covers as far as the Humber Estuary to the south of the A63, as far as Daltry Street Flyover to the west, the railway station, including the city centre, to the north and just west of Garrison Road Roundabout to the east of the scheme. ’Non-Local’ was defined as all respondents other than ‘Local’. Respondents who did not provide an address or postcode were included within this category.

9.6.3. There was no requirement for respondents to complete this question.

Question 2

9.6.4. Question 2 asked “Please indicate your Preferred Option.”
9.6.5. Of the 1503 completed questionnaires received 1474 (98%) of the respondents answered this question, 79 of these were local and 1398 were non-local. Overall, 33.1% expressed a preference for the Underground Option, 54.2% expressed a preference for the Overground Option, 7.5% had no preference, 3.3% wanted neither option and 1.9% declined to answer.

9.6.6. There is a clear difference in views between the local and non-local respondents. Overall, approximately 54% of local respondents favoured the Underground Option compared to only 33% of non-locals, whereas 34% of local respondents favoured the Overground Option compared with 57% of non-locals.

Question 3

9.6.7. Question 3 asked “How successful do you think the two options are in addressing Castle Street's particular problems?” A check box matrix for the two preferred options was provided.

9.6.8. The majority of respondents considered the Underground Option to be Good at improving accessibility (657 of 1095 respondents, i.e. 60%), Good at reducing traffic congestion (590 of 1094 respondents, i.e. 54%) and Good at improving safety (547 of 1075 respondents, i.e. 51%).

9.6.9. There were mixed views regarding the Underground Option's ability to address severance. 379 of 1003 respondents (38%) graded this option as Good and 452 respondents (45%) graded this option as Satisfactory. Overall, 83% of respondents graded the Underground Option as either Good or Satisfactory. Only 172 respondents (17%) graded the Underground Option as Poor in addressing severance.

9.6.10. With regard to Environment, 39% of respondents rated the Underground Option as Good and 40% as Satisfactory. Overall, 79% of respondents graded this option as either Good or Satisfactory. 231 of the 1076 respondents (21%) graded the Underground Option as Poor with respect to environment.

9.6.11. The majority of respondents considered the Overground Option to be Good at improving accessibility (845 of 1223 respondents, i.e. 69%), Good at reducing traffic congestion (775 of 1218 respondents, i.e. 64%) and Good at improving safety (719 of 1203 respondents, i.e. 60%).
9.6.12. There were mixed views regarding the Overground Option’s ability to address severance. 473 of 1105 respondents (43%) graded this option as Good, 493 respondents (45%) graded this option as Satisfactory. Overall, 87% of respondents graded the Overground Option as either Good or Satisfactory. Only 139 respondents (12%) graded the Overground Option as Poor in addressing severance.

9.6.13. With regard to Environment, 41% graded the Overground Option as Good and 40% as Satisfactory. Overall, 81% respondents (81%) rated this option as either Good or Satisfactory. 227 of the 1182 respondents (19%) graded the Overground Option as Poor with respect to environment.

9.6.14. Overall for both preferred options, over 78% of respondents who answered this question graded both the Overground and Underground Options as either Good or Satisfactory in addressing Castle Street's particular problems of Accessibility to the Docks, Traffic Congestion, Safety, Severance and the Environment.

Question 4

9.6.15. Question 4 asked “Do you use the existing pedestrian crossings?”. The question was also subdivided for each of the three signalised crossing points at Porter Street, Princes Quay and Market Place.

9.6.16. Of the 1503 questionnaires received, 1295 respondents (86%) commented on the Porter Street crossing, with 208 (14%) declining to answer, 1429 (95%) commented on the Princes Quay crossing, with 74 (5%) declining to answer, and 1370 (91%) commented on the Market Place crossing, with 132 (9%) declining to answer.

9.6.17. Of the 1295 respondents who commented on the Porter Street crossing, 409 (32%) indicated that they used the crossing and 886 (68%) indicated that they did not use the crossing. Of the 1429 respondents who commented on the Princes Quay crossing, 928 (65%) indicated that they used the crossing and 501 (35%) indicated that they did not use the crossing. Of the 1370 respondents who commented on the Market Place crossing, 753 (55%) indicated that they used the crossing and 618 (45%) indicated that they did not use the crossing.
9.6.18. Overall, 32% of respondents use the Porter Street crossing, 65% of respondents use the Princes Quay crossing and 55% of respondents indicated that they use the Market Place crossing.

Question 5

9.6.19. Question 5 asked “Which type of crossing facility would you prefer to see?” This question was subdivided by crossing location, i.e. Porter Street, Princes Quay and Market Place.

9.6.20. Of the 1503 questionnaires received, 1406 (94%) commented on the Porter Street crossing, 1441 (96%) commented on the Princes Quay crossing and 1426 (95%) commented on the Market Place crossing.

9.6.21. At Porter Street 971 (65%) respondents preferred a footbridge, 192 (13%) preferred a signalised crossing, 243 (16%) had no preference and 97 (6%) declined to answer. At Princes Quay 1078 (72%) respondents preferred a footbridge, 214 (14%) preferred a signalised crossing, 149 (10%) had no preference and 62 (4%) declined to answer. At Market Place 1024 (68%) respondents preferred a footbridge, 224 (15%) preferred a signalised crossing, 178 (12%) had no preference and 77 (5%) declined to answer.

9.6.22. Overall, at all three crossing locations the majority of respondents indicated that they would prefer a footbridge type of crossing.

Question 6

9.6.23. Question 6 asked “Do you travel along Castle Street by:”. The respondents were given a list of nine options: car; motorcycle; commercial vehicle; public transport; pedestrian; equestrian; cyclist; other and ‘I do not use Castle Street’, and encouraged to tick all relevant options.

9.6.24. Of the 1503 respondents, 1332 indicated that they used their car along Castle Street, 89 were motorbike users, 219 were commercial vehicle users, 137 used public transport, 1009 were pedestrians, 7 were equestrians and 172 were cyclists. In addition, 17 respondents ticked the “other” usage check box but did not provide any additional comments on their “other” mode of transport and 35 respondents indicated that they did not use Castle Street.
Additional Comments

9.6.25. A section was included on the questionnaire to allow respondents to provide additional comments. A summary of the comments is given below.

<table>
<thead>
<tr>
<th>Issue</th>
<th>No. of Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flooding / High water Table</td>
<td>195</td>
</tr>
<tr>
<td>Replacement of signalised crossing with footbridges</td>
<td>111</td>
</tr>
<tr>
<td>Change In View / Amenity</td>
<td>78</td>
</tr>
<tr>
<td>Scheme Overdue / Get on with It</td>
<td>69</td>
</tr>
<tr>
<td>Disability, etc access to footbridges</td>
<td>52</td>
</tr>
<tr>
<td>Severance</td>
<td>47</td>
</tr>
<tr>
<td>Extended Viaduct</td>
<td>41</td>
</tr>
<tr>
<td>Pollution / Noise</td>
<td>25</td>
</tr>
<tr>
<td>Cut and Cover Tunnel</td>
<td>24</td>
</tr>
<tr>
<td>Disruption due to construction</td>
<td>19</td>
</tr>
<tr>
<td>Vandalism / anti-social behaviour</td>
<td>15</td>
</tr>
<tr>
<td>Offline solution</td>
<td>7</td>
</tr>
<tr>
<td>Landbridge</td>
<td>4</td>
</tr>
<tr>
<td>Bypass</td>
<td>3</td>
</tr>
<tr>
<td>Roundabout at Mytongate Junction</td>
<td>1</td>
</tr>
</tbody>
</table>


9.7. CORRESPONDENCE FROM INDIVIDUALS

9.7.1. As well as the comments received on the questionnaire and comment forms during the Public Exhibition, comments on the scheme were also provided separately by a number of individuals. These comments were submitted either by post or via the scheme’s e-mail address.

9.7.2. A summary of these comments is tabulated below.

<table>
<thead>
<tr>
<th>Comment</th>
<th>No of Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative</td>
<td>3</td>
</tr>
<tr>
<td>Request to reassess non-preferred options</td>
<td>2</td>
</tr>
<tr>
<td>Request for Information (scheme drawings)</td>
<td>2</td>
</tr>
<tr>
<td>Query relating to Trinity Burial Ground (graves)</td>
<td>2</td>
</tr>
</tbody>
</table>
9.7.3. More details on the comments are presented in the Report on the Public Consultation (PF, 2009h).

9.8. PUBLIC EXHIBITION COMMENTS

Feedback Forms and Comments Sheets

9.8.1. Feedback forms, comments sheets and a ballot box were provided at the exhibitions for attendees to submit comments or requests for further information.

9.8.2. A summary of the comments submitted on the feedback forms is shown in the table below.

<table>
<thead>
<tr>
<th>Issue</th>
<th>No of Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provision for pedestrian accessibility</td>
<td>11</td>
</tr>
<tr>
<td>Support for Overground Option</td>
<td>10</td>
</tr>
<tr>
<td>Support for Underground Option</td>
<td>6</td>
</tr>
<tr>
<td>Flooding</td>
<td>5</td>
</tr>
<tr>
<td>Support for extended viaduct (non-preferred option)</td>
<td>5</td>
</tr>
<tr>
<td>Alternative options</td>
<td>5</td>
</tr>
<tr>
<td>Needed urgently</td>
<td>4</td>
</tr>
<tr>
<td>Provision for cyclists</td>
<td>4</td>
</tr>
<tr>
<td>Severance of the waterfront from the city centre</td>
<td>3</td>
</tr>
<tr>
<td>Excavation in poor ground conditions and high water table</td>
<td>3</td>
</tr>
<tr>
<td>Impact on Trinity Burial Ground</td>
<td>3</td>
</tr>
<tr>
<td>Land take</td>
<td>3</td>
</tr>
<tr>
<td>Garrison Road Roundabout</td>
<td>3</td>
</tr>
<tr>
<td>Demolition of Grade II listed buildings</td>
<td>2</td>
</tr>
<tr>
<td>Traffic signals at Market Place</td>
<td>2</td>
</tr>
<tr>
<td>Understanding of Non-preferred Options</td>
<td>2</td>
</tr>
<tr>
<td>Inclusion of Myton Swing Bridge in scheme</td>
<td>2</td>
</tr>
<tr>
<td>Direct Access to Princes Quay from the marina area</td>
<td>1</td>
</tr>
<tr>
<td>Number of westbound traffic lanes</td>
<td>1</td>
</tr>
</tbody>
</table>
9.8.3. More details on the comments is presented in the Report on the Public Consultation (PF, 2009h)

Verbal Comments

9.8.4. During the four days of the Public Exhibition, HA and PFC staff spoke with many visitors, taking brief notes of any comment, concerns or observations received. A list of the principal comments is given below. More details on the comments is presented in the Report on the Public Consultation (PF, 2009h)

- Works are needed Urgently;
- Preferred Options don’t fully address severance;
- No enhancement of the existing cycling facilities was outlined;
- Potential for problems during construction if the Underground Option;
- Concerns regarding flooding of the Underground Option;
- Visual impact of the preferred options;
- Demolition of Grade II listed buildings; and
- Potential for disruption during construction.

9.9. SUMMARY OF KEY STAKEHOLDERS’ RESPONSES

Environment Agency

9.9.1. The EA stated that they would object to the Underground Option as they considered that it would increase the flood risk for the site.

9.9.2. They also indicated that if the Overground Option was taken forward a full Flood Risk Assessment would be required to demonstrate that the flood risk would not be increased as a result of the proposal, in particular, that there would be no impact on flood flow routes through the site.
9.9.3. In addition, they indicated that the Environmental Statement should take into account the effects of the proposed scheme on controlled waters, assess the likelihood of encountering contaminated land and provide a detailed drainage assessment.

Hull City Council

9.9.4. The Council indicated that their preference was for the Underground Option. In support of this preference they stated, “we feel that the physical and visual intrusion caused by any elevated option in what is, a conservation area, would be totally unacceptable and contrary to the Government’s own guidelines and best practice”. They also considered that any elevated road would add to the perceived and real physical severance effect of the road and would work against their strong ambitions and plans to regenerate the waterfront areas.

9.9.5. HCC also requested that more careful consideration of pedestrian and cyclist desire lines be undertaken. They suggested that at a later stage ‘design competitions’ could be undertaken to produce imaginative and iconic structures. They indicated that they felt it vital that any footbridges provided were at least as convenient to use as the existing crossings and preferably more so. They also suggested the potential incorporation of lifts and viewing areas.

9.9.6. HCC expressed concern regarding the effect of the scheme on vehicle access to the trunk road from local roads. They requested that any removal of the signals at the Market Place/Queen Street junction be carefully considered. In particular, they were concerned that access to Castle Street would be difficult from Market Place and Queen Street if the signal control was removed from this junction.

9.9.7. However, while HCC stated their preference for the Underground Option over the Overground Option, they also indicated that they were not totally convinced that a ‘landbridge’ option was completely unattainable, and they requested that the HA examine the possibility of being able to deliver an enhanced Underground Scheme, which would be more in keeping with the Council’s desire for a landbridge scheme.

Hull and Humber Chamber of Commerce

9.9.8. The Chamber of Commerce expressed disappointment that the Underground Landbridge was not one of the preferred options put forward during Public
Consultation. They indicated that they felt that the Underground Landbridge option would deliver more benefits to Hull than the HA’s preferred options.

9.9.9. They stated that “we would like to see the Highways Agency do more to bring the costs of this option (Underground Landbridge) down in order to take it back within the budget”.

9.9.10. They concluded that if they could not have the landbridge option, then the Underground Option would be preferable, as this would be less visually intrusive and could help reduce severance. They emphasised that their first priority was to see work on Castle Street move ahead quickly.

Associated British Ports (ABP)

9.9.11. ABP indicated that their preference was for the Underground Option.

9.9.12. ABP expressed their concern about the potential congestion which could occur during the construction of the scheme and stressed the importance of maintaining two lanes of traffic on Castle Street throughout the whole construction period.

9.9.13. They confirmed that they were happy with the removal of the traffic lights and the replacement of the signalised pedestrian crossings with footbridges. They also confirmed that they would prefer the removal of the existing signals at the Market Place Junction.

9.9.14. They also expressed concern that Garrison Road/Plimsoll Way Roundabout was not within the remit of the proposed scheme for Castle Street.

P&O Ferries

9.9.15. P&O indicated that they had no preference for either the Underground Option or Overground Option. However, they suggested that, given Hull’s recent flooding problems and Castle Street’s proximity to the Rivers Hull and Humber, the Overground Option might be a better solution as it would remove the possible risk of flooding.

Visit Hull & East Yorkshire (VHEY)

9.9.16. VHEY indicated that they supported an Underground Landbridge and that they felt this option should be more thoroughly investigated.
9.9.17. They believed that the final solution for Castle Street needed to provide improved connectivity between the city centre and the marina, as they considered Castle Street to be a significant barrier that divided these two areas.

Natural England

9.9.18. Natural England indicated that they had a neutral opinion of the scheme proposals at this time.

English Heritage

9.9.19. English Heritage (EH) reiterated that their views previously given in a letter to Pell Frischmann dated 28 October 2008 were still valid. They confirmed that they considered the four non-preferred options would be the most damaging to the heritage of central Hull and that they supported the two preferred options.

9.9.20. They stated that while they still had concerns over the damage which the two preferred options would cause to the historic core, they wished to continue to engage with the HA to try to mitigate the damage and offered a number of comments.

9.9.21. They queried whether the Grade II listed Buildings, Earl de Grey and Castle Buildings needed to be demolished or whether it would be possible to amend the slip road design in order to allow the buildings to be retained as this would help the historic environment in this area.

9.9.22. They questioned whether amendments to the proposed highway alignment could reduce/mitigate the impacts on Trinity burial ground and the Humber Dock wall.

9.9.23. Finally, they indicated that they would like to ensure that the visual intrusion of signage, barriers and other street furniture is minimised and to explore how the footbridges could be designed innovatively so that the structures are sensitive to the area’s heritage.

9.10. ALTERNATIVES PROPOSED

9.10.1. A number of respondents suggested that the A63 Castle Street scheme could be improved through alternative means. The suggested alternatives involve both on-line and off-line solutions. The alternatives are summarised in the table below.
### Suggested Alternative

<table>
<thead>
<tr>
<th>Suggested Alternative</th>
<th>No. of Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>On-Line Alternatives</strong></td>
<td></td>
</tr>
<tr>
<td>Incorporate a roundabout into the Proposed Mytongate Junction</td>
<td>2</td>
</tr>
<tr>
<td>High level road from Daltry Street Flyover to Myton Swing Bridge</td>
<td>2</td>
</tr>
<tr>
<td>Bridge between Ferensway and Commercial Road with dumbbell roundabouts</td>
<td>1</td>
</tr>
<tr>
<td>Leave access to Waverley Street open</td>
<td>1</td>
</tr>
<tr>
<td>High level roundabout at Mytongate</td>
<td>1</td>
</tr>
<tr>
<td>Slip roads westbound onto Castle Street and eastbound onto Myton Bridge</td>
<td>1</td>
</tr>
<tr>
<td>Close access to Waterhouse Lane from A63, make Ferensway 3 lanes northbound</td>
<td>1</td>
</tr>
<tr>
<td><strong>Off-Line Alternatives</strong></td>
<td></td>
</tr>
<tr>
<td>Alteration of access to A63 from local roads / diversion of some through traffic</td>
<td>4</td>
</tr>
<tr>
<td>Northern ring road</td>
<td>3</td>
</tr>
<tr>
<td>New route along the river edge</td>
<td>1</td>
</tr>
<tr>
<td>High level road along the Humber Estuary</td>
<td>1</td>
</tr>
</tbody>
</table>

9.10.2. All of the suggested alternatives were considered and a response to each was issued to the proposer by the HA.

9.10.3. In general the online solutions were rejected as they increased the costs of the scheme, reduced the BCRs, were unaffordable, had buildability issues, had safety issues or required more extensive earthworks and/or structures.

9.10.4. In general the offline solutions were rejected as they were outside of the scheme brief of an online solution which was set following the HUMMS study undertaken in 2002. In addition it was notes that a number of the alternatives would require additional land take and increase the costs of the scheme.

9.10.5. More details on the responses are given in the Report on Public Consultation (PF, 2009h)

9.11. **CONCLUSIONS OF THE PUBLIC CONSULTATION**

**Review of Consultation**

9.11.1. The consultation exercise gave statutory consultees, key stakeholders and the general public the opportunity to gain information about the scheme and to
comment on the proposals. The attendance at the exhibitions and the number of questionnaires, comment sheets and other correspondence returned confirms that the consultation has been a success.

9.11.2. The Public Consultation put forward two Preferred Options together with details of the four non-preferred options that were considered during the Options Identification Stage.

9.11.3. The overall response to the proposals for improving Castle Street was very good, with many respondents stressing that something needed to be done immediately. The majority of the public accepted the reasons why only two options were being put forward as preferred options; however, a number indicated that they felt some of the non-preferred options would help with the redevelopment of Hull and provide greater connectivity between the city centre and the waterfront.

9.11.4. Two main issues dominated the response from the public – the severance of the city centre from the waterfront and the risk of flooding, both during and after construction, as a result of the possible lowering of the A63.

9.11.5. A significant number of respondents expressed concern that an Underground Option was being considered despite the location of the scheme close to both the Humber Estuary and the River Hull. A number of flooding and construction problems which had occurred previously within the Hull area were quoted as examples of the high risk associated with any construction involving deep excavation.

9.11.6. There was also general concern over the adequacy of provisions for pedestrians and cyclists with the scheme.

**Summary of Respondents' views**

9.11.7. Two contrasting preferences were obtained from the general public. Overall, the majority of the respondents to the consultation indicated a preference for the Overground Option. However, an analysis of the views of respondents living within 500m of the proposed scheme clearly revealed that the local residents preferred the Underground Option.
9.11.8. Analysis of the comments also indicated that the public’s views were strongly influenced by concerns about flooding, particularly following the serious flood event that affected Hull in 2007 and by problems that were encountered during previous deep excavation and tunnelling works in the Hull area, e.g. Yorkshire Water’s Deep Sewer and Ennerdale Bridge.

9.11.9. Mixed opinions were received from the key stakeholders, two of which, Visit Hull and East Yorkshire and Hull and Humber Chamber of Commerce, indicated that they felt the non-preferred Underground Landbridge scheme would benefit the city of Hull the most. However, Hull City Council indicated that if the Landbridge scheme was not viable, then, of the two preferred options, they would support the Underground Option.

9.11.10. A general summary of views is tabulated below:

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Preferred Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Public</td>
<td>Underground</td>
</tr>
<tr>
<td>Hull City Council (Local Authority)</td>
<td>Underground</td>
</tr>
<tr>
<td>Associated British Ports</td>
<td>Underground</td>
</tr>
<tr>
<td>Hull and Humber Chamber of Commerce</td>
<td>Underground</td>
</tr>
<tr>
<td>Non-Local Public</td>
<td>Overground</td>
</tr>
<tr>
<td>Environment Agency</td>
<td>Overground</td>
</tr>
<tr>
<td>English Heritage</td>
<td>No preference</td>
</tr>
<tr>
<td>P&amp;O</td>
<td>No preference</td>
</tr>
<tr>
<td>Natural England</td>
<td>No preference</td>
</tr>
<tr>
<td>Visit Hull &amp; East Yorkshire (VHEY)</td>
<td>Neither of the Preferred Options</td>
</tr>
</tbody>
</table>

9.12. POST PUBLIC CONSULTATION OPTION

9.12.1. It can be seen from the table in paragraph 9.11.10 that four of the respondents, including Hull City Council and residents local to the scheme, have indicated a preference for the Underground Option and two of the respondents have indicated a preference for the Overground Option. In addition, another three indicated that they have no preference between the two preferred options, while another one has indicated that they would preferred neither of the preferred options.
10. CONSULTATION (IN CONFIDENCE)

10.1. INTRODUCTION

10.1.1. Throughout the assessment process the HA is committed to engaging with key Stakeholders and statutory consultees. Key correspondence with Stakeholders is included in Appendix G.

10.1.2. At this Options Selection Stage of the PCF lifecycle consultation occurs through three ways:

- Value Management workshop
- Correspondence and meetings with key stakeholders and statutory consultees
- the Public Consultation process

10.2. VALUE MANAGEMENT WORKSHOP

10.2.1. A Stakeholder's Value Management (VM) Workshop was held on the 29th July 2009 to review the various scheme options associated with the A63 Castle Street Improvement Scheme. VM is used to continuously review objectives, identify options and to help control development of a major project, hence the value management process consists of workshops at key phases of major project development.

10.2.2. The broad aim of the VM workshop was to improve the value of the concept designs to align with the project objectives and develop value for money (VFM) improvements to the preferred scheme options.

10.2.3. The workshop was an opportunity for the HA to provide stakeholders with an overview of the development of the project and for stakeholders to review the various options so that they could contribute to the overall opinion assessment process by considering the relative strengths and weaknesses of the various options.

10.2.4. More detailed information on the discussions undertaken during the workshop can be found in the Value Management Workshop Report (CVRL, 2009).
10.3. AIR QUALITY CONSULTATION

10.3.1. A consultation meeting with Hull City Council Public Protection Team was undertaken (March 2009). The aim of the meeting was to provide the council with an update of the October 2008 assessment findings and to discuss the approach and assessment method proposed for the current assessment. It was statement that the current air quality work was being undertaken to update the assessment of the air quality impacts, given that new traffic model data is now available. Further to this, consultation included determining the availability of updated baseline data for this assessment.

10.4. CULTURAL HERITAGE

10.4.1. A copy of the Options Identification Stage Cultural Heritage Detailed Assessment was issued to English Heritage (EH) and Humber Archaeology Partnership (HAP) on the 7th August 2008, requesting comments. A reply was received from HAP on the 1st October 2008; and from English Heritage on the 28th October 2008. A summary of those replies is given below

Humber Archaeology Partnership

10.4.2. Many of HAP’s comments were factual stemming from their detailed knowledge of the study area; these comments were very useful and amendments were made to the Cultural Heritage chapter as necessary.

10.4.3. Significant comments and HAP’s reservations over the scoring system used to assess the impacts of the scheme options, related to the fact that specific individual medieval properties within the Old Town were not identified or itemised in the site gazetteer. They also commented that the proposed excavations within the Trinity Burial Ground were too large and might detract from the amount of excavation required in the Old Town. The proposed extent of excavation within the burial ground is in accordance with EH guidance.

10.4.4. HAP did not seem unduly concerned about the proposed demolition of the Listed Buildings, and questioned whether there was actually any viable future for the Earl de Grey public house. HAP is more concerned about the impacts on the underlying archaeology within the Old Town. Apart from the above comments relating to the burial ground, no significant comments were received concerning the scale and scope of the proposed mitigation strategy, and little comment was
made regarding impacts upon the built environment, townscape and Conservation Area, or the visual impacts.

**English Heritage**

10.4.5. EH took a wider perspective, and indeed questioned the whole rationale behind the scheme. They confirmed that they concurred with the HAP's comments regarding the below-ground archaeology and that there needed to be an appropriate mitigation strategy; although no specific comments were made on the proposed strategy.

10.4.6. EH was much more concerned about the above ground impact. They indicated that greater mention should be made of the impacts on the Conservation Area/townscape; this is an accepted omission in the cultural heritage report and has been addressed through the adoption of current DMRB guidance. In particular, they could not support the demolition of the various Listed Buildings, and did not consider that these demolitions could be justified.

**Further Consultation**

10.4.7. As part of the current task order and in response to the consultation letter received from EH a meeting was arranged between the HA, PF and EH. A brief background to the scheme and progress to date was discussed including descriptions of the scheme options and the key dates in the programme.

10.4.8. Discussions about the length of scheme construction and constraints due to construction works also took place at the meeting. PF explained the reasoning behind rejection of the four now non preferred options i.e. the conclusions that they are poor value for money, i.e. their BCR <1, as any BCR<2 is not considered acceptable and that they are unaffordable i.e. there cost ranges are above the Funding allocated by the Regional Transport Board. They also have other adverse impacts as well.

10.4.9. EH outlined their current concerns regarding the proposed schemes. Their first concern was the time it was taking to move the improvements for Castle Street forward.

10.4.10. EH also stated that they meet regularly with Hull Forward with regards to regeneration of the Fish Market area. Proposed improvements to the area are
difficult to undertake until the problems on Castle Street are dealt with e.g. they are having problems getting people to invest in the existing buildings which has a knock on effect on the area.

10.4.11. EH's main concern was to ensure that minimal impact on the historic environment was considered a priority. It was stressed that although archaeology is an important factor, they did not want the archaeology of the area (i.e. underground issues) to override the overground historic environment/listed buildings.

10.4.12. The proposed loss of the two listed buildings – Castle Buildings and Earl de Grey Public House were - concern to EH, and the question was raised as to whether there was any chance of saving these buildings. PF confirmed that during detailed design it may be possible to refine the preferred scheme in order to avoid demolition, however at the present conceptual stage, the worst case scenario would have to be the loss of these buildings. Both of the schemes require land take from the Trinity Burial Ground and this is unavoidable.

10.4.13. In summary the main issues of concern for EH are

- Demolition of historic buildings (inc listed buildings);
- Visual impact on the heritage townscape;
- Effect of the scheme on the viability of regenerating the historic areas of Hull; and
- Effect of the scheme on the connectivity of the conservation areas to the north and south of Castle Street.

10.4.14. A copy of the revised detailed Cultural Heritage Report (Option Selection Stage) was issued to EH on 17th July 2009 and a response was received on 12th August 2009.

10.4.15. In their response to the revised report EH confirmed that they considered the report to be a very through document which clearly sets out the heritage interests of the route between Mytongate and Market Place. They confirmed that the impact assessment was balanced and concise. They indicated that the descriptive nature and magnitude of the scheme impact was helpful, confirming that there will be damaging impacts on the cultural assets influenced by the route.
10.4.16. In their response they did not offer any indication of their views on the preferred options, but indicated that they would respond as part of the ongoing Public Consultation.

10.5. ECOLOGY

10.5.1. During the Options Identification Stage of the project, telephone consultation was undertaken with Natural England regarding the potential effects on ecology. A summary of the discussion is given below.

10.5.2. Chris McGregor, of the Natural England (North and East Yorkshire Team) was consulted by telephone in June 2008. Ecological surveys carried out by Golder Associates and the results of those surveys were discussed. Natural England did not consider the scheme likely to have significant effects on wildlife, however it was pointed out that appropriate surveys and mitigation must be put in place, in particular in relation to the confirmed bat roost. Natural England would be supportive of any ecological enhancements that could be incorporated into the scheme.

10.5.3. Further to the telephone consultation, Golder Associates sent a map showing the approximate scheme location. Chris McGregor forwarded this to Tim Page of the Natural England Humber to Pennines Team. The response was that potential disturbance to Humber Estuary SPA/SSSI/Ramsar birds should be considered and that this may require an assessment of Likely Significant Effect (LSE) and Appropriate Assessment. Natural England is satisfied that potential need for further assessment at a later stage has incorporated into the scheme assessment report.

10.5.4. Hull City Council does not currently have their own ecologist or nature conservation officer. Therefore, consultation is being undertaken with Humber Industries Nature Conservation Association (Humber INCA) and Hull Biodiversity Partnership. Humber INCA is a partnership between large firms who operate on either side of the estuary, statutory agencies and voluntary sector bodies while Hull Biodiversity Partnership is a group of voluntary and statutory organisations who have put together the Hull Biodiversity Action Plan, and monitor its effectiveness.

10.5.5. In addition, a copy of the ecology assessment was issued to the Natural England Officer with responsibility for Hull and the Humber Estuary on completion.
10.6. LANDSCAPE/TOWNSCAPE

10.6.1. During the Option Identification stage, a meeting was undertaken with the head of urban design and conservation at Hull City Council (Richard Wilson) in July 2008.

10.6.2. As part of the current Options Selection Stage, further consultation was undertaken with Hull City Council Urban Design, Planning and Landscape Department (April 2009) to discuss the October 2008 assessment approach and findings. Baseline data gathering also included consultation with Hull Forward, whom provided information regarding the Humber Quays and Quay West proposals and the new River Hull footbridge.

10.7. WATER

10.7.1. The Environment Agency was contacted by e-mail to obtained water quality data on the River Hull, River Humber and Humber Dock Marina, as well as information on any fisheries which may be affected by the proposed scheme. However flow data for the Humber Estuary was not available.

10.7.2. As flow data was not available contact was made with Network Services (NS) to seek advice on how to proceed with the assessment in the absence of flow data for the Humber Estuary.

10.7.3. The Environment Agency formally replied to the Public Consultation. A summary of the their views is given below

- They object to the Underground Option on grounds that lowering the road level would lead to an increased flood risk;
- They require a full Flood Risk Assessment for the Overground Option to ensure that there is no impact on the flood flow routes through the site and that construction of the scheme would not increase the flood risk;
- The Environmental Statement should assess the effects the proposed works would have upon controlled waters and how these effects would be mitigated;
- A detailed drainage assessment should be undertaken; and
- The likelihood of the scheme encountering contaminated land and the need for remediation should be assessed.
10.7.4. Following receipt of their response and attendance by representatives at the Stakeholder workshop a meeting between the Environment Agency, Highways Agency and Pell Frischmann was arranged for Friday 18th September 2009. A summary of the discussion undertaken in this meeting is given below.

10.7.5. A discussion of the stage of the project was undertaken. The EA indicated that the flood risk assessment (FRA) previously undertaken in 2007 was out of date and needed to be updated. It was confirmed that the FRA was being updated in conjunction with the current environmental assessment.

10.7.6. A discussion over the discharge methods was undertaken. PF confirmed that discharge to a Yorkshire Water sewer is very unlikely to be acceptable, as the current system is near its design capacity, therefore this method of discharge will no longer be considered as an option. The scheme cost has been estimated assuming discharge direct to the Humber Estuary; however there may be the potential to discharge into Railway Dock. This would be addressed in more detail at preliminary design stage.

10.7.7. EA confirmed that the risk of failure of the tidal barrage on the River Hull was low but the consequences if it did fail were high. The consequences would be amplified with the underground option. They indicated that HA would need to have a proactive emergency plan in place for the scheme, to ensure the safety of road users.

10.7.8. It was confirmed by the HA Senior Project Manager following discussions with his Network Operations colleagues on 2nd December 2009 that the HA are content to develop an emergency procedure appropriate to the chosen route option following preferred route announcement. It was also confirmed that Hull’s Strategic FRA was reviewed and its recommendations have been taken into consideration in the updated scheme FRA. It was confirmed that the HA would work together with the EA following PRA to finalise the scope of the FRA for the preferred route.

10.8. NETWORK OPERATIONS DIVISION

10.8.1. Following discussions with the HA’s Network Operations Division (NOD) during the Options Selection stage of the scheme development, they have indicated that their preference would be for the overground option as this option presents fewer operational risks. This preference was made after NOD had considered
the maintenance aspects for each of the two options. A copy of the formal response from NOD can be found in Appendix G

10.8.2. The project team have also had discussions with the MAC to determine the significant additional maintenance costs associated with both the Underground and Overground options. These items are the painting and bearing replacement for the overground option and the pumped drainage system for the underground option. The maintenance items have been costed and discounted back to 2002.

10.8.3. The 2002 estimate for the painting of the structure and replacing the bearings is £5.5m and the 2002.

10.8.4. The 2002 estimate for the pumped drainage system for the underground option is £1.3m.

10.8.5. The above figures show that the maintenance costs associated with the overground option are £4.2m higher than the underground option.
11. CONCLUSIONS

11.1 INTRODUCTION

11.1.1. This section summarises the main findings of the Scheme Assessment Report, in order to recommend an option for the Preferred Route Announcement.

11.2. SUMMARY OF FINDINGS OF SCHEME ASSESSMENT REPORT

Technical Appraisal

11.2.1. In the PCF Stage 1 Options Identification stage, 6 options were identified and assessed in a Technical Appraisal Report (TAR) published in November 2008. The TAR identified 2 preferred options, the A63 in cutting at Mytongate Junction (Underground Option) and the A63 on a flyover at Mytongate Junction (Overground Option). Both options represented High Value For Money with a BCR in excess of 2.0, both were affordable (i.e. within the budget set by the Regional Transport Advisory Board), and both had the least impact on the environment. The report recommended that both options should be taken forward for Public Consultation in the PCF Stage 2 Option Selection stage.

Public Consultation

11.2.2. Section 9 of this report summarises the outcome of the 12 week public consultation exercise undertaken in PCF Stage 2. The consultation responses indicated an overall preference for the Underground Option as demonstrated in the table in paragraph 9.11.10 of this report. It can be seen from this table that four of the ten respondent groups, including Hull City Council, Hull and Humber Chamber of Commerce, Associate British Ports and resident's local to the scheme, have indicated a preference for the Underground Option. It should be noted that strong support for the Underground Option was recorded from Hull City Council and local residents.

11.2.3. However, there were some concerns about the Underground Option from some consultees, particularly from those members of the general public who did not live local to the scheme and the Environment Agency (EA). The concern was that there could be potential difficulties during the construction of the Underground Option due to the poor ground conditions and the high water table. There was also a view that the Underground Option would increase the potential
for flooding on this section of the A63 when in operation and that people could get trapped in their vehicles in the cutting if a flood occurred.

11.2.4. A way forward, has been agreed between the Environment Agency and the HA regarding the assessment and mitigation of flood risk as the scheme moves forward into preliminary design. It has been confirmed that the HA would work together with the EA following Preferred Route Announcement (PRA) to finalise the scope of the Flood Risk Assessment (FRA) for the preferred route.

11.3. COMPARISON OF OPTIONS

11.3.1. A comparison assessment of the two preferred options has been undertaken to evaluate the benefits and disbenefits of each option. This assessment looked at both the environmental impacts of the scheme and the scheme economics. A summary of the assessment is given in the following paragraphs.

11.3.2. The two preferred options have matching footprints, but differ in vertical alignment at Mytongate Junction (Ferensway/Commercial Road). The Underground Option would lower the level of the A63 putting the dual carriageway into a cutting below Ferensway and Commercial Road. The Overground Option would raise the level of the A63 putting the dual carriageway on a flyover above Ferensway and Commercial Road.

Environmental

11.3.3. An Environmental Assessment Report (PF, 2009g) has been produced for the scheme and a summary of its findings is provided in Section 8 of this report. The following paragraphs summarise the differences between environmental impacts of the two preferred options.

Air Quality

11.3.4. There are no differences between the two options with respect to local air quality; however, the main issues are summarised below.

11.3.5. The scheme proposals are located within an existing Air Quality Management Area which has been declared, by Hull City Council, for the exceedence of the annual mean NO$_2$ objective. The WebTAG Local Air Quality Assessment for the study area has predicted an overall net improvement in local air quality (NO$_2$ and PM$_{10}$) with the scheme.
11.3.6. At sensitive receptors located at roadside locations, i.e. within 20m of the A63 Castle Street, the DMRB air quality model has indicated a minor increase of up to 1.5µg/m³ in annual mean NO₂ concentrations in the opening year of 2017 with the scheme compared to the scenario without the scheme and exceedences of Air Quality Objectives both with and without the scheme. However, there is a level of uncertainty of measured NO₂ concentrations used to verify the modelled results, due to a high monitored average NO₂ concentration recorded at one of the monitoring stations (6L) which is inconsistent with the other monitored concentrations at five other sites along the A63 Castle Street.

11.3.7. It has been recommended that further monitoring for a period of six months should be undertaken during the preliminary design stage to provide a more robust monitored data set. The six months additional monitoring data will be used to reassess the verification of DMRB model results. If deemed necessary, a detailed dispersion model for this stretch of the A63 will be constructed and modelled for the sensitive receptors.

11.3.8. Furthermore, in February 2010, i.e. after the completion of the air quality assessment for this scheme in January 2010 (presented in section 8.2.5 of this report), Defra updated and issued new vehicle emission factors and the factors for projecting measured annual mean roadside NO₂ concentrations to future years. The new vehicle emission factors have not yet been applied to the air quality assessment for this scheme; however, a sensitivity assessment of the future year adjustment factors for measured roadside NO₂ has been undertaken.

11.3.9. The sensitivity test was undertaken using the 2008 measured concentration recorded at monitoring station 6L. The use of this monitoring site is considered to be a “worst case” scenario as the concentration at this location is higher than all of the other monitoring stations along the A63 Castle Street and the concentrations predicted in the air quality model.

11.3.10. The 2008 measured concentration at site 6L was then factored up to predict the opening year concentration without the scheme in 2017, and the air quality model predicted maximum increase in NO₂ of 1.5µg/m³, as a result of the scheme, was added to this. The sensitivity test showed that no exceedences of the Air Quality Strategy objective for annual average NO₂ would occur in the opening year. Whilst the results of this of this sensitivity test are not conclusive
they give a strong indication that under the new assessment guidance the A63 will not cause exceedences of air quality objectives.

**Heritage**

11.3.11. The Underground Option is considered to have a Large Adverse overall assessment score compared to the Overground Option which will have a Very Large Adverse overall score.

11.3.12. The Overground Option has a worse impact as it has one Very Large Adverse impact on the Trinity Burial Ground due to increased visual impact, two more Moderate Adverse and one more Slight Adverse impacts compared to the Underground Option.

**Townscape**

11.3.13. Overall, for either of the preferred options, the significance of townscape impact is assessed to be Very Large Adverse.

11.3.14. From a visual impact perspective, the significance of impact ranges from Neutral through to Large Adverse. A cautious approach was taken to the overall scoring of the visual impact and the worst case scenario is presented as the overall score. The assessment methodology does not allow for any differential in grades of significance, but if the options are ranked according to professional judgement and the relative numbers of moderate and large adverse scores, the Overground Option would be ranked as having the greatest adverse visual impact, even though both options currently score the same. By its very nature i.e. external and above surface, it would be reasonable to consider the Overground Option as having the greatest adverse visual impact.

**Nature Conservation**

11.3.15. There are no differences between the two options with respect to Nature Conservation. Both of the options would have direct impacts upon several habitats of low or negligible ecological value, including amenity grassland and tall ruderal vegetation. The ecological impacts of these losses will be minimal. Loss of mature trees would, however, result in greater impacts. Destruction of habitat would incur losses of potential roost sites for bats and may affect nesting birds.
11.3.16. It is predicted that for either of the preferred options that there will be a Slight Adverse impact.

*Materials*

11.3.17. The Underground Option has the highest volume of material excavated and greatest extent piling works and, therefore, there is a higher potential risk of pollution to the environment. However, these are potential risks and can be managed through adequate site investigation at preliminary design stage and the implementation of a Construction Environmental Management Plan during construction.

*Noise*

11.3.18. Overall, for either of the preferred options there will be an improvement in the noise environment with the scheme. However, the Underground Option shows a slightly greater improvement than the Overground Option.

*Effect on all Travellers*

11.3.19. There are no differences between the two options with respect to Effect on all Travellers.

*Community and Private Assets*

11.3.20. There are no differences between the two options with respect to Community and Private Assets

*Road Drainage and the Water Environment*

11.3.21. The magnitude of impact for either of the preferred schemes is considered to be negligible; therefore, the overall impact on both groundwater and surface water attributes are Neutral for both options.

11.3.22. The Flood Risk Assessment has identified the requirement for a pumped drainage system to mitigate the impacts of surface water and groundwater flooding in the underpass associated with underground route.
Summary

11.3.23. In summary, the impacts of both of the preferred options are the same for five of the topics assessed (Air Quality, Nature Conservation, Effects on all Travellers Community & Private Assets and Road Drainage & the Water Environment), the Underground Option has less impact for three of the topics assessed (Heritage, Townscape and Noise) and the Overground Option has less impact for one of the topics assessed (Materials).

11.3.24. Overall, the Underground Option has a lower environmental impact than the Overground Option.

Economics

11.3.25. The cost range forecasts have been updated for the Underground and Overground options and the economic assessments have been updated to reflect these changes.

11.3.26. During the Option Selection stage in 2009, a new traffic model has been constructed to replace the 2002 HUMMS model and has been used for all assessment work undertaken during this stage.

11.3.27. Compared with the HUMMS model, economic analysis using the new model has resulted in a significant increase in the benefits accrued by both the Underground and Overground options. The reason for the increases lie in the focussed nature of the new model which has been developed specifically to assess the A63 scheme and thus has significantly improved network accuracy in the vicinity of the scheme.

11.3.28. The key outcomes of the economic and environmental assessments are summarised in Table 11.1.

**TABLE 11.1: SUMMARY OF ENVIRONMENTAL AND ECONOMIC ASSESSMENTS**

<table>
<thead>
<tr>
<th>Option</th>
<th>BCR</th>
<th>NPV (£m)</th>
<th>Environmental Impact Ranking</th>
<th>Central Estimate (£m)</th>
<th>Accident Benefit Ranking (1 = highest benefit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underground</td>
<td>3.6</td>
<td>249.852</td>
<td>1</td>
<td>160.8</td>
<td>1</td>
</tr>
<tr>
<td>Overground</td>
<td>3.5</td>
<td>246.801</td>
<td>2</td>
<td>166.5</td>
<td>1</td>
</tr>
</tbody>
</table>
11.4. ANALYSIS OF RESULTS

11.4.1. The Value for Money (VfM) guidance advice to Ministers classifies BCR scores as follows:

- BCR > 4.0 represents Very High VfM
- BCR 2.0 – 4.0 represents High VfM.
- BCR 1.5 – 2.0 represents Medium VfM.
- BCR 1.0 – 1.5 represents Low VfM.
- BCR < 1.0 represents Poor VfM.

11.4.2. Table 11.1 indicates that both options have BCRs > 2 with the Underground Option having a slightly higher BCR of 3.6 compared to the Overground Option with a BCR of 3.5.

11.4.3. The Government’s New Approach To Appraisal (NATA) Refresh in April 2010 will require a change in approach to the calculation of BCR, in which the Indirect Tax resulting from a scheme will be included in the Present Value of Benefits (PVB) rather than as at present where it is used in reducing the Present Value of Costs (PVC). The effect is to change the BCR values. Whilst this requirement does not become mandatory until April 2010 the calculations have been made in Table 11.2 below for comparison:

<table>
<thead>
<tr>
<th>Option</th>
<th>Revised PVC (£m)</th>
<th>Revised PVB (£m)</th>
<th>NPV (£m)</th>
<th>BKR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underground</td>
<td>94.068</td>
<td>343.920</td>
<td>249.852</td>
<td>3.6</td>
</tr>
<tr>
<td>Overground</td>
<td>97.911</td>
<td>343.920</td>
<td>246.801</td>
<td>3.5</td>
</tr>
</tbody>
</table>

11.4.4. NATA Refresh stresses that Net Present Value (NPV) should also be given higher importance than previously in choosing options.
12. RECOMMENDED ROUTE (IN CONFIDENCE)

12.1. The scheme objectives are:

- Reduce congestion on this section of the A63
- Reduce journey times to the port of Hull
- Improve safety on this section of the A63
- Reduce severance between the north of the city centre and the south

12.2. The technical appraisal of the Underground and Overground options has shown that both options meet the scheme objectives. The significant journey time savings (as indicated in Section 6 of this report) show that both options meet the objectives of reducing congestion on this section of the A63 and reducing journey times to the port of Hull.

12.3. Both options also meet the objective of improving safety, providing accident benefits (indicated in Section 6 of this report) resulting from a reduction of the number of accidents on this section of the A63.

12.4. Both options reduce severance by the provision of pedestrian footbridges at key crossing points on the A63 thereby providing uninterrupted access across the A63 and removing the interface between pedestrians and vehicles. However, the Underground Option does have a distinct advantage over the Overground Option in that visual severance is reduced as the A63 will be in a cutting, whereas with the Overground Option the visual intrusion will be greater due to the presence of the flyover.

12.5. The concern raised at the Public Consultation regarding the potential for flooding during construction in poor ground conditions would be mitigated within the scheme design by providing a fully watertight excavation.

12.6. Furthermore, regarding the potential for flooding during operation, a fully independent drainage system with a pumping station and storage facilities would be provided. In addition, the HA would also implement an emergency diversion strategy which would close the cutting to all traffic and divert traffic onto the slip roads during periods of potentially high flood risk.

12.7. A way forward has been agreed between the Environment Agency and the HA regarding the assessment and mitigation of flood risk as the scheme moves
forward into preliminary design. It has been confirmed that the HA would work together with the EA following PRA to finalise the scope of the FRA for the preferred route.

**Affordability**

12.8 The range forecast for the Underground Option produces a central estimate of £160.8m which is within the total Regional Transport Advisory Board Budget of £189m which was reaffirmed in July 2009. The central estimate for the Overground option is some £5.7m higher at £166.5m.

**Value for Money**

12.9 The Underground Option has the highest BCR at 3.6 which is marginally better than the BCR of the Overground Option of 3.5.

12.10 The Overground Option has a slightly higher environmental impact than the Underground Option due to a larger impact on Cultural Heritage and a larger impact on the Landscape due to the visual intrusion of the Overground Option, thereby making the Underground Option the marginally better option in relation to the impact on the environment.

12.11 The NATA Refresh guidance for calculating BKR, which will be used from April 2010, has also been considered for both options, as shown in Table 11.2. Using this guidance, the BKR for the Underground Option increases to 3.7 and the BKR for the Overground Option remains at 3.5. The NATA Refresh guidance also requires that, to help give an initial indication of the overall value for money of a scheme, an increased emphasis should be given to the Net Present Value (NPV). Of the two schemes considered the Underground Option has the higher NPV of £249.9m compared to a NPV of £246.8m for the Overground option.

12.12 Due to the increased maintenance costs associated with the two preferred options, a sensitivity test has been undertaken on the BCR and NPV to take into account the maintenance issues discussed in section 10.8 of this report. This would result in a BCR of 3.6 for the Underground option and a BCR of 3.3 for the Overground Option. The revised NPVs would be £248.4m for the Underground Option and £241.3m for the Overground Option.
Due to the higher BCR of 3.6, the higher NPV, the lower total scheme cost, the lesser impact on the environment and the preference of the majority of consultees following the public consultation exercise, it is recommended that the Underground Option should be announced by the Minister as the Preferred Route.
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