

Liverpool to Manchester Overhead Line Electrification

Environmental Assessment Report
Volume 1: Main Text

August 2011

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Glossary of Terms

Term	Meaning / Definition
CRE	Contracts Requirement - Environment
dB	Decibel
EA	Environment Agency
EAR	Environmental Assessment Report
FC	Forestry Commission
GLVIA	Guideline for Landscape and Visual Impact Assessment
GMEU	Greater Manchester Ecology Unit
HRA	Habitat Regulations Assessment
LNR	Local Nature Reserve
LWS	Local Wildlife Site
MAGIC	Multi-Agency Geographic Information for the Countryside
MEWP	Mobile Elevated Working Platform
NBN Gateway	National Biodiversity Network Gateway
NE	Natural England
NERC	Natural Environment and Rural Communities Act 2006
NGR	National Grid Reference
NSR	Noise Sensitive Receivers
OLE	Overhead Line Electrification
Overbridge	A Bridge Over the Railway
PEAR	Preliminary Environmental Assessment Report
PPGs	Pollution Prevention Guidelines
PMW	Precautionary Method of Working
PPS9	Planning Policy Statement 9: Biodiversity and Geological Conservation
PPV	Peak Particle Velocity
rECOrd	Biological Records Centre for Cheshire
RRV	Road Rail Vehicles
SAC	Special Area of Conservation
SBI	Site of Biological Interest
SINC	Site of Importance for Nature Conservation
SSSI	Site of Special Scientific Interest
Underbridge	A Bridge Under the Railway

Executive Summary

Introduction

This Environmental Assessment Report (EAR) has been produced by Atkins on behalf of Network Rail. It sets out the potential significant environmental impacts as they are presently understood (before completion of detailed design) for the construction and operation of the Liverpool to Manchester Railway Overhead Line Electrification (OLE), and has been prepared in accordance with Network Rail's environmental and sustainability policy. The EAR follows on from the Preliminary Environmental Assessment Report¹ which 'scopes out' environmental impacts associated with the scheme that are not considered to be potentially significant.

The report assesses the potential significant impacts of the scheme on landscape and visual receptors, noise and vibration receivers, ecology and the historic environment. It suggests mitigation required to limit the impacts of the scheme, and sets out further action that is required before scheme construction. As part of the assessment process consultation has been undertaken with Natural England and local authorities and a number of site visits, surveys and desk studies have been completed.

The Scheme

The scheme covers approximately 50km of railway that runs through seven local authorities comprising Liverpool City Council, Knowsley Metropolitan Council, St Helens Council, Warrington Borough Council, Wigan Council, Salford Council and Manchester City Council. The aim of the scheme is to electrify the line to allow more easily maintained and reliable electric trains, rather than diesel to operate passenger services on the line. This requires that OLE gantries are installed approximately every 50m along the length of the scheme. Some works are also required to structures along the scheme, including attachment of OLE, raising of parapets, demolitions and reconstructions and lowering of the track alignment in order to pass the new OLE beneath some structures. Four distribution sites are also proposed, which distribute the electric current to the OLE across the scheme.

Ecology

The report concludes that once the recommended mitigation measures are implemented, there will be no significant adverse impacts anticipated to occur as a result of the scheme on ecology. However, once detailed design of the scheme has been finalised, further consultation with Natural England will be required, and Habitats Regulations Assessment screening will need to be undertaken to confirm that the features for which Manchester Mosses is designated as a Special Area of Conservation will not be adversely impacted by the scheme.

Noise and Vibration

There would be no adverse operational noise impacts as a result of the scheme.

The potential construction noise impacts of the scheme would be spread across the scheme area during different stages of the works but the impacts on any one location are likely to be limited in duration. Significant noise effects are predicted for certain noisy types of construction activities where dwellings are within 100m and in direct line-of-sight of the activities. Piling may also cause significant effects at dwellings within 50m and in direct line of sight of the activities. There is potential

¹ Atkins, Liverpool to Manchester Overhead Line Electrification, Preliminary Environmental Assessment Report, Ref 5096672/ATK/R/018 Rev1, April 2011

for significant impacts from vibration, particularly from piling, which can be mitigated as part of the detailed design process.

Historic Environment

The permanent electrification of the railway would be beneficial for the historic Liverpool to Manchester railway as it will safeguard its future operation, which is critical for its historic significance. However, there will be adverse localised impacts to historic structures along the route. The works could also impact upon the character and setting of Conservation Areas and Listed Buildings, as well as altering the character of the wider historic urban environment in Liverpool and Manchester/Salford.

Temporary construction impacts are not considered to constitute a significant impact to the historic environment.

Landscape, Townscape and Visual Amenity

Effects are largely minor, and will mostly arise from the removal of screening vegetation to allow for the installation of OLE gantries and wiring. This would be most severe where the railway line is on embankment or on bridges or viaducts as the railway would become a more defined element in the landscape/townscape. The operational impacts will reduce over time as vegetation re-establishes.

Part I – Background Information

1. Introduction

1.1 General

- 1.1.1 This Environmental Assessment Report (EAR) sets out the potential significant environmental impacts for the construction and operation of the Liverpool to Manchester Railway Overhead Line Electrification (OLE). All works are Permitted Development under Part 11 of the Town and Country Planning Act (GDPO 1995) and therefore the scheme does not require statutory Environmental Impact Assessment as a requirement of the EIA Regulations². The following report is therefore prepared in accordance with Network Rail's sustainability policy. This report follows on from the Preliminary Environmental Assessment Report (PEAR)³ which 'scopes out' environmental impacts affected by the scheme that are not considered to be significant and recommends further study for the environmental topics that are.
- 1.1.2 This EAR assesses the potential significant environmental impacts of the scheme on landscape and visual receptors, noise and vibration receivers, ecology and the historic environment.

1.2 Background to Project – The Case for Electrification

- 1.2.1 Electrification is an important part of the Department for Transport's Carbon Strategy and will allow the use of electric trains, which are cleaner, quieter when stopped and at low speeds, and are responsible for less carbon emissions than diesel trains, which are presently used along the line. Electric trains, on average, emit 20-35% less carbon dioxide per passenger mile than a diesel train and this advantage will increase over time as the national power generation mix becomes less carbon intensive. Electric trains have zero emissions at the point of use, which is particularly a benefit for air quality in pollution hotspots such as city centres and mainline stations. Using electric trains over diesel reduces fuel consumption and the associated cost by around 50%, reducing the reliance on imported diesel fuel.
- 1.2.2 Further energy savings can be made with the increased roll out of regenerative braking systems. These enable electric trains to re-use the energy that would otherwise be lost when braking, by converting the energy back into electricity.
- 1.2.3 Electric trains also have more seats than diesel locomotive hauled trains, and have superior acceleration, which can reduce journey times, particularly on urban routes allowing a greater contribution to growth in demand.
- 1.2.4 As a further benefit, the development of more diversionary routes will reduce the need to revert to replacement bus services, which would lead to an additional reduction in carbon emissions and less frustration and increased journey reliability for passengers.

² Town and Country Planning (EIA) (England and Wales Regulations 1999

³ Atkins, Liverpool to Manchester Overhead Line Electrification, PEAR, Ref 5096672/ATK/R/018 Rev1, January 2011

1.3 Scope and Content of the EAR

Preliminary Environmental Assessment

- 1.3.1 A PEAR was previously undertaken³ in order to review the potential subject matter and scope of environmental assessment required for the scheme, to highlight issues that may be significant and need further assessment, and set out the proposed methods for these assessments.
- 1.3.2 The conclusions of the report suggested that there may be significant impacts on ecology, the historic environment, landscape and visual receptors and receivers of noise and vibration. These topics were therefore taken forward for detailed assessment and the findings of that work are recorded in this report.
- 1.3.3 Further assessment was also recommended with regard to severance and community impacts as well as for traffic impacts from bridge closures. These latter two subject areas are not covered in this report, but any alterations to structures, including road closures will be dealt with by Network Rail on the basis of Prior Approval with the relevant local planning authority.
- 1.3.4 The scheme was not considered to have a significant impact on air quality, the water environment or socio economics. No significant contamination issues were predicted to result from the scheme.

Consultation

- 1.3.5 As part of the assessment process, where sufficient scheme information is available, it is good practice to consult relevant authorities/organisations during the environmental assessments. This provides the opportunity for statutory authorities /organisations to raise any concerns or specific requirements they have so appropriate measures can be incorporated into the design of the development.
- 1.3.6 As the scheme design has not been finalised, further consultation will be required. This is particularly of note with English Heritage and the local authorities through which the scheme runs. Once detailed design for affected structures is completed, Network Rail's planning team will consult these bodies with regard to seeking Prior Approval for works to structures, and Listed Building Consents, where appropriate.
- 1.3.7 In order to undertake the ecology and noise and vibration assessments, consultations were undertaken with Natural England and local authorities. Further details are provided in Part III of this report.

Content of the EAR Technical Chapters

- 1.3.8 The environmental assessments presented within the technical chapters consider the effects arising during both construction and operation of the development in relation to the current baseline on the environment.
- 1.3.9 Each of the technical chapters broadly provides the following information, where relevant under the headings given, though these are adapted to suit the specific reporting needs of each section:

Summary of Findings

- 1.3.10 A brief summary of the main residual impacts and issues discussed in the coming section. The key mitigation issues are also mentioned.

Introduction

- 1.3.11 An introduction from the perspective of the specific technical subject.

Planning and Legislative Context

- 1.3.12 The subject specific regulatory, planning and policy framework against which the assessment is carried out. Identification of relevant guidance and legislation that has been followed and reference to relevant planning policy documents that have guided the approach.

Study Area

- 1.3.13 Defining of the area or areas assessed within the chapter.

Assessment Methodology

- 1.3.14 The method of identifying the environmental aspects and assessing the environmental effects.

Criteria of Assessment

- 1.3.15 Sets out the criteria used for determining the significance of the effects.

Baseline Conditions

- 1.3.16 A description of the existing conditions, determined through documentary review, site surveys and the development of environmental models.

Key Environmental Issues

- 1.3.17 The environmental aspects of the scheme, during both the construction and operational phases. An assessment of the potential effects without mitigation measures is made for each phase.

Mitigation

- 1.3.18 Mitigation measures that are proposed to avoid or alleviate the adverse environmental effects, and additional measures that would potentially provide environmental enhancements above and beyond the minimum requirements.

Environmental Impact Assessment

- 1.3.19 An assessment of the potential effects of the development on the environment during both the construction and operation phases accounting for the proposed mitigation measures.

Summary

- 1.3.20 Provides a bulleted summary of key environmental impacts.

Conclusions

- 1.3.21 The conclusions of the assessment, detailing areas of uncertainty.

Part II - The Proposed Scheme

2. The Proposed Scheme

- 2.1.1 A location plan of the proposed scheme is shown in Figure 1 in Appendix A. The following sections should be read in conjunction with this drawing.

2.2 Site Location

- 2.2.1 The site – a section of the Liverpool to Manchester railway – runs for a length of approximately 50km and through seven local authority areas as shown on Figure 1 in Appendix A. The section of railway between Earlestown Junction and Newton-le-Willows Junction is already electrified and therefore no works are required here. Works will be undertaken to connect with the western electrified limits at Edge Hill, Liverpool (connecting the Bootle Branch) to the eastern limits along two branches to Victoria Station and the Castlefield Junction section to Deansgate Station. The approximate grid reference for Edge Hill is SJ37064 90597, with Manchester's Victoria Station at approximately SJ84013 98970, the line crosses Newton-le-Willows (SJ59357 95340) approximately half way along the route.

2.3 Description of Site and Adjacent Land

- 2.3.1 An overview of the site description is provided below, broken down into each affected local authority area. All permanent works will be undertaken within the Network Rail operational boundary, with some ancillary works adjacent to the boundary. These ancillary works comprise vegetation removal, alterations to bridges and viaducts and temporary use of land for access and material and plant storage. Further information, presented for each specific environmental topic is provided in Part III of this report.

Liverpool City Council

- 2.3.2 Within the Liverpool City Council local authority area the railway is generally bounded by housing on either side. This is interrupted in some places, including Wavertree Technology Park, which consists of low rise commercial and industrial units. At Edge Hill, the railway lies in an industrial area adjacent to Wavertree Technology Park. Heading east the railway line passes through residential suburbs.

Knowsley Metropolitan Council

- 2.3.3 The railway runs parallel with the M62 until Junction 5, after which it passes through the residential areas of Huyton-with-Roby. Midway through the Knowsley Metropolitan Council area the railway crosses the M57. It then passes through the large open green space of Stat Moers Park and the residential area of Whiston.
- 2.3.4 The rail verge has an increasing amount of vegetation and tree cover as the line passes through Knowsley. There are some areas of open space typically associated with the M57 motorway corridor and disused quarry workings. The M57 and M62 motorways cut through the area and form physical and visual barriers, particularly to the landscape of Knowsley Hall registered park and garden to the north.
- 2.3.5 Key watercourses in the area include Deys Brook, Prescott Brook and Longwood Mill Brook. There are many structures of note including bridges such as the Archway Road Bridge.

St Helens Council

- 2.3.6 Two areas of St Helens Council are crossed by the scheme. After passing through Rainhill the surrounding landscape becomes largely rural with some large but scattered industrial areas before reaching the built areas of Lea Green and St Helens. Once the line has passed through the small

section of the Warrington Borough Council district and crosses the M6 it reaches Newton-le-Willows. The wider landscape is largely rural. Colliers Moss Common Local Nature Reserve (LNR) is located in the St Helens Council area.

- 2.3.7 There are four notable water courses within the St Helens Council area – Pendlebury Brook, Sutton Mill Brook, Sankey Brook and Newton Brook. Structures of particular historical note include Rainhill Station and Earlestown Station.

Warrington Borough Council

- 2.3.8 Two areas of the Warrington Borough Council area are crossed by the Liverpool to Manchester railway. A small rural section to the north of Burtonwood, and after the line has passed through an area of the Wigan district, it passes through a rural landscape north of Culcheth before reaching Glazebury and the border with the Wigan Council area. The area is intersected by the motorway corridor of the M62.
- 2.3.9 There are a number of small drains within the vicinity of the railway, notably in the Burtonwood Moss area adjacent to the railway line. Other water courses include Glaze Brook which joins the Manchester Ship Canal, another small watercourse which passes under the railway line to the east of Whites Farm, Sankey Brook and a tributary of Jibcroft Brook in the Culcheth Carrs area.
- 2.3.10 There are many structures of historical note, in particular the Grade 1 listed Sankey Viaduct, which crosses the Sankey Brook at grid reference SJ5687794718. This structure is also partly in St Helens as the boundary follows the course of the Sankey Brook.

Wigan Council

- 2.3.11 The railway passes through two largely rural sections of the Wigan local authority area. The first section runs from Highfield Moss, just east of the A573, to north east of Kenyon. The second runs from Glazebury to midway between Bedford and Barton Mosses.
- 2.3.12 Two Sites of Special Scientific Interest (SSSI) and one Special Area of Conservation (SAC) fall within Wigan Council's district. Highfield Moss SSSI is bisected by the Liverpool to Manchester railway line. Astley and Bedford Mosses SSSI lies immediately adjacent to the northern boundary of the Liverpool to Manchester railway. Manchester Mosses SAC comprises a number of SSSIs including Astley and Bedford Mosses.
- 2.3.13 There are some large water bodies in the council area including Pennington Flash and the Leeds and Liverpool Canal.
- 2.3.14 There are no structures of particular historical note in this area.

Salford Council

- 2.3.15 Through Salford, the railway passes through rural mosslands to the west and the M62 motorway intersects the landscape to the south of the rail line, through the rural Chat Moss area before reaching the M60 ring road where inside the M60 it becomes increasingly urbanised as the line passes through Eccles and Salford as it nears the centre of Manchester.
- 2.3.16 Manchester Mosses SAC, which is comprised of a number of SSSIs such as as Risley Moss, Astley & Bedford Mosses and Holcroft Moss on the Mersey floodplain also falls within Salford.
- 2.3.17 Watercourses of note are the Worsely Brook and the Bridgewater Canal, which are present between the M60 and Patricroft Station, and both of which join the Manchester Ship Canal. The Rivers Irwell and Irk are located adjacent to the railway between Liverpool Road Junction and Victoria Station.
- 2.3.18 Structures of particular historical note include the Southern Railway Viaduct, the brick bridge over the River Irwell and the Greengate/ Chapel Street Railway Viaduct.

Manchester City Council

- 2.3.19 A small section at the eastern end of the line falls within Manchester City Council's area, where the line reaches Victoria Station. Here the line is located in the highly developed centre of Manchester.
- 2.3.20 The River Irwell, Rochdale Canal, Bridgewater Canal and the River Medlock are all located within the vicinity of Deansgate Station. Structures of note include Stephenson's bridge, the viaduct over the River Irwell and Victoria Station.

2.4 Proposed Scheme

- 2.4.1 Detailed design of the scheme has not been completed yet therefore the exact scheme design and method of construction has not been determined. This EAR therefore considers the general impacts of the scheme as presently understood.
- 2.4.2 The main scheme works impacting upon the environment generally comprise the following key tasks:
- Installation of OLE gantries
 - Bridge works
 - Track lowering
 - Vegetation clearance
 - Installation of electrical distribution sites
- 2.4.3 A general description of these works is described below.

Installation of OLE Gantries

- 2.4.4 The OLE gantries are required to support the overhead electrified lines and therefore are required along the entire length of the electrified scheme from Liverpool, to Earlestown and Newton-le-Willows to Deansgate and Victoria stations, Manchester. This is illustrated on Figure 1 one in Appendix A. Gantries are installed approximately 50m apart, but this distance may vary depending on factors such as ground conditions and the location of structures. Depending on the location of the gantries, they may be either a cantilever structure or portal structure, having one or two footings, respectively. The footings for the gantries could be piled using a range of techniques including percussive or drilled, or they could be formed using ground bearing concrete pads. The piled footings can be expected to be 4 to 6m in depth in general, but piling as deep as 10m may be necessary at some points where ground conditions necessitate it. The height of the gantry will vary depending on the type installed at each location, but is generally around 7m tall. The installation of gantries and associated wiring along the length of the railway can be considered to represent the key visual impact of the scheme.
- 2.4.5 The equipment required to install OLE gantries and wiring is likely to include:
- Piling rigs
 - Trailers
 - Road Rail Vehicles (RRVs)
 - Mobile Elevated Working Platforms (MEWPs)
 - Cranes

Bridge Works

2.4.6 In order to install OLE along the scheme a number of bridges will be affected. Depending on the constraints that each structure poses, the solution will be different, and not all structures will require works in order to achieve electrification. A process of optioneering has been undertaken by Network Rail in order to identify the best option at each bridge where insufficient clearance is available to install the OLE, or where there is a safety risk posed to users of the bridge if OLE was installed without any bridge alteration. The chosen option in each case reflects a number of considerations including safety, the heritage value of the structure, the potential impacts on neighbours and users of the bridge, and the buildability and therefore cost associated with the works. The following are broad types of work that will be required across the scheme:

- Bridge demolitions and reconstructions
- Bridge jacking (raising the height of a structure to increase clearance)
- Parapet works
- OLE attachments (attaching OLE supports to the underside of a bridge, or attaching gantries to a viaduct structure)

2.4.7 A full inventory of all the physically affected structures and a summary of the required works at each is provided in Appendix B. Figures 1.1 to 1.18 in Appendix A illustrate the locations of each of these structures.

Bridge Demolitions and Reconstructions

2.4.8 These works will necessitate bridge closures of up to 20 weeks. The bridge will first be dismantled and then rebuilt to increase the clearance of the structure to allow installation of the OLE. This solution is only be used when other solutions such as track lowering are not feasible at a given location. There are five bridges that will definitely be demolished and reconstructed, with a further two where demolition and reconstruction may be required. Our assessment has assumed demolition will be required in order to capture the worst case.

2.4.9 The equipment required for bridge demolition and reconstruction is likely to include:

- Road saws
- Pneumatic breakers
- All terrain teleloaders
- Jacking equipment
- Road planers
- Road pavers
- Road rollers
- 13 tonne wheeled excavators
- Peckers
- Dumpers
- Kerb lifters
- Core drills
- Concrete pumps
- Lighting
- Generators

Bridge Jacking

- 2.4.10 This requires raising a bridge's height to allow the required clearance. The structure of the bridge will be maintained as far as possible and placed on raised footings. This technique is being used for two footbridges in Rainhill Station.
- 2.4.11 The equipment required for bridge jacking is likely to include:
- Road cranes
 - Compressors
 - Mag drills
 - Concrete pokers
 - Dumpers
 - Lighting
 - Generators

Parapet works

- 2.4.12 Parapet works are generally required for safety reasons, to keep members of the public a safe distance from the proposed electric cables. Different techniques are being used for different bridge types to achieve the required protection whilst retaining the character of the bridge. Coping is being added to some bridges while other solutions involve increasing the height of masonry or providing metallic plates.
- 2.4.13 The equipment required for parapet works may include but will not be limited to the following:
- 13 tonne wheeled excavators
 - Compressors
 - Mag drills
 - Impact wrench
 - Loose lifting tackle
 - Paddle mixer
 - Lighting
 - Generators

OLE Bridge Attachments

- 2.4.14 Some bridges over the railway (overbridges) will require an attachment to be drilled onto them to support the electrified lines under the structures. Depending on the type, clearance and length of the structure the attachment solution and construction method will vary. In addition, where a bridge supporting the railway (underbridge) is of sufficient length that one or more gantries is required to support the OLE, attachment of gantries will be required to the underbridge structure. This is the case for viaducts.

Track Lowers

- 2.4.15 Track lowers are undertaken beneath bridges that require increased headroom to allow the OLE to be installed under the structure at the correct height for use by trains. The track is lowered by either removing some of the ballast or by lowering the ground level underneath the ballast.
- 2.4.16 The equipment required to lower the track may include but will not be limited to the following:
- Engineering trains

- Tracked excavators
- 20 tonne RRV excavators
- Dumpers
- Plain line tampers
- Stressing equipment
- Welding equipment
- Lifting equipment
- Lighting
- Generators

2.4.17 The length of track lowering required by the scheme generally varies between approximately 250m and 350m, and depth of the lowering at its deepest point under the constraining structure is generally only a few centimetres, and at some locations the amount of additional clearance required is so small that clearance can simply be achieved by replacing the current concrete sleepers with steel sleepers.

2.4.18 At some locations a track slue is required, where the track will be slightly moved to one side to achieve the required clearance.

Vegetation Clearance

2.4.19 In order to facilitate construction of the scheme, a significant amount of vegetation removal will need to be undertaken, though the exact areas where removal is required is not known at the present time. In order to ensure a safe clearance distance from OLE, once it is installed, up to 7m (from the edge of the running line where installation of auto-transformers are required) of vegetation may need to be removed.

2.4.20 Clearance of ground vegetation will only be undertaken where necessary, for example where the footings of OLE gantries need to be installed. This will limit the ecological impact of the works.

2.4.21 A Work Package Plan will be used to ensure that vegetation clearance is kept to a minimum. For instance low lying vegetation such as small shrub/trees and brambles will be retained where they will not interfere with the electrified lines. Selective clearance will be undertaken by the contractor to maintain as much vegetation as possible.

Distribution Sites

2.4.22 Four potential locations have been identified along the route where electrical distribution equipment will be installed in a new building. The sites are required to distribute electric current to the overhead lines. The four sites – at Huyton, Newton-le-Willows, Astley and Ordsall Lane – are shown on Figures 1.3, 1.9, 1.12 and 1.17. There are three site options at Astley, one of which will eventually be used to construct a building or a number of OLE gantry-type structures to house the distribution equipment. The exact designs for each of the proposed sites will be determined during detailed design.

2.4.23 At Newton-le-Willows and Ordsall lane, the proposed buildings will be approximately 20m by 4m in length and width, and approximately 3m to 3.5m in height. At Huyton and Astely, it is proposed that OLE gantries are incorporated in the design, and the height will be approximately 6m. Further details on noise emissions of the distribution equipment are provided in Section 3.

The distribution sites are an addition to the scheme since the PEAR was prepared, and there are potential scheme impacts with regard to flood risk and contaminated land that were not identified in the PEAR. This EAR therefore provides an additional assessment of distribution sites for flood risk and contaminated land (which are presented in Appendices H and I), as well as for the main

topics covered in the EAR – noise and vibration, landscape and visual impacts, historic environment and ecology – which are covered within Sections 3 to 6.

2.5 Access

- 2.5.1 Much of the construction of the scheme will be undertaken from the railway, with equipment and plant being brought in by rail. The remaining equipment, workers and materials will be brought to site by road. A number of potential access points have been identified for the scheme and these are shown on drawings 1.1 to 1.18 in Appendix A and are listed in Appendix B.

2.6 Construction Programme

- 2.6.1 The main site works for the scheme are programmed to begin in autumn 2011 with construction of the eastern section of the route between Newton-Le-Willows and Manchester. Construction of the western end of the scheme, between Newton-Le-Willows and Liverpool, is programmed to commence in spring 2012. These main site works will include enabling works such as vegetation clearance, the installation of shallow and piled foundations, erection of steel gantries and associated infrastructure to support overhead lines, installation of wiring and finally testing and commissioning. Completion of the eastern end of the scheme is programmed for December 2013, with completion of the western section in December 2014.
- 2.6.2 For the eastern end of the scheme some works, including bridge reconstructions, will be undertaken in advance of the main site works and are programmed to commence on 15th March 2011. These “early works” comprise the following:
- Three bridge reconstructions (Bridge References DSE 123, DSE 124 and DSE 125) located in Salford
 - Five track lowers (Bridge References DSE 101 in Wigan, and Bridge References DSE 129, DSE 131, DSE 133, and DSE 138, all in Salford)
- 2.6.3 Atkins prepared separate reports for these early works ahead of this EAR⁴.
- 2.6.4 For the western end of the scheme these works will commence in tandem with the main construction works, in spring 2012.

2.7 Construction Stage Environmental Management

Network Rail Sustainability Policy

- 2.7.1 Network Rail's corporate Sustainability Policy Statement, published in 2009, sets out their vision for delivering a sustainable railway by setting goals and targets across the three areas of social, economic and environmental sustainability. A copy of the Policy Statement is contained in Appendix G. This document includes amongst other things a commitment to 'encourage modal shift from less efficient forms of transport', to 'improve the energy efficiency of running trains', and to 'protect our heritage and natural resources and seek opportunities to enhance them where reasonably possible'.

Contract Requirements - Environment

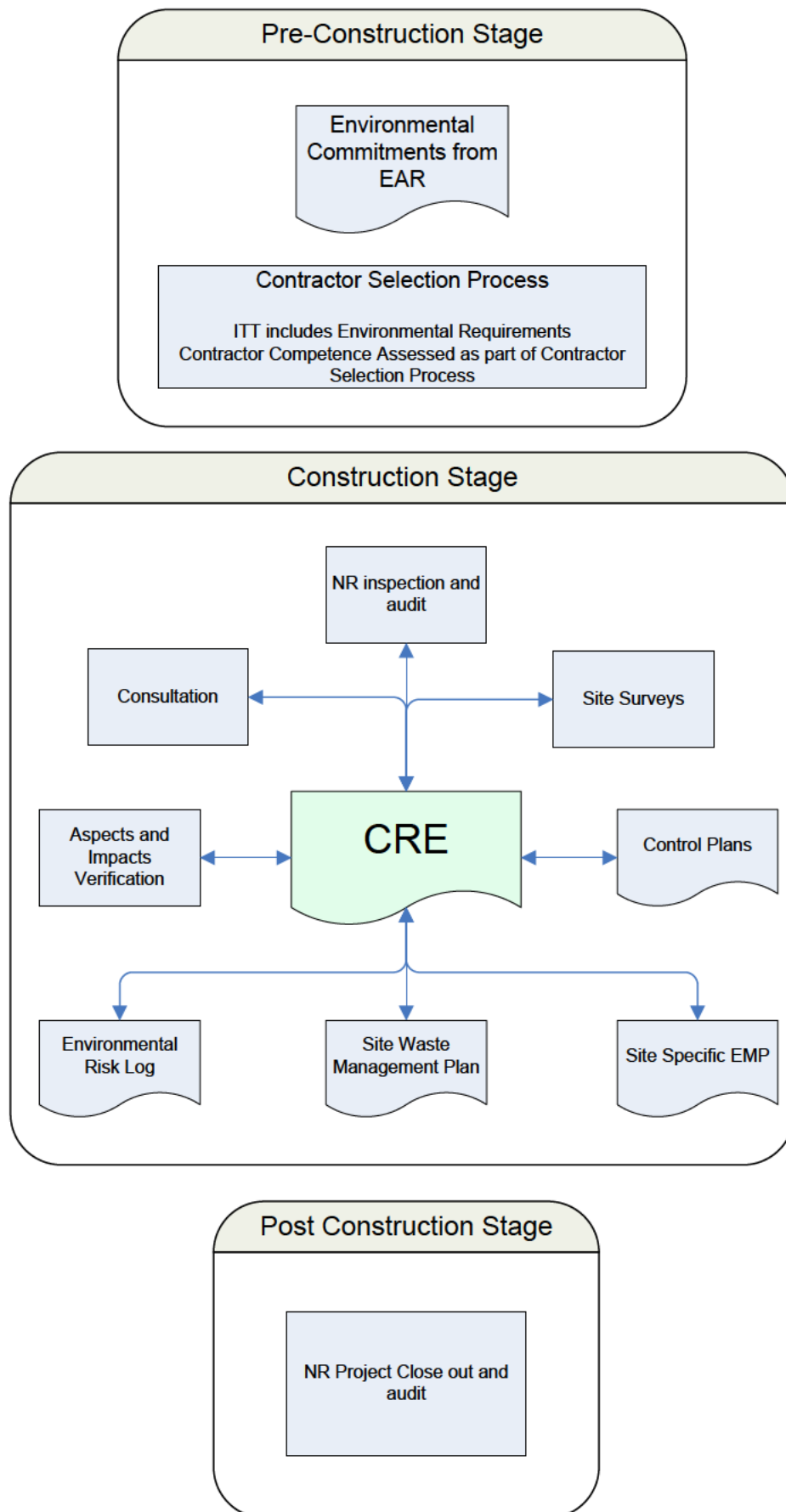
- 2.7.2 Originally published in 1999, Network Rail's Contract Requirements Environment (CRE) is now in its 5th revision. The purpose of CRE, as set out on page 5 of that document (see Appendix G), is as follows:

⁴ Atkins, Liverpool to Manchester Overhead Line Electrification, Early Deliverable Reports on Ecology, Noise and Traffic, January 2011, refs 5096672-ATK-R-021, 5096672-ATK-R-20, 5096672-ATK-R-19

- 'The purpose of the Contract Requirements – Environment is to provide a controlled source of mandatory environmental clauses that sets out the minimum requirements for each and every contract and the particular requirements for specific contracts. It also provides the framework for satisfying Network Rail that the contractor is fully aware of the environmental issues that could affect the Contract.'

2.7.3 Compliance with CRE is mandatory for all Network Rail projects involving design or physical works and will be the key environmental management tool for the scheme. Figure 2.1 below illustrates how the environmental commitments identified in the EAR will be captured and integrated into the contractual responsibilities of the project using CRE.

Figure 2.1 - Environmental Management Flow Chart



Summary

- 2.7.4 Network Rail are committed through their corporate policy to ensuring high standards of environmental performance on their projects, and have a proven mechanism (CRE) for requiring that environmental commitments made in this EAR will be implemented by their chosen contractor during construction.

Part III – Environmental Assessment

3. Noise and Vibration

3.1 Summary of Findings

- 3.1.1 This assessment considers the likely impacts from the operation and construction of the proposed Liverpool to Manchester Electrification scheme.
- 3.1.2 An assessment has been undertaken to determine the potential noise impact associated with the operation of the distribution equipment to be located at sites at Huyton, Newton-Le-Willows, Ordsall Lane and Astley.
- 3.1.3 The assessment indicates that for the sites at Huyton, Ordsall Lane and Astley there is a positive indication that complaints are unlikely. For the site at Newton-Le-Willows the assessment shows that the likelihood of complaints is at worst of marginal significance and is nearer to a positive indication that complaints are unlikely. Based upon these findings mitigation will not be required.
- 3.1.4 It is concluded that there would be no adverse operational noise impacts as a result of the scheme.
- 3.1.5 Using good working practices and with appropriate mitigation measures in place, it would be possible to minimise the potential noise and vibration impacts from construction activities. However it may not be practicable to fully eliminate the impacts from some activities and the magnitude of noise impacts could be as follows:
- Moderate to severe noise impacts from breaking, drilling, cutting and compaction operations at dwellings within 100m and with a direct line- of- sight of the activities.
 - Minor to Major noise impacts from piling operations at dwellings within 50m and with a direct line- of- sight of the activities.
 - Minor noise impacts from most of the remaining activities and items of plant where the construction activities are taking place at least 30m away from the noise-sensitive receivers.
- 3.1.6 With the use of appropriate piling techniques, vibration impacts could be greatly minimised or eliminated.

3.2 Introduction

- 3.2.1 This section identifies the potential noise and vibration impacts from the operation of the railway and construction activities and makes recommendations on a number of mitigation measures to minimise the impacts.
- 3.2.2 The main operational change as part of the scheme would consist of the existing diesel trains being replaced by electric trains. There would be no major changes in the track alignment, line speed, the frequency of services or timetable. Electric trains are known to be quieter than diesel trains when idling and accelerating. There may be minor beneficial noise changes as a result of the project, at some locations where these types of rail movements occur (i.e. at or near the stations). However at normal operating speeds, generally the noise levels would be dominated by noise generated at the wheel/rail interface and no significant changes in noise would be expected due to the scheme. The overall operational impacts of the proposed scheme, when averaged over a typical day-time (16-hour) or a night-time (8-hour) period across the study area, would be expected to be insignificant.
- 3.2.3 Noise impacts associated with the operation of the distribution equipment have been assessed following the guidance with BS4142: 1997 "Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas". This is the main source of guidance used in the rating of noise of an industrial nature and is based upon the margin by which noise produced by a source, after

being adjusted for tonal characteristics, impulsiveness or irregularity, exceeds the background noise level. The standard may be used to indicate the likelihood of complaints from local residents.

- 3.2.4 A difference of around +10dB or more above measured background noise levels dB L₉₀ indicates that complaints are likely. A difference of around +5 dB is of marginal significance. If the rating is more than 10 dB below the measured background noise then this is a positive indication that complaints are unlikely.
- 3.2.5 It is expected that the main scheme impacts would be from noise and vibration generated during the construction works. In order to install the OLE, some overbridges will need to be altered and/or the track below the bridge will need to be lowered. A full inventory of all the physically affected structures and a summary of the required works at each is provided in Appendix B. Figures 1.1 to 1.18 in Appendix A illustrate the locations of each of these structures. Gantries for the overhead lines will be constructed approximately every 50m along the line.

Planning and Legislative Context

- 3.2.6 The key guidance document used in this assessment is B2 5228:2009 'Code of practice for noise and vibration control on construction and open sites'. Part 1 of this Code of Practice relates to the assessment of noise impacts and Part 2 applies to vibration impacts.

Study Area

- 3.2.7 The study area comprises a buffer of 100m around the Network Rail operational railway boundary and is largely built up and densely populated. The main sources of ambient noise comprise a number of motorways (such as M57, M62, M6, M602 and M60), other major A-roads and major railway lines. The dominant source of noise is road traffic, with rail traffic affecting areas which are situated close to the railway lines and away from major roads.

Consultation

- 3.2.8 Consultations were undertaken with the relevant local authorities regarding the noise survey locations and the measurement durations. The noise measurement surveys were aimed at establishing the baseline conditions at receivers that could experience the greatest adverse impacts from construction activities. The responses of various local authority areas are summarised below.

Table 3.1 – Consultation Summary

Authority	Contact name	Contact date	Outcome
Liverpool	████ ████	08/11/2010	Contact had no adverse comment.
Knowsley	████ ████	04/11/2010	No response has been received. A reminder email was sent on 17/11/2010.
Manchester	████████	04/11/2010	Email was passed on to ██████████ at Manchester who had no adverse comment.
St Helens	████████	04/11/2010	Contact had no adverse comment.
Warrington	████ ████	04/11/2010	Contact had no adverse comment.
Wigan	████ ████████	04/11/2010	Email was passed on to ██████████ at Wigan who had a number of comments and queries, regarding assessment and noise survey methodology. These are addressed in this document.

Authority	Contact name	Contact date	Outcome
Salford	■■■■	04/11/2010	Some queries were received about the specifics of the measurement procedure, a response to which was provided.

- 3.2.9 In considering the impact of construction noise and vibration, of particular importance will be the exact nature of the activities, plant and equipment types, distance between receivers and activities, the hours of working and the effects of piling. When a contractor is appointed, it is expected that a more detailed construction programme will be prepared and the preferred construction methods will be finalised. It is recommended that the contractors engage in further consultations with the relevant local authority identified above to establish the preferred practice within each local authority area, particularly with regards to setting noise limits and agreeing working methods.
- 3.2.10 The local authorities may prefer the contractor to work either towards fixed noise limits or relative limits commensurate to ambient noise in the area. The latter approach has been adopted in this report to provide an indicative assessment of construction noise impacts.
- 3.2.11 Similarly there may be differences in the way different local authorities wish to manage noise and vibration impacts. This could be through formal Section 61 agreements or via more informal arrangements such as the use of best practicable means described in this document.

3.3 Assessment Methodology

Operational Noise – Distribution Equipment

- 3.3.1 The proposed sites for the distribution equipment are at Huyton, Newton-Le-Willows, Ordsall Lane and Astley (there are 3 options to consider at Astley), shown on Figures 1.3, 1.9, 1.12 and 1.17 in Appendix A.
- 3.3.2 Typically background noise levels will be at their lowest at night and it is at this time that noise impacts are potentially at their greatest. For the sites under assessment, at the rural site of Astley the night time background level has been taken as 30 dB(A) L_{90} and at the other sites (that are located near to roads) a figure of 35 dB(A) L_{90} has been taken. The background noise levels are taken from the long term ambient noise monitoring data presented in Appendix C.
- 3.3.3 Noise emission data for the distribution equipment (essentially transformers) and their specification is provided below:
- Noise emission shall be less than 55 dB(A) when measured in accordance with EN60076-10:2001 “Power transformers - determination of sound levels”. In addition, the level in any of the octave bands of centre frequency 250Hz, 500 Hz, 1kHz and 8kHz shall not exceed 53 dB.
- 3.3.4 At the Huyton site 2 autotransformers are specified. The nearest Noise Sensitive Receiver (NSR) is located 25m away on the corner of Victoria Road and Huyton Hey Road. Using the expression:
- $$SPL = SWL - 20 \log r - 8,$$
- Where r is the distance from the source to the receiver and SWL is the sound power of the transformers, the noise level at the nearest receptor can be calculated. It has been assumed that the intervening ground is reflective.
- 3.3.5 Similarly for the receptors at the other sites the noise level at the nearest NSR can be calculated. At these sites one autotransformer is specified at each site.
- 3.3.6 At the Newton-Le-Willows site the nearest NSRs are located on Rosemary drive at a distance of 10m. At Ordsall Lane there are NSRs on Middlewood Street at a distance of 70m. At Astley the

nearest NSRs are Station Cottages and Moss Side Farm, these are located some 20m to 100m from the proposed installation dependent upon the option.

- 3.3.7 Given the performance specification and the requirement to control tonal emissions, for the purposes of this assessment a correction for tonality has not been applied. Table 3.2 below provides a summary of the BS4142 assessment.

Table 3.2 – BS 4142 Assessment

Calculation step	Assessment dB(A)					
	Huyton	Newton-Le-Willows	Ordsall Lane		Astley	
				Option 1	Option 2	Option 3
Source level	57	54	54	54	54	54
Predicted level at nearest NSR	21	26	9	12	20	6
Rating Level	21	26	9	12	20	6
Background noise level	35	35	35	30	30	30
Excess of rating over background level	-14	-9	-26	-18	-10	-24

- 3.3.8 The assessment indicates that for the sites at Huyton, Ordsall Lane and Astley there is a positive indication that complaints are unlikely. For the site at Newton-Le-Willows the assessment shows that the likelihood of complaints is at worst of marginal significance and is nearer to a positive indication that complaints are unlikely. Based upon these findings mitigation will not be required.

Construction noise and Vibration

- 3.3.9 Construction noise and vibration and its effect on existing residential properties were assessed in accordance with BS 5228:2009 Parts 1 & 2 'Code of Practice for Noise and Vibration Control on Construction and Open Sites'.
- 3.3.10 Annex F of Part 1 sets out methods of estimating noise from construction sites. Annex E of Part 1 gives guidance on the significance of noise effects from the construction works.
- 3.3.11 The Standard provides generic source noise data for various items of plant used on open sites along with methods for calculating the effects of these activities and their respective noise levels at nearby noise sensitive properties. It also provides methods for calculating the noise levels of plant and vehicles moving along haul roads. The calculation method takes into account distance, ground effects, reflections from surfaces and screening by obstacles.
- 3.3.12 Part 1, Annex E 'Significance of Noise Effects' of BS5228 presents various methods of determining the significance of noise effects due to construction works. In this assessment, the ABC method detailed in Annex E.3.2 has been used, where for the appropriate period (night, evening/ weekends or day), the ambient noise level measured is rounded to the nearest 5 dB. This is then compared with the total noise level, including construction. If the total noise level exceeds the appropriate category value, then a significant effect is deemed to occur. The example threshold of significant effect at dwellings is shown below in Table 3.3.

Table 3.3 - Example threshold of significance effect at dwellings

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A	Category B	Category C
Night-time (23:00-07:00)	45	50	55
Evenings (19:00-23:00 weekdays) and weekends (13:00-23:00 Saturdays and 07:00-23:00 Sundays)	55	60	65
Daytime (07:00-19:00) and Saturdays (07:00-13:00)	65	70	75

- 3.3.13 The values in category A, B and C are the threshold values to be used when ambient noise levels (when rounded to the nearest 5 dB) are less than, equal to, or higher than the values in Category A column, respectively.
- 3.3.14 BS 5228:2009 Code of Practice for Noise and Vibration Control on Construction and open sites, Part 2- Vibration, gives guidance on vibration levels that could be used to assess the likely impacts of construction activities, including piling, on the environment and people.
- 3.3.15 Annex B of Part 2 gives guidance on the significance of vibration effects in terms of human response to vibration (Table 3.4) and structural response to vibration (Table 3.5).

Table 3.4 - Guidance on effects of vibration levels perceptible to humans

Vibration level	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration
0.3 mm/s	Vibration might be just perceptible in residential environments
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents
10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level

Table 3.5 - Transient vibration guide values for cosmetic damage

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15Hz and above
Reinforced or framed structures	50mm/s at 4Hz and above	50mm/s at 4Hz and above
Industrial and heavy commercial buildings		
Unreinforced or light framed structures	15 mm/s at 4Hz increasing to 20 mm/s at 15Hz	20 mm/s at 15Hz increasing to 50 mm/s at 40Hz and above
Residential or light commercial buildings		

3.4 Criteria of Assessment

- 3.4.1 In accordance with the significance criteria highlighted in Table 3.3, and the ambient noise levels summarised in Table 3.7, the total noise levels (construction noise and ambient noise) should not exceed the following threshold values;
- 65 dB L_{Aeq} (Category A) during the day (07:00-19:00) and on Saturdays (07:00-13:00)
 - 60 dB L_{Aeq} (Category B) in the evenings (19:00-23:00 weekdays) and over weekends (13:00-23:00 Saturdays and 07:00-23:00 Sundays)
 - 55 dB L_{Aeq} (Category C) at night time (23:00 – 07:00)
- 3.4.2 If the total noise level exceeds the appropriate category value, then a significant effect is deemed to occur. BS 5228 does not provide guidance to determine the degree of significance for various exceedance levels.
- 3.4.3 The response of the human hearing system is logarithmic rather than linear in behaviour, and able to detect a noise level difference of about 1 dB between two steady sounds, when presented in rapid succession under controlled laboratory conditions. The smallest change in environmental noise that is generally noticed by an individual over a period of time is about 3 dB. A 10 dB change approximates to a subjective doubling or halving of loudness.
- 3.4.4 In line with the methodology adopted in the rest of this report, the following terms will be used to describe the noise impacts:

Table 3.6 – Noise Assessment Criteria

Impact	Magnitude of impacts
<1 dB(A) change	Negligible impact
1<2.9 dB(A) change	Minor impact
3<4.9 dB(A) change	Moderate impact
5<9.9 dB(A) change	Major impact
≥10 dB(A) change	Severe impact

- 3.4.5 The likely vibration impacts from piling activities will be assessed using the fixed criteria highlighted in Table 3.4 and Table 3.5.

3.5 Baseline Conditions

- 3.5.1 Noise measurements were undertaken at three locations, continuously over approximately four days, to capture both daytime and night-time noise levels at representative receivers in the study area which could experience the greatest adverse impacts. These were supplemented by 15-minute sample measurements at a number of additional locations, as appropriate. The full details of noise surveys are shown in Appendix C1. The locations of the noise monitoring points are shown on Figures 1.1 to 1.18 in Appendix A.
- 3.5.2 The average noise levels, rounded to nearest 5 dB for the three assessment categories specified in BS 5228, are summarised in Table 3.7.

Table 3.7 - Average noise levels for BS5228 criteria

BS 5228 Assessment Category	Average Noise Level dB L _{Aeq}		
	No. 10 Vernon Avenue	No. 9 Bridge Road	Penny Lane
Night-time (23:00-07:00)	55	55	50
Evenings (19:00-23:00 weekdays) and weekends (13:00-23:00 Saturdays and 07:00-23:00 Sundays)	60	55	55
Daytime (07:00-19:00) and Saturdays (07:00-13:00)	65	55	55

- The monitoring location at No. 10 Vernon Avenue is approximately 10m from the Liverpool to Manchester railway line and 30m from M602. The noise levels measured at this dwelling represent the relatively high ambient noise levels within the study area.
- The monitoring location at No. 9 Bridge Road is approximately 30m from Liverpool to Manchester railway line, with the nearest motorway some 400m away (M62). The noise levels measured at this dwelling represent the majority of dwellings in the study area, affected by railway noise and distant road traffic noise.
- The monitoring location at Penny Lane is approximately 100m from the Liverpool to Manchester railway line, with the nearest motorways approximately 3km away (M6 and M62). The noise levels measured at this dwelling represent the locations where the ambient noise levels may be expected to be lower than usual, for example, away from major roads and railway noise sources.

- 3.5.3 The findings of the baseline noise surveys have been used in the assessment to determine the noise limits for identifying the construction noise impacts.

3.6 Key Environmental Issues

Description of Works

- 3.6.1 The construction works will comprise the following main types of activities.
- Major bridge works (demolition and rebuilding)
 - Track lowering works
 - Overhead line support installation, including piling
 - Construction of access routes
- 3.6.2 In considering the impact of construction noise and vibration, of particular importance will be the exact nature of the activities, plant and equipment types, distance between receivers and activities, the hours of working and the effects of piling.
- 3.6.3 Activities such as major bridge works, track lowering works and construction of access routes will occur at intervals along the length of the scheme to coincide with the structures concerned.
- 3.6.4 The critical works associated with bridges (from a noise impact perspective) will comprise the required demolition and rebuilding activities. For each structure, it is anticipated that the major work, such as deck removal and replacement, will be undertaken during a 54 hour possession period, where the railway is closed to traffic.
- 3.6.5 The track lowering works will be undertaken on a single line during a possession with the engineering train stationed on the adjacent line. The possession period will typically comprise 54 hours per line.
- 3.6.6 The OLE gantry installation works would be linear in nature and repeated approximately every 50m. A number of foundation options are currently being devised for the gantries to support the overhead electric lines. Under certain ground conditions, it is possible that percussive piling techniques will be used, which could be a source of significant levels of vibration.
- 3.6.7 In addition to the direct impacts from physical construction works, there could be indirect impacts from construction traffic routes and road traffic noise during diversion works.
- 3.6.8 The main plant and equipment likely to be used and the corresponding noise levels at a distance of 10m in dB L_{Aeq} are shown in AppendixC2. The plant lists have been compiled from the information provided in Network Rail's Construction Management Strategy⁵ and previous experience on similar developments. Where no specific information was identified in BS 5228 for the particular activity or plant, an equivalent has been assumed. It should be noted that there could be changes to the plant and equipment to be used due to variations in the preferred construction methods by the appointed Contractor.

Assumptions

- 3.6.9 Due to the size of the scheme and the nature of activities, there will be a number of noise-sensitive receivers (NSRs) along the scheme which could be adversely affected by the proposed construction activities during different stages of the scheme. The NSRs could comprise residential properties, buildings in religious, educational or health use and commercial properties. The scheme drawings indicate that the NSRs could be situated as close as 20m from the nearest construction activities. Where the propagation of noise is not obstructed by buildings, cuttings or other natural features, there could be impacts from the construction works at distances up to

⁵ Network Rail CCMS Ref.61179866

100m from activities. On this basis, the calculations have been undertaken at various distances between 20m and 100m.

- 3.6.10 The construction noise calculations assume free-field conditions to enable direct comparison with the measured ambient noise levels at the NSRs. It is noted that some of the activities will take place in the railway cuttings. Where the railway cutting is deep enough to intercept the line-of-sight between the activities and the NSRs, it could provide a noise reduction of between 5 dB and 10 dB. In order to represent a worst case scenario, it has been assumed that railway cuttings provide no natural screening. This accounts for the presence of high rise buildings in the study area and the activities taking place at the level of the structures.
- 3.6.11 The percentage of the assessment period for which each activity takes place has to be taken into account. For instance, for a twelve hour assessment period, if a given activity takes place for only six hours (i.e. 50% 'on-time'), then a correction of -3 dB has to be applied to the relevant activity noise level. Similarly, a correction of -6 dB would be applicable if the activity would be taking place over three hours (i.e. 25% 'on-time'). For this assessment, an 'on-time' of 50% is assumed for all activities (hence -3 dB correction).
- 3.6.12 Taking into account the various correction factors described above, the calculated noise levels in dB L_{Aeq} at various receiver distances are summarised below. The noise levels are for individual items of plant. It is noted that a number of items of equipment are likely to be working together on the site at any one time. However their cumulative impacts cannot be determined with certainty until a more detailed construction programme is prepared and the preferred construction methods are finalised.

Noise from Bridge Demolition Works

Table 3.8 - Likely noise Levels from demolition works at various distances

Construction plant	Construction noise dB L_{Aeq} at receiver				
	@20m	@30m	@40m	@50m	@100m
Hand-held pneumatic breaker	86	82	80	78	72
Backhoe mounted hydraulic breaker	79	75	73	71	65
Hand-held circular saw (petrol)	78	74	72	70	64
Core drill	76	72	70	68	62
Wheeled mobile telescopic crane 400T	69	65	63	61	55
Excavator 13T	60	56	54	52	46
Dumper 9T	67	63	61	59	53
Compressor for hand-held pneumatic breaker	56	52	50	48	42
Generator (to provide power for welding, lighting etc)	57	53	51	49	43

Noise from Bridge Rebuilding works

Table 3.9 - Likely noise Levels from bridge rebuilding works at various distances

Construction plant	Construction noise dB L _{Aeq} at receiver				
	@20m	@30m	@40m	@50m	@100m
Wheeled mobile telescopic crane 400T	69	65	63	61	55
Excavator 13T	60	56	54	52	46
Dozer	68	64	62	60	54
Dumper 6T	70	66	64	62	56
Road Planer	73	69	67	65	59
Road Paver	68	64	62	60	54
Road Roller	72	68	66	64	58
Generator (to provide power for welding, lighting etc)	57	53	51	49	43

Noise from Track Lowering Works

Table 3.10 - Likely noise Levels from track lowering works at various distances

Construction plant	Construction noise dB L _{Aeq} at receiver				
	@20m	@30m	@40m	@50m	@100m
Traxcavator	71	67	65	63	57
Excavator 22T	62	58	56	54	48
Excavator 13T	60	56	54	52	46
Dumper 6T	70	66	64	62	56
Vibratory plate compactor	71	67	65	63	57
Compactor rammer	82	78	76	74	68
Hand-held welder	64	60	58	56	50
Wheeled mobile crane	61	57	55	53	47
Generator (to provide power for welding, lighting etc)	57	53	51	49	43

Noise from Overhead line support installation

Table 3.11 - Likely noise Levels from overhead line support installation at various distances

Construction plant	Construction noise dB L _{Aeq} at receiver				
	@20m	@30m	@40m	@50m	@100m
Excavator 13T	60	56	54	52	46
Dozer	68	64	62	60	54
Wheeled mobile telescopic crane 400T	69	65	63	61	55
Hydraulic hammer rig	78	74	72	70	64
Large rotary bored piling rig	74	70	68	66	60
Continuous flight auger, crawler mounted rig	70	66	64	62	56
Road lorry (empty)	74	70	68	66	60
Pumping concrete, truck mounted concrete pump + boom arm	70	66	64	62	56
Poker vibrator	60	56	54	52	46

Piling Vibration from Overhead line support installation

- 3.6.13 Significant levels of vibration could be expected from percussive piling activities, associated with overhead line support installation works. Table 3.12 gives predicted peak particle velocity levels in mm/s at incremental distances from percussive piling with nominal hammer impact energy of 30kJ for different ground conditions. Distances given are along the ground surface and the pile toe depth is 1m, to give the maximum expected level.

Table 3.12 - Predicted PPV levels from percussive piling works

Ground Conditions	Peak Particle Velocity (mms ⁻¹) at incremental distances					
	@10m	@20m	@40m	@60m	@80m	@100m
<i>Pile toe being driven through:</i> Soft cohesive soils Loose granular soils Loose fill Organic soils	8.6	3.5	1.4	0.8	0.6	0.4
<i>Pile toe not being driven through:</i> Stiff cohesive soils Medium dense granular soils Compacted fill	12.9	5.3	2.1	1.3	0.9	0.7
<i>Pile toe being driven through:</i> Very stiff cohesive soils Dense granular soils Fill containing obstructions which are large relative to the pile cross section	25.9	10.6	4.3	2.5	1.7	1.3
Piles driven to refusal	43.1	17.6	7.2	4.2	2.9	2.2

Noise from Construction of Access Routes

Table 3.13 - Likely noise Levels from haul road construction

Construction plant	Construction noise dB L _{Aeq} at receiver				
	@20m	@30m	@40m	@50m	@100m
Excavator 13T	60	56	54	52	46
Dozer	68	64	62	60	54

Noise and Vibration from Construction Traffic

- 3.6.14 The number of deliveries from lorries and trucks to and from the various sites during construction are not known at this stage. An assessment of potential traffic impacts has been described in the Traffic and Transportation section of the PEAR³. It is understood that the implementation of a comprehensive traffic management plan would significantly mitigate the character and impact of construction traffic upon local residents.
- 3.6.15 Construction traffic is not expected to be at a sufficiently high level to result in significant noise and vibration impacts in the wider road network.

Road Traffic Noise during Diversion Works

- 3.6.16 The diversion works planned as part of the reconstruction of Albert Road Bridge are described in the Early Deliverable Traffic Report⁶.
- 3.6.17 During the works, the 18-hour traffic flows on the southbound diversion route would increase by between 40% and 50%. Similarly, the traffic flows on the northbound route would increase by between 50% and 70%.
- 3.6.18 These increases in traffic would result in noise increases of between 1dB(A) and 3 dB(A) during day-time. In accordance with the assessment criteria described in this report, the noise impacts resulting from the traffic diversion works would be considered 'minor'. It should also be noted that the bridge closure is planned for a relatively short period of time (10 – 14 weeks) and the impacts would be temporary.

3.7 Mitigation

- 3.7.1 Where significant impacts are expected, mitigation measures would need to be considered. The potential mitigation measures would equally apply to all seven local authority areas covered by the scheme.
- 3.7.2 For minimising construction impacts, it may be necessary to employ a combination of quieter plant/ equipment⁷ in conjunction with good working practices such as careful selection of working hours and activity durations. In addition, noise barriers, and enclosures may need to be considered around some of the fixed plant/activities.
- 3.7.3 A number of mitigation measures and good working practices are described below, actual measures to be implemented for the scheme will be detailed in the Noise and Vibration Management Plan for the scheme, one of the control plans within the Construction Environmental Management Plan (CEMP);

⁶ Atkins, Liverpool to Manchester Overhead Line Electrification, Early Deliverable Report – Traffic, 5096672-ATK-R-019, Jan 2011

⁷ Quieter than the equipment noise levels used in this assessment – these are listed in Appendix C2, Plant and Equipment List

- As far as reasonably practicable, breaking and compaction operations should be avoided or minimised during night-time, evening and weekends.
- All ancillary pneumatic percussive tools should be fitted with mufflers or suppressers of the type recommended by the manufacturers and should be kept in a good state of repair.
- Where appropriate temporary noise barriers should be used during construction works between noisy activities and noise-sensitive receivers. For example, BS 5228 allows an approximate attenuation of 5 dB to be adopted in the cases where there is a barrier, building or other topographic feature between the source and the receiving position, and the top of the plant is just visible to the receiver over the noise barrier. In situations when the noise screen completely hides the source from the receiver, an attenuation of 10 dB can be assumed. The effectiveness of barriers at distances beyond several hundred metres is assumed to be zero, irrespective of the amount of screening. The appropriateness of using temporary barriers will need to be assessed by the contractor on a site by site basis, taking into account the advice above, the type and duration of the activities being undertaken, the topography of the site and the location of the NSRs.
- All vehicles and mechanical plant used for the purpose of the works should be fitted with effective exhaust silencers and should be maintained in good and efficient working order.
- All compressors and generators should be 'sound reduced' models fitted with properly lined and sealed acoustic covers which should be kept closed whenever the machines are in use, and
- Machines in intermittent use should be shut down in the intervening periods between work or where this is impracticable, throttled down to a minimum.
- The site compound and static machines should be sited to minimise noise to adjacent properties.
- Where practicable, plant with directional noise characteristics should be positioned to minimise noise at adjacent properties.
- When handling materials, care should be shown not to drop materials from excessive heights.
- In order to keep the potential impacts to a minimum, the delivery routes used by trucks and lorries should avoid residential areas as far as possible.

3.7.4 In order to avoid significant vibration impacts from piling activities the following are recommended

- As far as possible, foundation techniques involving percussive piling should not be undertaken within 30m of a structure. For listed buildings, this exclusion zone may need to be greater.
- Where other engineering constraints allow, foundation options involving rotary bored piling, continuous flight auger techniques, or standard slab or gravity pads for shallow foundations should be preferred, to minimise likely vibration impacts.

3.7.5 The local residents should be kept informed of the progress of the works in accordance with CRE and other Network Rail's standards⁸. Information will include when and where the activities will be taking place and how long they are expected to last. All noise complaints will be effectively recorded, investigated and addressed.

⁸ Network Rail Construction Noise Mitigation through the Section 61 Consent Process Ref NR/GN/ENV/00022 April 2004, Network Rail Best Practicable Means: Control of Noise and Vibration from Construction Operations, Ref. NR/GN/ENV/00023 April 2004.

3.8 Environmental Impact Assessment

- 3.8.1 Due to the size of the scheme, there would be potential noise and vibration impacts at a number of NSRs in a large study area during different stages of the works. However the impacts at any one location would be limited in duration.
- 3.8.2 The noise calculations show that, during the day (07:00-19:00) and on Saturdays (07:00-13:00);
- significant noise effects would be expected from breaking, drilling, cutting and compaction operations at dwellings within 100m and with a direct line- of- sight of the activities.
 - significant noise effects would be expected from piling operations at dwellings within 50m and with a direct line- of- sight of the activities.
 - no significant noise effects would be expected from most of the remaining activities and items of plant where the construction activities are taking place at least 30m away from the noise-sensitive receivers.
- 3.8.3 At night (23:00-07:00), in the evenings (19:00-23:00 weekdays) and over weekends (13:00-23:00 Saturdays and 07:00-23:00 Sundays);
- significant noise effects would be expected from most construction activities, particularly the breaking, cutting and compaction operations, at dwellings with direct line- of- sight of the activities.
- 3.8.4 The assessment does not take into account potential screening from existing earthworks such as railway cuttings or any local screening from the garden walls and fences of properties. This could reduce the impacts.
- 3.8.5 An assessment of vibration levels from percussive piling techniques indicated that,
- Vibration may be perceptible up to distances of 100m from the activity.
 - It is likely that up to 60m there would be some complaints, extending to 100m with some ground types.
 - At distances less than 20m adverse comments would be highly likely
 - Within 10m there would be significant risk of cosmetic damage to properties.
- 3.8.6 It is important to note that the likely impacts are for well maintained and structurally sound properties and they should be considered an absolute maximum not an allowable level.

3.9 Summary

- 3.9.1 No adverse operational impacts are expected, and the impacts associated with construction activities would typically be:
- Negative;
 - Direct,;
 - Temporary; and
 - Short-term.

3.10 Conclusions

- 3.10.1 An assessment has been undertaken of the potential noise impacts associated with the operation of the distribution equipment. The overall operational impacts of the proposed scheme, when averaged over a typical day-time (16-hour) or a night-time (8-hour) period across the study area,

were expected to be insignificant. It is concluded that there would be no adverse operational noise impacts as a result of the operation of this equipment.

- 3.10.2 This section identifies the potential noise and vibration impacts from construction activities proposed as part of the electrification of Liverpool to Manchester railway line. An assessment was undertaken in accordance with BS 5228: 2009. A number of recommendations were made on appropriate mitigation measures to minimise the impacts.
- 3.10.3 Using good working practices and with appropriate mitigation measures in place, it would be possible to minimise the potential noise and vibration impacts from construction activities. However it may not be practicable to fully eliminate the impacts from some activities and the magnitude of noise impacts could be as follows:
- Moderate to Severe noise impacts from breaking, drilling, cutting and compaction operations at dwellings within 100m and with a direct line- of- sight of the activities.
 - Minor to Major noise impacts from piling operations at dwellings within 50m and with a direct line- of- sight of the activities.
 - Minor noise impacts from most of the remaining activities and items of plant where the construction activities are taking place at least 30m away from the noise-sensitive receivers.
- 3.10.4 With the use of appropriate piling techniques, vibration impacts would be greatly minimised or eliminated.

4. Historic Environment

4.1 Summary of Findings

- Electrification would be beneficial for the historic Liverpool to Manchester railway as it will safeguard its future operation which is critical to its historic significance.
- Works would have localised physical adverse impacts on designated and undesignated heritage assets such as the Grade I listed Sankey Viaduct and other Grade II listed structures. Whilst these cannot be resolved through mitigation measures they would not substantially harm the structures and the scheme would deliver substantial public benefit.
- The scheme would affect the setting of a number of designated and undesignated heritage assets in the local historic environment as well as altering the character of the wider historic urban environment in Liverpool and Manchester / Salford. These effects are not substantial and cannot be entirely mitigated.

4.2 Introduction

- 4.2.1 This chapter reports the likely effects of the proposed scheme on the historic environment and sets out how those affects have been assessed.
- 4.2.2 As set out in Part II of this report, the proposed development would be situated within the existing railway corridor and would include the installation of overhead gantries and distribution equipment, alterations and additions to railway structures (e.g. bridges) and a small number of 'track lowers' where the line would be lowered under a bridge. The PEAR³ therefore concluded that *"given the highly disturbed nature of the land within the railway corridor and the limited scale of ground disturbance associated with proposed development there will be no impacts on below-ground archaeological remains. Consequently, below ground archaeological remains have been scoped out of the assessment and will not be considered further."*
- 4.2.3 The assessment therefore considers the potential impacts of the proposed scheme on the built heritage resource, including designated and undesignated heritage assets.
- 4.2.4 There is only one exception to this, namely one of the options considered for distribution, access and parking at Astley where off-line permanent development may be required. Here potential archaeological issues have been identified.

Planning and Legislative Context

- 4.2.5 This assessment has been undertaken in the context of national legislation and planning policy guidance, in particular the Planning (Listed Building and Conservations Area) Act 1990 and Planning Policy Statement 5: Planning for the Historic Environment (PPS 5) (2010).

Study Area

- 4.2.6 The scheme runs from the centre of Liverpool to Manchester through seven local authority areas. The nature of the development, i.e. the installation of gantries and other equipment within an existing railway corridor, means that the scheme has the potential to affect the setting of designated and undesignated heritage assets that lie outside of the railway corridor. Given this potential, a study area of 150m has been established either side of the route centre to identify designated assets and significant undesignated assets whose settings may be affected.
- 4.2.7 Designated and undesignated historic buildings and structures within the railway corridor have also been identified where they may be directly physically affected by the proposed scheme.

4.3 Assessment Methodology

4.3.1 The assessment has included the following aspects and stages of work:

Identification of Baseline

4.3.2 Information on all designated and significant undesignated heritage assets within 150m of the centre line has been collated and mapped. These assets are mapped (see Figures 1.1 to 1.18 in Appendix A) and where they may be affected they are reported in Appendix D. The PEAR identified the unaffected assets.

4.3.3 In accordance with Planning Policy Statement 5: Planning for the Historic Environment (PPS 5) the identified and affected assets have been described and their significance assessed at a “...level of detail proportionate to the importance of the heritage asset and no more than is sufficient to understand the potential impact of the proposal on the significance of the heritage asset” (paragraph HE6.1).

4.3.4 A key element of the process included site visits along the entire length of the route to identify significant structures that may be affected and to develop a clear understanding of the potential impacts.

Assumptions Underpinning Assessment Process

4.3.5 The following assumptions have been made in lieu of a detailed design for the proposed scheme and underpin this assessment:

- The designs for the scheme will broadly reflect the information set out in Part II of this report.
- Vegetation clearance will occur along the line up to 7m out from the track, but the following locations will not be affected by this:
 - The north end of Station Road in the Roby Conservation Area
 - The substantial evergreen hedge at the north side of The Orchard, Huyton Conservation Area
- Works to trees within Conservation Areas will only occur following the statutory notification period.
- Gantries will only be directly fixed to the following listed structures (other listed structures will not be physically affected by gantry installation):
 - Sankey Viaduct, Grade I listed, UID 405596 and UID 216315
 - Brick bridge over River Irwell, Grade II, UID 471614
 - Viaduct from Deansgate to River Irwell, Grade II, UID 388102
- Gantries and other equipment will be sensitively sited in relation to the setting of all listed structures (including bridges, stations, buildings, memorials etc) within the study area and final locations will be determined in consultation with the local authority and under advice from heritage professionals.
- Gantries and other equipment will be sensitively sited in relation to the setting and character of all conservation areas within the study area and final locations will be determined in consultation with the local authority and under advice from heritage professionals
- Works to listed structures e.g. parapet alterations, OLE attachments, etc, will be designed in consultation with the local authority and with input from an accredited conservation architect. These works will be subject to listed building consent and will not commence without such consent.

- Works to unlisted but important historic structures, e.g. the numerous unlisted 1828-1830 railway bridges and tunnels, will be designed and undertaken sensitively with input from an accredited conservation architect.
- Where historic structures require removal, surviving historic fabric will wherever possible be retained e.g. brick abutments and pillars for bridges
- New bridge structures will be designed to respect the setting of nearby listed buildings or conservation areas and these will be designed in consultation with the local authority
- All historic structures along the line will be subject to an appropriate level of recording prior to works commencing in accordance with English Heritage guidance (Understanding Historic Buildings, 2006). The scope of this recording will be determined in consultation with English Heritage and is likely to include desk-based assessment, archival analysis and photographic survey. This may include an element of public dissemination.
- No new public interpretation or information would be provided along the route.
- No conservation works to listed and unlisted structures along the line of the scheme would be delivered as part of the scheme.

Assessment of Potential Impact

4.3.6 As set out in the PEAR³, this assessment has taken into account the following potential impacts on designated and undesignated heritage assets:

- Impacts on the significance of an asset resulting from changes to its setting. This includes designated and undesignated assets within 150m of the development; excluding the designated assets identified as not requiring further assessment in the PEAR; and
- Impacts on the significance of assets resulting from physical changes to designated and undesignated heritage assets within the railway corridor, excluding the designated assets identified as not requiring further assessment in the PEAR

4.3.7 These impacts are generally permanent in nature. These have been determined through a process of design review (where available), site visits and documentary analysis. The criteria for assessment are set out in a separate section below.

Identification of Mitigation

4.3.8 Detailed designs for the scheme will be developed by an external contractor for Network Rail. These should, wherever possible, minimise any identified adverse impacts (see Appendix D). Potential design measures could include re-siting gantries, altering the form of structures and altering fixings etc. The assumptions set out above identify the degree to which these measures have been taken into account within the assessment.

4.3.9 Where adverse impacts cannot be designed out, appropriate mitigation measures will need to be identified and incorporated into the scheme. At this time no such measures have been assumed to have occurred (see assumptions above).

Assessment of Effect

4.3.10 The residual environmental effect, following mitigation and design review, has been assessed based on the assumptions set out above.

Consultation

4.3.11 No consultation with English Heritage or the Local Authority Conservation Officers has occurred during the preparation of this report, although contact has been made with English Heritage and the local authorities by the Network Rail planning team to explain the overall scheme. Once more detailed designs are made available then the relevant Conservation Officers at each of the seven

local authorities will be consulted by the Network Rail planning team. English Heritage will also be consulted by the Network Rail planners where proposals would affect Grade II* or Grade I listed buildings and more generally about the scheme. Consultation should focus on ensuring that design and mitigation proposals are acceptable.

4.4 Criteria for Assessment

- 4.4.1 The environmental effect of the proposals, in relation to an individual asset, is determined through identifying the asset's value and then assessing the impact that the proposal would have on the significance of that asset (i.e. the attributes that provide it with its value). This well established approach of combining value and impact to determine effect provides clear differentiation between significant and insignificant environmental effects. It also reflects policy in PPS 5: Planning for the Historic Environment (DCLG 2010) which identifies that different scales of impact (i.e. Substantial Harm and Less than Substantial Harm) on assets of differing value have a different weighting in national policy terms.
- 4.4.2 The following sets out the criteria for identifying the value of an asset, assessing its impact and how these are combined to determine the effect.

Value of Asset

Table 4.1 – Description of asset value

Value	Description	Example
High	Nationally or internationally important heritage assets generally recognised through designation as being of exceptional interest and value.	World Heritage Sites, Grade I and II* Listed Buildings, Grade I and II* Registered Parks and Gardens, Scheduled Monuments, Protected Wreck Sites, Registered Historic Battlefields, Conservation Areas with notable concentrations of heritage assets and undesignated assets of national or international importance.
Medium	Heritage assets recognised as being of special interest, generally designated.	Grade II Listed Buildings, Grade II Registered Parks and Gardens, Conservation Areas and undesignated assets of regional or national importance.
Low	Assets that are of interest at a local level primarily for the contribution to the local historic environment.	Undesignated heritage assets such as locally listed buildings, undesignated archaeological sites, undesignated historic parks and gardens etc. Can also include degraded designated assets that no longer warrant designation.
Minimal	Elements of the historic environment which are of insufficient significance to merit consideration in planning decisions and hence be classed as heritage assets.	Undesignated features with very limited or no historic interest. Can also include highly degraded designated assets that no longer warrant designation.

Assessment of Impact

Table 4.2 – Broad criteria for assessing the scale of benefit and adverse change

Scale of Change	Description of nature of change
Large Adverse	<p>Substantial harm to, or loss of, an asset's significance as a result of changes to its physical form or setting.</p> <p>For example, this would include demolition, removal of physical attributes critical to an asset, loss of all archaeological interest or the transformation of an asset's setting in away that fundamentally compromises its ability to be understood or appreciated. The scale of change would be such that it could result in a designated asset being undesignated or having its level of designation lowered.</p>
Medium Adverse	<p>Less than substantial harm to an asset's significance as a result of changes to its physical form or setting</p> <p>For example, this could include physical alterations that remove or alter some elements of significance but do not substantially alter the overall significance of the asset, notable alterations to the setting of an asset that affect our appreciation of it and its significance, or the unrecorded loss of archaeological interest.</p>
Minor Adverse	<p>Limited harm to an asset's significance as a result of changes to its physical form or setting</p> <p>For example, this could include physical changes that alter some elements of significance but do not noticeable alter the overall significance of the asset and small-scale alterations to the setting of an asset that hardly affect its significance.</p>
Neutral	No appreciable change to an asset's significance
Minor Beneficial	<p>Limited improvement of an asset's significance as a result of changes to its physical form or setting</p> <p>For example, this could include physical changes that reveal or conserve some elements of significance but do not noticeable alter the overall significance of the asset, or small-scale alterations to the setting of an asset that improve our ability to appreciate it.</p>
Medium Beneficial	<p>Notable enhancement of an asset's significance as a result of changes to its physical form or setting</p> <p>For example, this could include physical alterations that conserve or restore elements of significance, notable alterations to the setting of an asset that improve our appreciation of it and its significance, or changes in use that help safeguard an asset.</p>
Large Beneficial	<p>Substantial enhancement of an asset's significance as a result of changes to its physical form or setting</p> <p>For example, this could include major changes that conserve or restore elements of high significance, alterations to the setting of an asset that very substantially improve our appreciation of it and its significance, or changes in use that safeguard an asset e.g. by taking it off the At Risk Register.</p>

Determination of Effect

- 4.4.3 The environmental effect is determined through a combination of the value of the asset and the scale of the change, as depicted in the table below. This table does not provide a formulaic assessment and professional judgement is used at all stages in the process.

Table 4.3 – Determination of environmental effect

Value	High	Neutral	Slight / Moderate	Moderate / Major	Major
	Medium	Neutral	Slight	Moderate	Moderate / Major
	Low	Neutral	Neutral / slight	Slight	Moderate / Slight
	Minimal	Neutral	Neutral	Neutral	Slight
		Neutral	Minor	Medium	Large
Change (Adverse or Beneficial)					

4.5 Baseline Conditions

- 4.5.1 The proposed electrification runs along the majority of the historic Liverpool to Manchester railway (it does not cover the western extremity of the original line). This line is one of the most important historic railways in Britain and beyond. The design, building and opening of the railway in 1828-30 marks a defining moment in the development of the railways. It was the first true passenger line in that it was conceived, designed and operated to facilitate the carriage of passengers and freight; other earlier lines were exclusively for freight.
- 4.5.2 The line also hosted the Rainhill trials in 1829 which saw a number of early steam locomotive designs tested through a competition of speed, reliability and strength. This trial had considerable implications for the early development of locomotives in Britain.
- 4.5.3 The design for the entire line was begun by George Stephenson in 1824 before being taken on by George and Jon Rennie (another firm of engineers) before actually being successfully built by Stephenson. The line is notable for a number of engineering feats and notable firsts, these include:
- The building of the world's first railway viaduct – the Sankey Viaduct. This is now a Grade I listed structure and is considered to be an internationally important structure
 - The c.7.5km crossing of Chat Moss using a floating platform over hurdles pressed down by thousands of tonnes of rubble. This structure still supports the railway line.
 - The construction of the first railway skew bridge at Rainhill, now a grade II listed structure
 - The use of the 4ft 8.5" gauge which set a global standard
 - The use of coloured signals to manage train movements
- 4.5.4 In addition to these, there are a number of other surviving bridges along the route which date to the first phase of the railway, these include:
- Brunfields Bridge (Greystones Road), UID 215263, Grade II listed stone railway bridge
 - Chidwell Lane Bridge, UID 215261, Grade II listed stone railway bridge / tunnel
 - Pilch Lane East Bridge, UID 215275, Grade II listed stone railway bridge
 - Archway Road Bridge, UID 215259, Grade II listed stone railway bridge
 - School Lane / Dragon Lane Bridge, UID 503553, DSE 65, Grade II listed single span arched masonry bridge crossing the Liverpool & Manchester Railway Line. One of the earliest bridges of the railway age, designed and built by George Stephenson in c.1829.

- Cumber Lane Bridge, DSE67, Stone built bridge over railway, probably one of the original c.1828-30 bridges and certainly in place by 1850.
- Warrington Road (A57) Bridge, UID 436402, Grade II listed stone railway bridge built in 1828-30, notable as being probably the world's first skew bridge over a railway line.
- Bourne's Tunnel, UID 507533, Grade II listed skew tunnel under railway line.
- Lea Green Station former vehicle bridge, UID 216374, Grade II listed much altered stone built railway bridge.
- New Street Bridge, UID 216376, Grade II listed stone railway bridge.
- Parkside Road Bridge, DSE 99, Stone built bridge over railway, probably one of the original c.1828-30 bridges and certainly in place by 1850.
- Kenyon Lane Tunnel, DSE 101, Brick built railway tunnel with road over. Built pre-1850 and may be part of the original railway or an early addition.
- Kenyon Farm Bridge, DSE 105, Brick single arched span farm bridge in reasonable condition and in-use. Good example of type along the railway and probably from the 1828-1830 construction period.
- Broseley Lane Bridge, DSE 106, Slightly altered, brick built overbridge. Good example of type along the railway and probably from the 1828-1830 construction period.
- Worsley Road bridge, UID 211948, Grade II listed brick single span skew bridge built in c. 1828-1830.
- Bridge carrying Liverpool to Manchester railway over River Irwell, UID 457832 (502504 in Salford), Grade I listed 1830 bridge by George Stephenson that forms a key integral element of the eastern terminus of the world's first passenger railway line. Now sandwiched between two other bridges.

4.5.5 The historic significance of the route is further evidenced by the recognition of the Liverpool docks and City Centre as a World Heritage Site and the inclusion of the Ancoats area of Manchester on the UK list of tentative World Heritage Sites. This highlights the global importance of these cities in terms of their influence in the early 19th century. The railway connected these two cities and provided support for massive regional industrial & commercial growth. Without the railway these cities would not have achieved their global standing; the railway is therefore a key part of this wider historic story.

4.5.6 As well as connecting the economic powerhouses of Liverpool and Manchester the line also ran through a number of then smaller settlements including for example Rainhill, Roby, Huyton, Salford etc. The development of the railway was also instrumental in the social, economic and physical growth of these smaller settlements.

4.5.7 The existing line therefore contains considerable surviving evidence of the world's first passenger line (and one of the world's first major railway lines) in the form of bridges, embankments, viaducts etc. It also provides evidence of the development of the railway in the 19th and 20th centuries with numerous additional stations, bridges, footbridges, sidings and other lines. These later additions are of less significance but do form part of the story of the development of the railway.

4.6 Key Environmental Issues

4.6.1 It is not considered that temporary construction impacts affected by the scheme constitute a significant impact to the historic environment, and as such are not considered further. Appendix D details the potential impact of the proposed development on individual assets along the route. This clearly identifies the following as the key historic environment issues:

Potential Impact on the Fabric and Character of Historic Bridges due to the Installation of OLE Equipment and the Alteration of Parapets, etc

- 4.6.2 The route crosses, and is crossed by, a large number of listed and unlisted bridges of varying ages, condition and significance.
- 4.6.3 The majority of impacts on these structures relate only to changes to their setting of the bridge caused by the installation of equipment and overhead wires. These are very minor permanent impacts that cannot be mitigated.
- 4.6.4 There are however a significant number of other places along the route where the scheme will require the physical alteration of historic bridges, which could detrimentally affect their significance. These are permanent impacts and can only be partially mitigated by design. Impacts identified at this stage are:
- Wavertree Nook Footbridge (DSE 38) – raising of parapets
 - School Lane / Dragon Lane Bridge, Grade II (DSE 65) – alterations to parapets
 - Cumber Lane Bridge (DSE 67) – alterations to parapets and attachment of OLE equipment to the underside of the bridge
 - Warrington Road Bridge, Grade II (DSE 71) - alterations to parapets and attachment of OLE equipment to the underside of the bridge
 - Rainhill Station Footbridge, Curtilage listed (DSE 72) – raising of bridge and alterations to parapet and structure
 - Footbridge beside Rainhill Station (DSE73) – raising of bridge and alterations to parapet and structure
 - New Street Bridge, Grade II (DSE 78) - alterations to parapets and attachment of OLE
 - Leech Lane Footbridge (DSE 82) – attachment of OLE equipment to the underside of the bridge
 - Junction Lane / Sugar Works Bridge (DSE 90) - alterations to parapets and attachment of OLE equipment to the underside of the bridge
 - Parkside Road Bridge (DSE 99) - alterations to parapets and attachment of OLE equipment to the underside of the bridge
 - Kenyon Farm Bridge (DSE 105) - alterations to parapets and attachment of OLE equipment to the underside of the bridge
 - Broseley Lane Bridge (DSE 106) - alterations to parapets and attachment of OLE equipment to the underside of the bridge

Potential Impact on the Fabric and Character of Historic Viaducts due to the Installation of OLE Equipment

- 4.6.5 The railway is notable for the number of significant viaducts that it crosses. The length of these structures means that OLE gantries and equipment have to be physically mounted on them which may affect their fabric. The equipment will also alter the profile and visual character of the assets. These permanent impacts can only be partially mitigated by design but it will be critical given the importance of these structures and their role in the landscape / townscape to ensure that designs for equipment are sensitively and appropriately addressed.
- 4.6.6 Assets affected in this regard include:
- The Sankey Viaduct, Grade I listed (DSE 89)

- Viaduct from River Irwell to Deansgate, Grade II listed (COL MSJA)
- Viaduct over River Irwell, Grade II listed (COL 130)
- Viaduct from Irwell to Victoria Station (DSE146) including Southern Railway Viaduct, Grade II* listed bridge at Salford Station and Stephenson's Bridge, Grade II listed bridge on the approach to Victoria Station

Loss of Assets due to Reconstruction

- 4.6.7 The proposed scheme would require the reconstruction of the following heritage assets:
- Bridge Road (DSE 52) – demolition and replacement of bridge
 - Leech Lane former rail Bridge (DSE 83) – removal of bridge and possible replacement
 - Broad Lane Bridge (DSE 86) – possible demolition and replacement of bridge
 - Chadwicks Eccles Footbridge (DSE 123) – demolition and replacement of bridge
- 4.6.8 These impacts are permanent and cannot be addressed through mitigation, although it has been assumed that whenever possible historic fabric will be retained e.g. brick abutments.
- 4.6.9 The four affected structures are not listed nor are they of particular significance. They do however form part of the wider historic railway.

Impact on the Character and Setting of Conservation Areas and Listed Buildings in the Study Area

- 4.6.10 As set out in Appendix D, the installation of the OLE equipment will affect the setting of a number of listed buildings and conservation areas that are situated around the development corridor. These impacts would be permanent and are generally not addressable through mitigation.
- 4.6.11 For the most part they are minor and not significant, but in some cases there are potentially more significant issues that it has been assumed will be addressed through detailed design (see Assumptions in Section 4.3). These include:
- Roby Conservation Area – careful siting of OLE equipment to avoid impact on key view
 - Rainhill Station, Grade II – careful siting of OLE equipment to minimise visual intrusion
 - Rainhill Conservation Area - careful siting of OLE equipment to minimise visual intrusion
 - Former Wheatsheaf Hotel, Grade II - careful siting of OLE equipment to minimise visual intrusion
 - Earlestown Station, Grade II - careful siting of OLE equipment to minimise visual intrusion
 - Huskisson Memorial, Grade II - careful siting of OLE equipment to minimise visual intrusion
 - Queens Arms, Grade II - careful siting of OLE equipment to minimise visual intrusion
- 4.6.12 However, where the line runs on viaducts through Salford / Manchester the addition of the OLE equipment will alter the setting of a number of listed buildings and conservation areas, as well as the wider historic townscape. These impacts cannot be mitigated by design although they are generally small scale (see Appendix D for further details).

4.7 Mitigation

- 4.7.1 Section 4.3 outlines our assumptions in relation to the design of the scheme and mitigation measures. No further mitigation beyond these measures has been taken into account as part of this assessment.

4.8 Environmental Impact Assessment

- 4.8.1 Appendix D details the potential impact of the proposed development on individual heritage assets along the route. This assessment is based on the design and mitigation assumptions set out in Section 4.3.

Liverpool to Manchester Railway

- 4.8.2 In addition to the impacts on the individual assets identified in Appendix D and summarised below, it is also important to consider the overall impact of the scheme on the historic Liverpool to Manchester Railway. As discussed above, this line is one of the most important historic railways in the UK and perhaps the world. It represents a fundamental shift in the development of railways and marks a key moment in the modern industrial age. It is known for its technological firsts (e.g. the first railway viaduct and first skew bridge over a railway line) and it was a pioneer in modern transport infrastructure in its time. Its current low-key marginal role does not reflect this historic importance.
- 4.8.3 In this context it is worth considering the appropriateness of electrification for this historic railway. Essentially, the electrification of the line represents a modern response to modern transport needs; this modern response continues the historic tradition of innovation and social responsiveness established by the original line's backers and engineers. Continued improvement and innovation is therefore in keeping with the spirit and purpose of the line. The electrification in many respects represents a natural evolution of the line. More importantly, the electrification of the line will ensure that it continues to operate and regains some of its transport importance; this continuation is central to its historic and communal significance and as such the continued operation of the line is a substantial benefit.
- 4.8.4 However, the delivery of the OLE will require the physical alteration of numerous historic structures and will modernise the visual appearance of the line. These forms of changes will not degrade the historic significance of the line – it will still be the world's first passenger line; but they will adversely affect its overall aesthetic quality and the aesthetic appeal of a number of important structures e.g. the Sankey Viaduct. Whilst these structures and the form of the line are essentially functional they do have an aesthetic quality which undoubtedly forms part of their original design intent; as such the changes will adversely affect their designed and acquired aesthetic significance.
- 4.8.5 Overall, the proposals will change the aesthetic quality of the Liverpool to Manchester Railway. They will modernise it and denude its historic character. However, more importantly they will safeguard its future and ensure that the line regains some degree of prominence as a route between these two historic cities. On balance, the localised adverse impacts on historic structures and the wider aesthetic impacts on the railway as a whole are less significant than the public benefits that electrification will bring in terms of improving the service along the line, delivering economic benefits for the region and the conservation of the line's historic, technological and communal significance by ensuring its continued operation.

Salford / Manchester Historic Townscape

- 4.8.6 The proposed route runs along a number of substantial and prominent brick built viaducts through the historic core of Salford, to Victoria Station in Manchester and down to Deansgate. These viaducts are an integral element of the cities' townscape and historic environment. Whilst the scheme would not substantial harm the viaducts it would alter their visual appearance and consequently would change the visual character of the local historic townscape. Essentially the proposed OLE works would form a new highly visible element in the townscape that would alter views, backdrops to key buildings and the setting of other assets. In many instances the viaducts are topped with parapets which will reduce the visual prominence of the OLE gantries but the gantries will still be highly visible. The gantries will however be read as part of a wider developed

urban form containing a diverse mix of modern development and heritage assets. The addition of one more such element into this townscape will not substantially alter or degrade its character and significance.

- 4.8.7 This issue is addressed in more detail in the Landscape and Visual Impact Assessment chapter.

Distribution Sites

- 4.8.8 Four locations have been identified along the route where distributor equipment would need to be installed. The following briefly summarises the potential impacts that these may have on the historic environment

Huyton

- 4.8.9 The proposed works would include new switchgear on the embankment and an ancillary compound at the east of an existing car park at the base of the embankment. There are two listed buildings and a conservation area in the vicinity of the works (see Figure 1.3). Assuming some of the existing vegetation is retained as screening, the works will have a negligible impact on the setting of these designated assets.
- 4.8.10 The works on the embankment would not affect archaeological remains. Those in the car park are proposed for previously disturbed ground and should not require major excavation; they too should not affect below ground archaeological remains.
- 4.8.11 No significant impacts on the historic environment are predicted for this location.

Newton-Le-Willows

- 4.8.12 The proposed compound and equipment would be sited on a former railway siding, consequently there would be no impacts on significant archaeological remains. The Grade II listed Newton-le-Willows station lies c. 140m to 200m away from the proposed compounds (depending on final location). There will be limited intervisibility and the compound, assuming that appropriate boundary treatments are selected, will not affect the setting of the station.
- 4.8.13 No significant impacts on the historic environment are predicted for this location.

Astley (3 options)

- 4.8.14 Three options are proposed for Astley:
- **Option 1:** This would be constructed on the side of the railway on previously disturbed land; it would not impact on significant archaeological remains. Care will be required not to disturb any foundations associated with the railway's original construction. There are no designated heritage assets in the vicinity of the works. Station Cottages are a set of late 19th / early 20th century buildings associated with the former Astley Station which was sited to the west of the current level crossing. The proposed works would affect their setting and appropriate screening and boundary treatments are recommended if this option is taken forward
 - **Option 2:** This would be located on previously undeveloped land to the west of the railway line. The area, on the edge of Chat Moss, has the potential to contain archaeological and palaeo-environmental remains. Given this, detailed desk-based assessment and pre-determination archaeological investigation will probably be required for this site; the relevant planning authority and their archaeological advisor should be consulted on this matter. It should be noted that archaeological works would also be required for the proposed temporary works, if these works require extensive ground disturbance. Station Cottages are a set of late 19th / early 20th century buildings associated with the former Astley Station which was sited to the west of the current level crossing. The proposed works would be screened by existing vegetation from the buildings and assuming that screening is maintained no impact on their setting is predicted.

- **Option 3:** This would be constructed on the side of the railway on previously disturbed land; it would not impact on significant archaeological remains which pre-date the railway. It is however recommended that a full inspection of the location is undertaken to ensure that any surviving features associated with the former Astley station e.g. signal posts etc are recorded and, if possible, retained on site. Station Cottages are a set of late 19th / early 20th century buildings associated with the former Astley Station which was sited to the west of the current level crossing. The proposed works would affect their setting and appropriate screening and boundary treatments are recommended if this option was taken forward.

Ordsall Lane

- 4.8.15 The site is located on a substantial area of made ground associated with the railway, there will therefore be no impacts on pre-railway archaeological remains. The site lies in the vicinity of the former Ordsall Station and it is recommended that a full inspection of the location is undertaken to ensure that any surviving features associated with the former station are recorded and, if possible, retained on site.
- 4.8.16 There are no designated heritage assets in the vicinity of the site and consequently there will be no impacts on the setting of such assets.

Summary of impact on individual assets

- 4.8.17 The following table summarises the results of the assessment presented in Appendix D:

Table 4.4 – Summary of assessment results

Fig Refs.	Local Authority	Name	Unique Id(s)	Scoring		
				Value	Scale of Change	Effect
1.1	Liverpool City Council	Wavertree Nook Road Footbridge	DSE 38	Low	Minor	Neutral
1.2	Knowsley Metropolitan Council	Brunfields Bridge (Greystones Road)	UID 215263	Medium	Minor	Slight Adverse
1.2	Knowsley Metropolitan Council	Chidwell Lane Bridge	UID 215261	Medium	Neutral	Neutral
1.2	Knowsley Metropolitan Council	Pilch Lane East Bridge	UID 215275	Medium	Minor	Slight Adverse
1.3	Knowsley Metropolitan Council	Bridge Road	DSE52	Minimal	Large Adverse	Slight Adverse
1.3	Knowsley Metropolitan Council	Roby Conservation Area	---	Medium	Minor Adverse	Slight Adverse
1.3	Knowsley Metropolitan Council	Archway Road Bridge	UID 215259	Medium	Minor Adverse	Slight Adverse
1.3	Knowsley Metropolitan Council	The Orchard, Huyton Conservation Area	---	Medium	Neutral	Neutral

Fig Refs.	Local Authority	Name	Unique Id(s)	Scoring		
				Value	Scale of Change	Effect
1.3	Knowsley Metropolitan Council	Park Hall Congregational Church and Hall	UID 215264	Medium	Minor Adverse	Slight Adverse
1.3	Knowsley Metropolitan Council	Ben Venue	UID 390712	Medium	Minor Adverse	Slight Adverse
1.3	Knowsley Metropolitan Council	Victoria Road and Huyton Church Road, Huyton Conservation Area	---	Medium	Minor Adverse	Slight Adverse
1.3	Knowsley Metropolitan Council	Manor Farmhouse	UID 215266	Medium	Minor Adverse	Slight Adverse
1.4	Knowsley Metropolitan Council	School Lane / Dragon Lane Bridge	UID 503553 DSE 65	Medium	Medium adverse	Moderate Adverse
1.4	Knowsley Metropolitan Council	Cumber Lane Bridge	DSE67	Medium	Medium adverse	Moderate Adverse
1.5	St Helens Council	Warrington Road (A57) Bridge	UID 436402	Medium	Medium adverse	Moderate Adverse
1.5	St Helens Council	Rainhill Station	UID 502149	Medium	Neutral	Neutral
1.5	St Helens Council	Rainhill Station Footbridge	UID 502149 DSE 72	Low	Minor Adverse	Neutral
1.5	St Helens Council	Footbridge beside Rainhill Station	DSE 73	Low	Medium adverse	Slight adverse
1.5	St Helens Council	Rainhill Conservation Area	--	Medium	Minor Adverse	Slight Adverse
1.5	St Helens Council	Bourne's Tunnel	UID 507533	Medium	Neutral	Neutral
1.6	St Helens Council	Lea Green Station former vehicle bridge	UID 216374	Medium	Neutral	Neutral
1.6	St Helens Council	New Street Bridge	UID 216376	Medium	Minor Adverse	Slight Adverse
1.6	St Helens Council	Church of St Nicolas, New Street	UID 216375	Medium	Neutral	Neutral
1.6	St Helens Council	Leech Lane, Footbridge	DSE 82	Low	Neutral	Neutral
1.6	St Helens Council	Leech Lane, Former rail bridge	DSE 83	Minimal	Large Adverse	Slight Adverse

Fig Refs.	Local Authority	Name	Unique Id(s)	Scoring		
				Value	Scale of Change	Effect
1.6	St Helens Council	Former Wheatsheaf Hotel	UID 216372	Medium	Minor Adverse	Slight Adverse
1.8	Warrington Borough Council	Broad Lane Bridge	DSE 86	Minimal	Large Adverse	Slight Adverse
1.8	St Helens (also in Warrington)	Sankey Viaduct	UID 405596 (216315 Warrington)	High	Medium Adverse	Moderate Adverse
1.6	St Helens Council	Junction Lane / Sugar Works bridge	DSE 90	Low	Minor Adverse	Slight Adverse
1.8	St Helens Council	Earlestown Station	UID 216336	Medium	Minor Adverse	Slight Adverse
1.9	St Helens Council	Newton-le-willows Station	UID 216329	Medium	Neutral	Neutral
1.9	St Helens Council	Parkside Road Bridge	DES 99	Medium	Minor Adverse	Slight Adverse
1.9	St Helens Council	Huskinson Memorial	UID 216335	Medium	Minor Adverse	Neutral
1.10	Wigan Council	Kenyon Lane Tunnel	DSE 101	Low	Minor Adverse	Neutral
1.10	Warrington Borough Council	Kenyon Farm Bridge	DSE 105	Low	Minor Adverse	Slight Adverse
1.10	Warrington Borough Council	Broseley Lane Bridge	DSE 106	Low	Minor Adverse	Slight Adverse
1.14	Salford Council	Worsley Road bridge	UID 211948	Medium	Minor Adverse	Slight Adverse
1.14	Salford Council	Queens Arms	UID 211953	Medium	Minor Adverse	Slight Adverse
1.15	Salford Council	Chadwicks Eccles / Old Wellington Road Footbridge	DSE 123	Minimal	Large Adverse	Slight Adverse
1.17	Salford Council	Southern Railway Viaduct at Salford Station	UID 471586	High	Minor Adverse	Slight Adverse
1.17	Salford Council	United Reform Church, Chapel Street	UID 471541	Medium	Minor Adverse	Slight Adverse
1.17	Salford Council	Former Chesters Brewery	UID 471548	Medium	Minor Adverse	Slight Adverse

Fig Refs.	Local Authority	Name	Unique Id(s)	Scoring		
				Value	Scale of Change	Effect
1.17	Salford Council	Church of the Sacred Trinity	UID4 471610	High	Minor Adverse	Slight Adverse
1.17	Salford Council	81 Chapel Street	UID 471538	Medium	Minor Adverse	Slight Adverse
1.17	Salford Council	Flat Iron Conservation Area	---	Medium	Minor Adverse	Slight Adverse
1.17	Manchester City Council	Chethams Hospital	UID 388291	High	Neutral	Neutral
1.17	Manchester City Council (extends into Salford)	Cathedral Conservation Area	---	High	Neutral	Neutral
1.17	Manchester City Council / Salford Council	Stephenson's Bridge	UID 504203 (508495 Salford)	Medium	Minor Adverse	Slight Adverse
1.17	Manchester City Council	Victoria Station	UID 457831	Medium	Neutral	Neutral
1.17	Salford Council	Greengate / Chapel Street Railway Viaduct	UID 471543	Medium	Neutral	Neutral
1.18	Manchester City Council and Salford Council	Bridge carrying historic Liverpool to Manchester railway over River Irwell	UID 457832 (502504 Salford)	High	Neutral	Neutral
1.18	Manchester City Council and Salford Council	Girder bridge over River Irwell,	UID 502503	Medium	Neutral	Neutral
1.18	Manchester City Council	Railway viaduct over River Irwell leading to Lower Byrom Street,	UID 457834	Medium	Neutral	Neutral
1.18	Salford Council	Brick bridge over River Irwell,	UID 471614	Medium	Minor Adverse	Slight Adverse
1.18	Manchester City Council	Viaduct from Deansgate to River Irwell	UID 388102 (related 471614 Salford)	Medium	Minor Adverse	Slight Adverse
1.18	Manchester City Council	Castlefield Conservation Area	---	Medium	Medium Adverse	Moderate Adverse

Fig Refs.	Local Authority	Name	Unique Id(s)	Scoring		
				Value	Scale of Change	Effect
1.18	Manchester City Council	Passenger railway station at terminus of Liverpool and Manchester Railway	UID 388277	High	Minor Adverse	Slight Adverse
1.18	Manchester City Council	123 Liverpool Road	UID 388274	Medium	Minor Adverse	Slight Adverse
1.18	Manchester City Council	Commercial Hotel, 125 Liverpool Road,	UID 388275	Medium	Minor Adverse	Slight Adverse
1.18	Manchester City Council	Potato Wharf, including Bridgewater canal basin, 'Giant's Hole' and weir	UIDs 388348, 456064, 456065	Medium	Minor Adverse	Slight Adverse

4.9 Conclusions

- 4.9.1 The Liverpool to Manchester Railway is one of the most important historic railways in the UK. Its construction marked a key moment in the development of railways and the evolution of the modern industrial age. The railway is notable for many technological firsts and it was a beacon of modern transport in its time. Its current secondary role does not reflect its historic importance.
- 4.9.2 The electrification of the line represents a modern response to our transport needs and continues a tradition of innovation in keeping with the spirit and purpose of the line; it is in essence a natural evolution for the line. The electrification will also ensure that the line regains some of its transport importance. This continued use is vital to its historic and communal significance.
- 4.9.3 However, the delivery of the OLE will require the physical alteration of a number of historic structures some of which are listed. The proposed works would also modernise the visual appearance of the line. These physical changes would not affect the historic interest of the line but they will adversely affect the aesthetic and architectural interest of individual structures and the entire line. Assuming that the proposals are sensitively designed and installed, they will not substantially harm any listed structures or important historic structures. Impacts will generally be minor or moderate in terms of their affect.
- 4.9.4 The proposals would also affect the setting of a number of designated and undesignated heritage assets within and around the railway corridor. For the most part these impacts are limited in effect and it has been assumed that they will be minimised through good design and placement. There will however be a number of locations where visual impacts cannot be avoided. This is particularly the case where the route runs along a number of prominent viaducts through the historic core of Salford and Manchester. Whilst the scheme would not cause substantial harm to the viaducts it would alter their visual appearance and change the character of the local historic townscape. The addition of OLE equipment would alter views, backdrops to key buildings and the setting of other assets in these areas. The equipment would however be read as part of a wider developed urban form and the addition of one more such element into this townscape will not substantially alter or degrade its significance.
- 4.9.5 In conclusion, the OLE proposals will deliver public benefit by improving journey reliability. The scheme would also safeguard the future of this important historic railway line and ensure that it regains a higher degree of prominence as a route between these two historic cities. These benefits outweigh the localised adverse impacts on historic railway structures, the general impact

on the aesthetic character of the railway and the impacts on the visual setting of the assets in and around the railway corridor.

5. Landscape and Visual Impacts

5.1 Summary of Findings

- The proposed scheme will result in a slight adverse effect upon the majority of landscape/townscape character areas.
- The proposed scheme will result in a neutral to slight adverse effect upon the majority of visual amenity receptors. The proposed scheme will result in a moderate adverse effect on residential receptors at Wharf Road as a result of direct, clear views of the railway along the top of the Sankey Viaduct.
- The proposed scheme will result in temporary moderate adverse effects at two locations along the route as a result of the temporary demolition and reconstruction of structures DSE52 and DSE125.

5.2 Introduction

- 5.2.1 This assessment consists of two separate but related sections. Landscape/townscape character assessment is the systematic description and analysis of the features within the landscape such as landform, vegetation cover, settlement, transport patterns, land use, building styles and historical and cultural components, and the assessment of the effects of the proposed development on these features and on the overall character of the landscape/townscape.
- 5.2.2 Visual amenity assessment is the description and analysis of the views of the landscape experienced by receptors from residential properties, public buildings, public open space, public rights of way, open access areas, transport corridors and places of work, and the assessment of the effects of the proposed development on these receptors.
- 5.2.3 The key element of the proposed scheme in landscape and visual terms is likely to be the installation of OLE gantries, the installation of distribution sites and vegetation clearance associated with these sites. Details of these elements can be found in Part II of this report. There may also be some effects as a result of works to structures along the length of the scheme, and from the loss of screening vegetation.

Planning and Legislative Context

- 5.2.4 There are no specific planning policy statements or legislative requirements related to landscape and visual impact assessment. Details of the various landscape and townscape designations, with reference to the relevant local development plans, can be found in the baseline conditions section of this report.
- 5.2.5 The effects of the scheme upon heritage elements, such as listed buildings, are dealt with in the cultural heritage section of this report (section 4).

Study Area

- 5.2.6 The study area includes the site (the proposed scheme) and the wider area which the proposed scheme may influence. The extent of the study area is wide enough to enable a good understanding of the contextual landscape/townscape character. A 500m buffer zone, taken from the centre line of the railway, is sufficient to account for the effects of the proposed development on the surrounding landscape/townscape character and on the majority of visual receptors.

5.3 Assessment Methodology

5.3.1 The methodology follows the guidelines produced by the relevant professional bodies concerned with landscape character and visual amenity assessment, and is set out in Appendix E1.

5.3.2 The assessment complies with the Guidelines for Landscape and Visual Impact Assessment (GLVIA), Second Edition, 2002 as published by the Landscape Institute and the Institute of Environmental Management and Assessment. The Countryside Agency Landscape Character Assessment, 2002, was also consulted for the description and analysis of existing landscape character.

5.3.3 This assessment was undertaken through a combination of desk studies and site surveys within the study area.

Desk Study

5.3.4 Within the study area, the relevant Local Plans and local authority guidance documents were studied to gain an understanding of the 'quality and sensitivity' of landscapes and visual features. The documents were:

- The City of Liverpool Unitary Development Plan, adopted November 2002;
- Knowsley Replacement Unitary Development Plan, adopted June 2006;
- St Helens Unitary Development Plan, adopted July 1998;
- Warrington Unitary Development Plan, adopted June 2005;
- The Replacement Wigan Unitary Development Plan, adopted April 2006;
- City of Salford Unitary Development Plan 2004-2016, adopted June 2006; and
- Manchester Unitary Development Plan, adopted July 1995.

5.3.5 Following the Countryside Agency (now Natural England) approach of a tiered method of landscape character assessment and analysis, reference was made to previously published landscape assessments. The Countryside Agency, Countryside Map of England was referred to for a broad understanding of landscape character at a national scale. The following local authority landscape character assessments have also been referred to:

- St Helens Landscape Character Assessment (2006)
- Wigan: A Landscape Character Assessment (2009)
- Salford City Council Landscape Character Assessment (2007)

5.3.6 The MAGIC website was consulted in relation to Ancient Woodland and the openaccess.gov.uk website in relation to open access land.

5.3.7 Ordnance Survey Maps Explorer 277 Manchester and Salford, 275 Liverpool and 276 Bolton, Wigan and Warrington (Scale 1:25,000), were studied to gain a general understanding of landform, location of any public rights of way and national cycle network routes, areas of open access land, and the extent and type of vegetation and land use.

Site Survey

5.3.8 A landscape architect undertook site surveys in January 2011 and June 2011. The surveys were undertaken from public highways and public rights of way. The surveys helped gain an understanding of existing landscape and townscape character and visual amenity receptors, and supplemented the available information collected during the desk study. The surveys also established the likely effects of the proposed development and possible mitigation.

Consultation

- 5.3.9 No formal consultation was undertaken.

Mitigation Measures

- 5.3.10 Mitigation measures are intended to avoid, reduce, remedy or offset negative effect of a proposed development. Mitigation measures however cannot be seen in isolation. All mitigation measures are developed through discussions between the design team and the environmental specialists, and constitute part of the consideration of alternative options.
- 5.3.11 Impacts on landscape character and on visual amenity during construction and during operation are most likely to arise from the removal of screening vegetation to allow the installation of gantries and distribution site. This will be most severe where the railway line is on embankment, although when in cutting, the gantries could be more obvious to receptors on overbridges where vegetation has been removed.
- 5.3.12 Construction impacts will also include demolition and reconstruction of structures, areas of bare earth until reseedling has established, and the presence of plant and machinery.
- 5.3.13 Operational impacts will be reduced over time as vegetation re-establishes, whether planted or naturally regenerating.
- 5.3.14 The mitigation measures will aim to:
- Get the best 'fit' with the surrounding landform or townscape;
 - Retain and make best use of existing landscape features;
 - Optimise protection and screening for visual amenity receptors; and
 - Avoid loss or damage to landscape/townscape features such as woodland, hedges, water features and field systems, street patterns or open spaces, including designated sites or areas.
- 5.3.15 Mitigation measures will be influenced by the surrounding landscape or townscape character. For example, if woodlands or hedgerows are indicative of an area, these could be reflected in the mitigation measures. Locally occurring plants will be used in the species selection to ensure the planting is sympathetic to the setting. There may also be the opportunity to improve nature conservation and biodiversity.
- 5.3.16 Mitigation measures broadly fall into two categories. These are:

Primary Mitigation Measures

- 5.3.17 Primary mitigation measures are included in the initial design of the proposed development. These include careful consideration of the form and finish of structures including paving, signs, lighting, and the design of earth shaping, planting and fencing.

Secondary Mitigation Measures

- 5.3.18 Secondary landscape mitigation measures aim to address any remaining negative effects of the final development proposals.

5.4 Criteria of Assessment

- 5.4.1 The criteria used for determining the significance of the effects is included in Appendix E1.

5.5 Baseline Conditions

Landscape and Townscape Character

- 5.5.1 Local and national landscape/townscape designations are shown on Figures 1.1 to 1.18 in Appendix A.
- 5.5.2 The landscape/townscape character in the immediate vicinity of the railway line has been assessed in each local authority area, using the landscape/townscape character studies published by Natural England and the local authority, where available. The narrow corridor nature of the site means that landscape/townscape quality and sensitivity has been determined using a relatively restricted, but site relevant, study area as set out above.
- 5.5.1 Landscape and townscape character baseline condition descriptions can be found in Appendix E2.

Visual Amenity Receptors

- 5.5.2 The Liverpool to Manchester railway corridor is visible from some discrete areas of the wider landscape; in particular where views are open, where there is limited screening and where the railway is elevated. The railway line is largely in cutting throughout the Liverpool area, which results in limited views to and from the surrounding landscape. The railway is generally on embankment throughout the Knowsley area and close, direct views are afforded where roads pass beneath the railway, such as at Childwall Lane. The railway is largely at grade as it approaches St Helens until it reaches the Sankey Viaduct where it becomes a very prominent feature within the landscape. The railway is in cutting between Highfield Moss and Glazebury, which results in limited views. The enclosed nature of the urban grain results in intermittent views to and from the surrounding landscape as the railway approaches Salford and travels into Manchester.
- 5.5.3 The views experienced by rail users have not been specifically considered in this case because the proposed development comprises visual changes to the railway corridor that are largely only discernable off-track. Potential visual amenity receptors and their existing views are shown in Appendix E3 and the locations are mapped on Figures 1.1 to 1.18 in Appendix A.

5.6 Key Environmental Issues

Landscape and Townscape Character

- 5.6.1 The existing landscape/townscape baseline conditions and potential effects are summarised in table 5.1 below.

Visual Amenity Receptors

- 5.6.2 The visual amenity receptors, their sensitivity to change and potential significance of effects are described in table 5.2 below. The receptors are listed in order from west to east along the railway therefore some local authority areas appear more than once. Where multiple receptor groups have views of the affected townscape from a certain position, the most sensitive criteria has been recorded.

Table 5.1 – Existing landscape/townscape baseline conditions and potential effects

Liverpool City Council

Landscape Character Summary	Quality/Sensitivity	Magnitude of Change	Significance of Effect
Overall, the landscape/townscape is typical of inner city and suburban development, and although not generally of high attraction, it does include areas with a positive character, such as Wavertree Garden Suburb.	The quality of the landscape/townscape is therefore assessed as ordinary and reasonably tolerant of change with medium sensitivity.	The railway line is largely in cutting, or screened from the wider landscape by adjacent development. The tops of OLE gantries are likely to be visible in the area of Wavertree Technology Park. There will be a very minor alteration to landscape character. The magnitude of change will be negligible.	The significance of the effect is neutral.

Knowsley Metropolitan Borough Council

Landscape Character Summary	Quality/Sensitivity	Magnitude of Change	Significance of Effect
Overall, the landscape/townscape is typical of suburban development, and although not generally of high attraction, it does include areas with a positive character, such as Roby Conservation Area, The Orchard Conservation Area and Huyton Conservation Area.	The quality of the landscape/townscape is therefore assessed as ordinary and reasonably tolerant of change with medium sensitivity.	The railway line is largely on embankment and the loss of embankment screening vegetation means that the OLE gantries are likely to be visible in areas where roads pass beneath the railway, such as at Swanside, Page Moss, Roby and Whiston. Although the railway is a characteristic element of the townscape, the impact of OLE gantries will be to make the railway a more defined element in the townscape. The installation of a distribution site at Huyton and the associated vegetation loss will also result in railway infrastructure becoming slightly more prominent within the landscape. There will be a minor, but not uncharacteristic, alteration to the townscape. The magnitude of change will be low adverse.	The significance of the effect is slight adverse.

St Helens Metropolitan Borough Council

Landscape Character Summary	Quality/Sensitivity	Magnitude of Change	Significance of Effect
Overall, the landscape/townscape is typical of inner city, suburban and urban fringe development, and although not generally of high attraction, it does include areas with a positive character, such as Rainhill Conservation Area. Although Sankey Viaduct is a Grade I listed structure, the surrounding landscape has been degraded by industrial development.	The quality of the landscape/townscape is therefore assessed as ordinary and reasonably tolerant of change with medium sensitivity.	The railway line is largely at grade, until it reaches the Sankey Viaduct, where it becomes a prominent feature in the landscape. The loss of embankment screening vegetation may mean that some OLE gantries are visible. Although the railway is a characteristic element of the townscape, the impact of OLE gantries will be to make the railway a more defined element in the townscape at Rainhill, Sutton and St Helens Junction. There will be a minor alteration to the townscape. The magnitude of change will be low adverse.	The significance of the effect is slight adverse.

Warrington Council

Landscape Character Summary	Quality/Sensitivity	Magnitude of Change	Significance of Effect
Overall, the landscape/townscape is typical of suburban and urban fringe development, and although not generally of high attraction, it does include areas with a positive character, such as Glazebury.	The quality of the landscape/townscape is therefore assessed as ordinary and reasonably tolerant of change with medium sensitivity.	The railway line is on embankment in the area of Sankey Viaduct, and is a prominent feature in the landscape. The loss of embankment screening vegetation may mean that some OLE gantries are visible. Although the railway is a characteristic element of the townscape, the impact of OLE gantries will be to make the railway a slightly more defined element in the landscape in the area surrounding Sankey Viaduct. The railway line is in cutting from Dolly's Bridge to Glazebury, although the top of some OLE gantries may be visible. There will be a minor, but not entirely uncharacteristic, alteration to the landscape/townscape.	The significance of the effect is slight adverse.

		The magnitude of change will be low adverse.	
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Wigan Metropolitan Borough Council

Landscape Character Summary	Quality/Sensitivity	Magnitude of Change	Significance of Effect
Overall, the landscape/townscape is typical of the rural urban fringe, and although not generally of high attraction, it does include areas with a positive character, such as Highfield Moss.	The quality of the landscape/townscape is therefore assessed as ordinary and reasonably tolerant of change with medium sensitivity.	<p>The railway line is in cutting from Sandfield Hall to Birchall's Farm. The loss of embankment screening vegetation may mean that the tops of some OLE gantries will be visible. The railway line is on embankment from Glazebury to east of Astley Moss and the OLE gantries are likely to be visible. Although the railway is a characteristic element of the landscape, the impact will be to make the railway a slightly more defined element in the landscape in many locations including the area surrounding Highfield Moss, and Bedford and Astley Mosses, particularly where the Astley distribution site (Options 1,2 and 3) is proposed. Overall, there will be a minor, but not entirely uncharacteristic, alteration to landscape character. The magnitude of change will be low adverse.</p> <p>Option 1 will result in a very minor alteration to the existing conditions and a negligible magnitude of change.</p> <p>Option 2 will result in a partial alteration to the existing conditions and a medium adverse magnitude of change.</p> <p>Option 3 will result in a very minor alteration to the</p>	<p>The overall significance of the effect is slight adverse.</p> <p>The significance of effect for Option 1 is neutral.</p> <p>The significance of effect for Option 2 is slight adverse.</p> <p>The significance of effect for Option 3 is neutral.</p>

		existing conditions and a negligible magnitude of change.	
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Salford City Council

Landscape Character Summary	Quality/Sensitivity	Magnitude of Change	Significance of Effect
<p>Astley Moss to the M60 motorway</p> <p>Overall, the landscape of the Salford Mosslands is typical of the rural wedge, and includes areas that exhibit positive character, although it does include areas that have been degraded by pylons, overhead power lines and the M62 motorway.</p>	<p>The quality of the landscape is therefore assessed as good, and reasonably tolerant of change with medium sensitivity</p>	<p>The railway line is largely on embankment from Astley Moss to the M60 motorway and the OLE gantries are likely to be visible. Although the railway is a characteristic element of the landscape, the impact will be to make the railway a slightly more defined element in the landscape; however, there will be some screening from woodland belts to the north of the railway line. There will be a minor, but not entirely uncharacteristic, alteration to the landscape.</p> <p>The magnitude of change will be low adverse.</p>	<p>The significance of effect is slight adverse.</p>
<p>East of the M60 motorway</p> <p>Overall, the townscape is typical of suburban and urban development, and includes the Flat Iron Conservation Area and part of the Cathedral Conservation Area. Although there are some detracting features, there is scope to improve the townscape.</p>	<p>The quality of the townscape is therefore assessed as ordinary and reasonably tolerant of change with medium sensitivity.</p>	<p>The railway line is on embankment and at grade through Patricroft and the OLE gantries are likely to be visible. Although the railway is a characteristic element of the landscape, the impact will be to make the railway a slightly more defined element in the townscape. East of Patricroft the M602 motorway is immediately adjacent to the north of the railway line, which is largely at grade. The tops of some OLE gantries will be visible in the wider townscape. East of the junction of the M602 and the A5063 the railway line is at grade and in shallow cutting. There will be a</p>	<p>The significance of effect is slight adverse.</p>

Landscape Character Summary	Quality/Sensitivity	Magnitude of Change	Significance of Effect
		<p>minor, but not entirely uncharacteristic, alteration to the landscape.</p> <p>The magnitude of change will be low adverse</p>	

Manchester Council

Landscape Character Summary	Quality/Sensitivity	Magnitude of Change	Significance of Effect
<p>Overall, the townscape is typical of urban development and includes the Cathedral Conservation Area. Although there are some detracting features, there is scope to improve the townscape.</p>	<p>The quality of the landscape/townscape is therefore assessed as ordinary and reasonably tolerant of change with medium sensitivity.</p>	<p>The railway line is on embankment, on viaducts, in cutting and at grade through Manchester, and the OLE gantries are likely to be visible. Although the railway is a characteristic element of the landscape, the impact will be to make the railway a slightly more defined element in the townscape. The tops of some OLE gantries will be visible in the wider townscape.</p> <p>There will be a minor, but not entirely uncharacteristic, alteration to the landscape.</p> <p>The magnitude of change will be low adverse.</p>	<p>The significance of the effect is neutral.</p>

Visual Amenity Receptors

Table 5.2 – Existing visual amenity baseline conditions and potential effects

Liverpool City Council

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
<p>1. Rathbone Road / Shanklin Road</p> <p>Receptors have oblique, close views of Wavertree Technology Park Rail Station, including the footbridge and car park. There are a number of vertical lighting elements in the foreground and middle distance. A number of technology park buildings are also visible in the middle distance to the north.</p>	Receptors are occupiers of residential properties: high sensitivity to change.	<p>Receptors will have partially screened views of the tops of OLE gantries. There will be a very minor alteration to views of the existing conditions.</p> <p>The magnitude of change will be negligible.</p>	The significance of the effect is neutral.
<p>2. Sturdee Road</p> <p>Receptors have largely oblique, close views of the railway line in deep cutting, a road overbridge, surrounding residential properties and a school. Vegetation is visible in the foreground and middle distance along the sides of the cutting.</p>	Receptors are occupiers of residential properties: high sensitivity to change.	<p>Receptors will have clear, oblique views of OLE equipment, including gantries, looking downwards into the cutting. Some vegetation may be lost. There will be a very minor alteration to views of the existing conditions.</p> <p>The magnitude of change will be negligible.</p>	The significance of the effect is neutral.

Knowsley Metropolitan Borough Council

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
<p>3. Bowring Park Road / Roby Road</p> <p>Receptors have close, direct views of the M62 motorway overbridge and more distant views of the railway on embankment to the north. Vegetation lining the railway is visible along the horizon. The residential area of Knotty Ash is partially visible through the arch of the railway overbridge.</p>	Receptors are occupiers of residential properties: high sensitivity to change.	<p>Receptors will have clear, direct views of OLE equipment along the top of the railway embankment. Some vegetation may be lost. There will be a minor loss and alteration to key elements of the view. The proposed scheme will result in an introduction of elements that may not be uncharacteristic when set within the existing view.</p> <p>The magnitude of change will be low adverse.</p>	The significance of the effect is slight adverse.
<p>4. Greystone Road</p> <p>Receptors have largely oblique, close views of the railway overbridge. Surrounding residential properties are also visible. Vegetation is visible along the sides of the embankment to the left of view.</p>	Receptors are occupiers of residential properties: high sensitivity to change.	<p>Receptors will have close, oblique views of OLE equipment along the top of the embankment. Some vegetation may be lost. There will be a minor loss and alteration to key elements of the view. The proposed scheme will result in an introduction of elements that may not be uncharacteristic when set within the existing view.</p> <p>The magnitude of change will be low adverse.</p>	The significance of the effect is slight adverse.
<p>5. Childwall Lane (North)</p> <p>Receptors have close, direct views of the railway line on embankment, the associated vegetation lining the route and the road tunnel beneath. Steel palisade fencing is visible along the top of the retaining walls adjoining the tunnel.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Receptors will have close views of OLE equipment along the top of the embankment. There will be a minor loss and alteration to key elements of the view. The proposed scheme will result in an introduction of elements that may not be uncharacteristic when set within the existing view.</p> <p>The magnitude of change will be low adverse</p>	The significance of the effect is slight adverse.
<p>6. Court Hey Avenue</p> <p>Receptors have close, direct views of the railway line on embankment, partially screened by the associated vegetation.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Receptors will have very close views of OLE equipment along the top of the embankment. Some vegetation may be lost. There will be a minor loss and alteration to key elements of the view. The proposed scheme will result in an introduction of elements that may not be uncharacteristic when set within the existing view.</p> <p>The magnitude of change will be low adverse.</p>	The significance of the effect is slight adverse.

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
<p>7. Roby Road</p> <p>Receptors have close, direct views of the railway line on embankment. Some mature vegetation partially screens views. An area of development land is visible in the foreground, bounded by herras fencing.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Receptors will have close views of OLE equipment along the top of the embankment. Some vegetation may be lost. The proposed scheme will result in the introduction of elements that may not be uncharacteristic when set within the existing view.</p> <p>The magnitude of change will be low adverse.</p>	The significance of the effect is slight adverse.
<p>8. Station Road, Roby Rail Station</p> <p>Receptors have oblique, close views of the railway line and station. Some mature vegetation lines the route.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Receptors will have close views of OLE equipment along the railway line. Existing views are characterised by railway buildings and infrastructure. There will be a very minor alteration to views of the existing conditions.</p> <p>The magnitude of change will be negligible.</p>	The significance of the effect is neutral.
<p>9. Bridge Road</p> <p>Receptors have oblique, close views of the bridge over the railway to the north and mature vegetation associated with the backs of adjacent properties to the east.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Receptors will have close views of the reconstruction of DSE52 overbridge. There will be a temporary, partial loss of an element of the existing view.</p> <p>The magnitude of change will be medium adverse.</p>	The significance of the effect is moderate adverse (temporary).
<p>10. Sandfield Close</p> <p>Receptors have oblique, close views of the railway on embankment including a stone retaining wall with a wooden post and rail fence running along the top.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Receptors will have very close views of OLE equipment along the top of the embankment. The proposed scheme will result in an introduction of elements that may not be uncharacteristic when set within the existing view.</p> <p>The magnitude of change will be low adverse.</p>	The significance of the effect is slight adverse.
<p>11. Public Right of Way off Blacklow Brow</p> <p>Receptors have views of the railway line, largely screened by a brick wall. Vertical elements such as lighting, telegraph poles and security cameras are visible above the wall.</p>	Receptors are users of public rights of way where appreciation of the view is not an intrinsic part of the experience: low sensitivity.	<p>Receptors will have close, partially screened views of OLE equipment above the existing brick wall. The proposed scheme will result in a very minor alteration to the existing view.</p> <p>The magnitude of change will be negligible.</p>	The significance of the effect is neutral.
<p>12. The Queens Arms Public House</p>	Receptors are users of recreational facilities:	Receptors will have close, partially screened views of OLE equipment above the existing brick wall.	The significance of the effect is neutral.

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
Receptors have direct views of the railway station building but largely screened views of the railway line. Some elevated infrastructure such as signal equipment is visible above a brick wall which forms the station boundary.	medium sensitivity.	The proposed scheme will result in a very minor alteration to the existing view. The magnitude of change will be negligible.	

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
<p>13A. Victoria Road/Huyton Hey Road (north of rail line)</p> <p>Receptors have direct views of a red brick wall with glimpsed palisade fence and a number of mature trees and other dense vegetation beyond. A car park is also visible in the distance.</p>	Receptors are occupiers of residential properties and properties within Huyton Conservation Area: high sensitivity.	Receptors will have clear, direct and some oblique views of the distribution site and palisade fencing bounding the site. OLE equipment is also likely to be visible beyond the compound. The proposed scheme will result in a partial alteration to views of the existing conditions and the introduction of elements that will be prominent but not substantially uncharacteristic. The retention of some existing mature vegetation will help to screen views from sensitive receptors (if vegetation is not retained, there may be a large adverse significance of effect). The magnitude of change will be medium adverse.	The significance of the effect is medium adverse.
<p>13. Huyton Hey Road</p> <p>Receptors have oblique views from rear windows of the railway on embankment, vegetation and an existing gantry.</p>	Receptors are occupiers of residential properties: high sensitivity.	Receptors will have oblique views of OLE equipment along the embankment. Existing views include an existing gantry. The proposed scheme will introduce elements that are characteristic of the existing views. The magnitude of change will be negligible.	The significance of the effect is neutral.
<p>14. North View</p> <p>Receptors have direct views of the railway bridge and partially screened views of the railway line beyond. Surrounding residential properties are also visible in the middle distance.</p>	Receptors are occupiers of residential properties: high sensitivity.	Receptors will have largely screened oblique views of the tops of OLE equipment. The proposed scheme will result in a very minor alteration to the existing view. The magnitude of change will be negligible.	The significance of the effect is neutral.
<p>15. Wood Lane</p> <p>Receptors have views of a low brick wall lining the road and intermittent views of the railway line in shallow cutting beyond the wall. Some residential properties are also visible to the south.</p>	Receptors are occupiers of residential properties: high sensitivity.	Receptors will have partially screened views of OLE equipment. The proposed scheme will result in a minor alteration to key views of the existing conditions. The magnitude of change will be low adverse.	The significance of the effect is slight adverse.

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
<p>16. Pottery Lane / Greene's Road</p> <p>Receptors have intermittent views of the railway overbridge and boundary fencing along the side of adjacent residential properties. Vegetation lines the road and screens views from the south west.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Receptors will have direct views of plating attached to girders to increase the height of structure DSE63 Pottery Lane overbridge. The proposed scheme will result in a very minor alteration to the existing view.</p> <p>The magnitude of change will be negligible.</p>	The significance of the effect is neutral.
<p>17. Ropers Bridge Close</p> <p>Receptors have clear, direct views of the railway overbridge and adjacent residential properties. An open parking area is visible in the foreground. A number of lighting columns are visible in the foreground and middle distance.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Receptors will have direct views of steeple coping attached to structure DSE65 School Lane / Dragon Lane overbridge. The proposed scheme will result in a very minor alteration to the existing view.</p> <p>The magnitude of change will be negligible.</p>	The significance of the effect is neutral.

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
<p>18. Dragon Lane</p> <p>Receptors have intermittent, clear views of Old Colliery Road foot bridge, the railway line, associated infrastructure and adjacent residential properties.</p>	<p>Receptors are people travelling through or passing the affected views: low sensitivity.</p>	<p>Receptors will have intermittent, clear views of plating attached to the top of girders to increase the height of structure DSE64 Old Colliery Road foot bridge. Receptors will also have intermittent views of OLE equipment along the railway. The proposed scheme will result in an introduction of elements that may not be uncharacteristic when set within existing views.</p> <p>The magnitude of change will be low adverse.</p>	<p>The significance of the effect is neutral.</p>
<p>19. Cumber Lane (North)</p> <p>Receptors have oblique views of the railway overbridge and adjacent residential properties.</p>	<p>Receptors are occupiers of residential properties: high sensitivity.</p>	<p>Receptors will have oblique views of an increase to the height of the masonry parapet of structure DSE67 Cumber Lane overbridge. The proposed scheme will result in a very minor alteration to the existing view.</p> <p>The magnitude of change will be negligible.</p>	<p>The significance of the effect is neutral.</p>
<p>20. Cumber Lane (South)</p> <p>Receptors have oblique views of the railway overbridge, surrounding residential development and open space.</p>	<p>Receptors are occupiers of residential properties: high sensitivity.</p>	<p>Receptors will have oblique views of an increase to the height of the masonry parapet of structure DSE67 Cumber Lane overbridge. The proposed scheme will result in a very minor alteration to the existing view.</p> <p>The magnitude of change will be negligible.</p>	<p>The significance of the effect is neutral.</p>

St Helens Metropolitan Borough Council

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
<p>21. Old Lane</p> <p>Receptors have oblique views of the railway overbridge and surrounding residential properties.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Receptors will have oblique views of the addition of steeple coping along the parapet of structure DSE70 Old Lane overbridge. The proposed scheme will result in a very minor alteration to the existing view.</p> <p>The magnitude of change will be negligible.</p>	The significance of the effect is neutral.
<p>22. A57 Warrington Road</p> <p>Receptors have oblique views of the railway overbridge, the rooflines of surrounding residential properties and road signage.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Receptors will have oblique views of an increase to the height of the masonry parapet of structure DSE71 A57 Warrington Road overbridge. The proposed scheme will result in a very minor alteration to the existing view.</p> <p>The magnitude of change will be negligible.</p>	The significance of the effect is neutral.
<p>23. Braithwaite Close</p> <p>Receptors have direct views from rear windows of the railway line and associated infrastructure. The Commercial Hotel and surrounding buildings are also visible to the south.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Existing views are characterised by the railway line and associated infrastructure. Receptors will have direct views of OLE equipment which will result in a very minor alteration to the existing view.</p> <p>The magnitude of change will be negligible.</p>	The significance of the effect is neutral.
<p>24. Public Right of Way, Ritherup Lane Footbridge</p> <p>Receptors have direct views of the railway line with playing fields visible to the south and agricultural land to the north. Residential properties at the edge of Rainhill are visible in the middle and far distance. The footbridge at Rainhill station is also visible in the distance.</p>	Receptors are users of outdoor recreational facilities where appreciation of the view is an intrinsic part of the experience: medium sensitivity.	<p>Receptors will have direct, close views of OLE equipment. The OLE equipment will be particularly prominent due to the 'tunnel' effect created by viewing gantries in succession. Receptors will also have close views of a possible bridge reconstruction or an increase in height of the parapet of structure DSE73B Ritherup Lane footbridge.</p> <p>The magnitude of change will be low adverse.</p>	The significance of the effect is slight adverse.

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
<p>25. Lea Green Road</p> <p>Receptors have views of the railway line and road over bridge (DSE77A). Views are partially screened by intervening vegetation. Overhead power lines are visible to the south.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Receptors will have direct views of OLE equipment along the track. The OLE equipment will be prominent within the view due to the 'tunnel' effect created by viewing gantries in succession.</p> <p>The magnitude of change will be low adverse.</p>	The significance of the effect is slight adverse.
<p>26. Covington Drive</p> <p>Receptors have close, partially screened views of the railway line on embankment from both front and rear windows at a new housing development to the west of Sutton.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Receptors will have partially screened, close views of OLE equipment along the top of the embankment. The proposed scheme will result in a very minor alteration to the existing view.</p> <p>The magnitude of change will be negligible.</p>	The significance of the effect is neutral.
<p>27. Elton Head Road</p> <p>Receptors have direct views of ramping and railings associated with access to Lea Green station platform. Receptors also have views of Lea Green Station overbridge.</p>	Receptors are people travelling through or passing the affected views: low sensitivity.	<p>Receptors will have partially screened views of OLE equipment along the railway. Existing views are characterised by rail infrastructure. The proposed scheme will result in a very minor alteration to the existing view.</p> <p>The magnitude of change will be negligible.</p>	The significance of the effect is neutral.
<p>28. New Street</p> <p>Receptors have oblique views of a grade II listed overbridge and adjacent footbridge. Mature trees are visible in the middle distance.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Receptors will have oblique views of an increase in height to the masonry parapet of structure DSE78 New Street overbridge and an increase in height to the parapet of structure DSE78A New Street. There will be a very minor alteration to existing views.</p> <p>The magnitude of change will be negligible.</p>	The significance of the effect is neutral.
<p>29. Dale Crescent</p> <p>Receptors have oblique, partially screened views of the railway line and associated vegetation lining the track. Surrounding residential properties are visible in the distance.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Receptors will have oblique views of OLE equipment along the railway line. There will be a very minor alteration in views.</p> <p>The magnitude of change will be negligible.</p>	The significance of the effect is neutral.

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
<p>30. Leach Lane / Carole Close</p> <p>Receptors have oblique views of the railway line, footbridge, disused overbridge and top floor windows of the adjacent school.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Receptors will have oblique views of OLE equipment along the railway line and partial views beyond the existing footbridge to the removal of structure DSE83 Leach Lane overbridge and potential replacement. There will be a very minor alteration in views.</p> <p>The magnitude of change will be negligible.</p>	The significance of the effect is neutral.
<p>31. Junction Road, Leonard Street</p> <p>Receptors have close views of the railway overbridge, brick retaining walls and surrounding residential properties to the north.</p>	Receptors are people travelling through or passing the affected views: low sensitivity.	<p>Receptors will have views of OLE equipment along the railway line on embankment. This will be particularly dominant where the railway crosses the road. There will be a minor alteration in views.</p> <p>The magnitude of change will be low adverse.</p>	The significance of the effect is slight adverse.
<p>32. Telford Drive</p> <p>Receptors have close, oblique views of the railway on embankment. A steel palisade fence and some mature vegetation lines the embankment.</p>	Receptors are occupiers of residential properties: high sensitivity.	<p>Receptors will have views of OLE equipment along the railway line on embankment. Some vegetation lining the railway may be lost. There will be a minor loss and alteration to views of the existing conditions.</p> <p>The magnitude of change will be low adverse.</p>	The significance of the effect is slight adverse.
<p>33. Recreational Space off Travers Entry</p> <p>Receptors have direct views of the railway line and associated vegetation. There are distant views of St Helens Junction.</p>	Receptors are users of outdoor recreational facilities where appreciation of the view is an intrinsic part of the experience: medium sensitivity.	<p>Receptors will have views of OLE equipment along the railway line. Some vegetation lining the railway may be lost. There will be a minor loss and alteration to views of the existing conditions.</p> <p>The magnitude of change will be low adverse.</p>	The significance of the effect is slight adverse.

Warrington Council

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
<p>34. Broad Lane</p> <p>Receptors have wide views of agricultural land in the foreground bounded by fragmented hedgerows. A small copse is visible in the centre of view and the built form of Burtonwood is visible in the distance.</p>	Receptors are occupiers of residential properties: high sensitivity.	Receptors will have distant, largely screened views of OLE equipment along the railway line. Some vegetation lining the railway may be lost. There will be a very minor alteration to existing views. The magnitude of change will be negligible.	The significance of the effect is neutral.
<p>35. Penkford Lane</p> <p>Receptors have direct views of the railway overbridge and the B5204. There are limited, screened views of the railway line from this location.</p>	Receptors are people travelling through or passing the affected views: low sensitivity.	Receptors will have direct, clear views of OLE equipment along the railway line across the overbridge. There will be a very minor alteration to existing views. The magnitude of change will be negligible.	The significance of the effect is neutral.
<p>36. Lumber Lane</p> <p>Receptors have open views across agricultural land with a small copse of trees to the right of the view and a boundary hedge to the left of the view. The railway is visible along the Sankey Viaduct to the north. The built form of the edge of Newton Le Willows is visible in the distance.</p>	Receptors are occupiers of residential properties: high sensitivity.	Receptors will have clear views of OLE equipment attached to structure DSE89 Sankey Viaduct. Built form and vegetation beyond the viaduct reduces the likelihood of silhouetting. There will be a very minor alteration in views. The magnitude of change will be negligible.	The significance of the effect is neutral.
<p>37. PROW, Bradleigh Old Hall</p> <p>Receptors have framed views of the Sankey Viaduct with agricultural land visible in the foreground. Overhead electricity pylons cut across the skyline. Belts of trees are visible to the right of the view.</p>	Receptors are users of outdoor recreational facilities where appreciation of the view is an intrinsic part of the experience: medium sensitivity.	Receptors will have direct views of OLE equipment attached to structure DSE89 Sankey Viaduct. The proposed scheme will result in an introduction of elements that are prominent but not considered to be substantially uncharacteristic of the existing view. The magnitude of change will be medium adverse.	The significance of the effect is slight adverse.

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
<p>38A. Rosemary Drive</p> <p>Receptors have close, partially screened views of the railway line, beyond line side vegetation and some private rear garden vegetation.</p>	<p>Receptors are occupiers of residential properties: high sensitivity.</p>	<p>Receptors will have close, direct views of the distribution site and palisade fencing bounding the site. OLE will also be visible. The proposed scheme will result in the introduction of elements that are not considered to be substantially uncharacteristic of the existing view.</p> <p>The magnitude of change will be low adverse.</p>	<p>The significance of the effect is slight adverse.</p>

St. Helens Metropolitan Borough Council

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
38. Wharf Road Receptors have clear, direct views of Sankey Viaduct and open green space in the foreground. Some blocks of scrub vegetation are visible in the middle distance.	Receptors are occupiers of residential properties: high sensitivity.	Receptors will have clear, close and direct views of OLE equipment along the top of structure DSE89 Sankey Viaduct. The proposed scheme will result in an introduction of elements that are prominent but not considered to be substantially uncharacteristic of the existing view. The magnitude of change will be medium adverse.	The significance of the effect is moderate adverse.
39. Parkside Road Receptors have oblique views of the overbridge at Parkside road and vegetation lining the road.	Receptors are occupiers of residential properties: high sensitivity.	Receptors will have oblique views of additional steeple coping at structure DSE99 Parkside Road overbridge. There will be a very minor alteration in existing views. The magnitude of change will be negligible.	The significance of the effect is neutral.

Wigan Metropolitan Borough Council

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
40. Winwick Lane Receptors have direct, clear views of the overbridge at Winwick Lane. Open agricultural fields are also visible to the east and west.	Receptors are people travelling through or passing the affected views: low sensitivity.	Receptors will have direct views of additional steeple coping at structure DSE100A Winwick Lane overbridge. There will be a very minor alteration in existing views. The magnitude of change will be negligible.	The significance of the effect is neutral.
41. Kenyon Lane Receptors have oblique views of the railway overbridge and adjacent vegetation.	Receptors are people travelling through or passing the affected views: low sensitivity.	Receptors will have oblique, largely screened views of the tops of OLE equipment. There will be a very minor alteration in existing views. The magnitude of change will be negligible.	The significance of the effect is neutral.

Warrington Council

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
42. Broseley Bridge Receptors have oblique views of the overbridge at Broseley. Adjacent residential properties are visible in the foreground. Mature vegetation lining Broseley Lane is also visible.	Receptors are occupiers of residential properties: high sensitivity.	Receptors will have oblique views of additional steeple coping at structure DSE106 Broseley Lane overbridge. There will be a very minor alteration in existing views. The magnitude of change will be negligible.	The significance of the effect is neutral.
43. Public Right of Way, Hurst Lane Receptors have direct views of agricultural land to the south, the railway on embankment and associated vegetation lining the track.	Receptors are users of outdoor recreational facilities where appreciation of the view is an intrinsic part of the experience: medium sensitivity.	Receptors will have direct views of OLE equipment along the railway. Some vegetation may be lost. There will be a very minor alteration in existing views. The magnitude of change will be negligible.	The significance of the effect is neutral.

Wigan Metropolitan Borough Council

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
44. Public Right of Way, Light Oaks Road Receptors have framed, partially screened views of the railway on embankment in the distance. The Glaze Brook is visible in the centre of view and some mature vegetation lines the brook to the east. A private garden is visible to the west.	Receptors are users of outdoor recreational facilities where appreciation of the view is an intrinsic part of the experience: medium sensitivity.	Receptors will have distant, partially screened views of OLE equipment along the railway. There will be a very minor alteration in existing views. The magnitude of change will be negligible.	The significance of the effect is neutral.
45. Glazebrook Trail Public Right of Way Receptors have views of agricultural fields to the east and west bounded by hedgerows and post and wire fencing. There are direct views of the railway on embankment to the north. A rail overbridge is also visible in the centre of view.	Receptors are users of outdoor recreational facilities where appreciation of the view is an intrinsic part of the experience: medium sensitivity.	Receptors will have direct views of OLE equipment along the railway embankment. Some vegetation lining the track may be lost. There will be a minor alteration in existing views. The magnitude of change will be low adverse.	The significance of the effect is slight adverse.

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
<p>46A. Rindle Road</p> <p>Receptors have partially screened views from residential properties on Rindle Road towards the rail line on embankment and the associated level crossing. Vegetation partially screens views across the moss to the east.</p>	<p>Receptors are occupiers of residential properties: high sensitivity.</p>	<p>Receptors will have partially screened, oblique views of Option 1 distribution site and palisade fencing in an area of existing rail infrastructure. OLE will also be visible. There will be a minor alteration in existing views.</p> <p>The magnitude of change will be low adverse.</p> <p>Receptors will have partially screened views of Astley Option 2 distribution site and palisade fencing in an existing area of undeveloped agricultural land. The proposed scheme will introduce elements that will be prominent but not necessarily substantially characteristic of the existing views.</p> <p>The magnitude of change will be medium adverse.</p> <p>Receptors will have oblique views from side windows of Option 3 distribution site within a small footprint, in an area characterised by rail infrastructure. OLE will also be visible. There will be a very minor alteration in existing views.</p> <p>The magnitude of change will be negligible.</p>	<p>The significance of effect for Option 1 is moderate adverse.</p> <p>The significance effect for Option 2 is large adverse.</p> <p>The significance of effect for Option 3 is neutral.</p>
<p>46. Rindle Road</p> <p>Receptors have partially screened, close views of the railway line. Hedgerows and scrubby vegetation lines the side of the road and residential properties.</p>	<p>Receptors are occupiers of residential properties: high sensitivity.</p>	<p>Receptors will have close views of OLE equipment along the railway. Some vegetation may be lost. There will be a minor alteration in existing views.</p> <p>The magnitude of change will be low adverse.</p>	<p>The significance of the effect is slight adverse.</p>

Salford City Council

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
<p>47. Stannard Road</p> <p>Receptors have close, direct views of the railway line from rear windows. Some mature vegetation is visible along the top of the brick wall of the embankment.</p>	Receptors are occupiers of residential properties: high sensitivity.	Receptors will have close, direct views of OLE equipment along the top of the railway embankment. Some vegetation may be lost. The scheme will result in an introduction of elements that are prominent but not considered to be substantially uncharacteristic of the existing view. The magnitude of change will be low adverse.	The significance of the effect is slight adverse.
<p>48. Residential Receptors off Barlow Lane</p> <p>Receptors have oblique, largely screened views of the railway on embankment. A number of mature birch trees screen views.</p>	Receptors are occupiers of residential properties: high sensitivity.	Receptors will have oblique, largely screened views of OLE equipment along the railway. Some vegetation may be lost. This will not include adjacent birch trees on private land. There will be a very minor alteration in existing views. The magnitude of change will be negligible.	The significance of the effect is neutral.
<p>49. Hampden Grove</p> <p>Receptors have direct, close views of the railway line, usually bounded by brick walls or steel palisade fencing. Large storage and commercial premises are visible beyond the railway line to the north. A footbridge over the line is also visible in the middle distance.</p>	Receptors are occupiers of residential properties: high sensitivity.	Receptors will have direct, close views of OLE equipment along the railway line and the reconstruction of structure DSE123 Chadwicks Eccles / Old Wellington Road Footbridge. This will result in an introduction of elements that may not be uncharacteristic when set within the existing view. The magnitude of change will be low adverse.	The significance of effect is slight adverse.
<p>50. Albert Street</p> <p>Receptors have direct views of the road overbridge and adjacent built form. There are a number of lighting columns visible in the foreground and middle distance.</p>	Receptors are people travelling through or passing the affected views: low sensitivity.	Receptors will have direct views of the reconstruction of structure DSE125 Albert Road overbridge. There will be a temporary, partial loss of an element of the existing view. The magnitude of change will be medium adverse.	The significance of effect is moderate adverse (temporary).
<p>51. Weaste Road / Calvert Street</p> <p>Receptors using the overbridge have direct views of the railway line adjacent to the M602. Some new build properties are visible in the middle distance.</p>	Receptors are people travelling through or passing the affected views: low sensitivity.	Receptors will have direct views of OLE equipment along the track. Existing views are dominated by motorway infrastructure including gantries. There will be a very minor alteration in existing views. The magnitude of change will be negligible.	The significance of the effect is neutral.

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
<p>52. Derby Road</p> <p>Receptors have direct views of the railway line adjacent to the M602. A large scale concrete wall is visible in the foreground and into the distance. The built form of Salford is visible in the far distance.</p>	<p>Receptors are people travelling through or passing the affected views: low sensitivity.</p>	<p>Receptors will have oblique views of OLE equipment along the track. Existing views are dominated by motorway infrastructure. There will be a very minor alteration in existing views.</p> <p>The magnitude of change will be negligible.</p>	<p>The significance of the effect is neutral.</p>
<p>53A. Fusion Apartments, Middlewood Street</p> <p>Receptors have oblique and direct views of the rail line and surrounding vacant land, including an existing compound which has been vandalised. The rooflines of Regent Retail Park are also visible.</p>	<p>Receptors are occupiers of residential properties: high sensitivity.</p>	<p>Receptors will have oblique and direct views from top floor windows of the proposed Ordsall Lane distribution site and palisade fencing. There will be a very minor alteration in existing views.</p> <p>The magnitude of change will be negligible.</p>	<p>The significance of the effect is neutral.</p>
<p>53. Kielder Square</p> <p>Receptors have clear, direct views of the railway line, vegetation lining the track to the south, the M602 bounded by concrete walls and residential properties to the south.</p>	<p>Receptors are people travelling through or passing the affected views: low sensitivity.</p>	<p>Receptors will have oblique views of OLE equipment along the track. Existing views are dominated by motorway infrastructure. There will be a very minor alteration in existing views.</p> <p>The magnitude of change will be negligible.</p>	<p>The significance of the effect is neutral.</p>
<p>54. Windsor Street</p> <p>Receptors have clear views of the railway line in shallow cutting with associated vegetation lining the track. Large scale commercial and industrial premises are visible to the south.</p>	<p>Receptors are people travelling through or passing the affected views: low sensitivity.</p>	<p>Receptors will have oblique views of OLE equipment along the track. There will be a very minor alteration in existing views.</p> <p>The magnitude of change will be negligible.</p>	<p>The significance of the effect is neutral.</p>
<p>55. Oldfield Road</p> <p>Receptors have clear views of the overbridge and block of apartments to the north.</p>	<p>Receptors are people travelling through or passing the affected views: low sensitivity.</p>	<p>Receptors will have direct views of additional steeple coping attached to the parapet of structure DSE141 Oldfield Road. There will be a very minor alteration in existing views.</p> <p>The magnitude of change will be negligible.</p>	<p>The significance of the effect is neutral.</p>

Manchester City Council

Visual Amenity Receptors	Sensitivity	Magnitude of Change	Significance of Effect
<p>56. Duke Street</p> <p>Receptors have clear views of the large intersection bridge, including gantry-like structures, and open green space to the east and west.</p>	<p>Receptors are people travelling through or passing the affected views: low sensitivity.</p>	<p>Receptors will have clear views of OLE equipment along the top of the railway viaduct. There will be a very minor alteration in existing views.</p> <p>The magnitude of change will be negligible.</p>	<p>The significance of the effect is neutral.</p>
<p>57. Salford Central Station</p> <p>Receptors have clear, direct views of the railway viaduct. A car park is visible in the foreground and commercial office buildings are visible to the right of view.</p>	<p>Receptors are people travelling through or passing the affected views, including those using the railway station: low sensitivity.</p>	<p>Receptors will have clear views of OLE equipment along the top of the railway viaduct. The scheme will result in an introduction of elements that are prominent but not considered to be substantially uncharacteristic of the existing view.</p> <p>The magnitude of change will be medium adverse.</p>	<p>The significance of the effect is slight adverse.</p>

5.7 Mitigation

5.7.1 The following mitigation measures are suggested:

- Restricting clearance of existing vegetation to the minimum required to undertake the works;
- Sowing any new grass areas with a low maintenance species rich grass seed mix (80% grass, 20% wildflowers) to stabilise embankments, reduce the need for mowing, and improve biodiversity; and
- Where possible, planting replacement tree and shrub species that will not compromise the safe operation of the railway, whilst increasing the range of species to improve biodiversity or quality of screening.

5.8 Environmental Impact Assessment

5.8.1 An assessment of the potential effects of the development on the environment during both the construction and operation phases accounting for mitigation has been included in Table 5.1 and Table 5.2 above.

5.9 Summary

- Landscape and townscape effects are largely minor, negative, long term and permanent.
- Visual amenity effects are largely minor or negligible, negative, long term and permanent

5.10 Conclusions

- 5.10.1 Impacts on landscape/townscape character and on visual amenity during construction and during operation are most likely to arise from the removal of screening vegetation to allow the installation of gantries and distribution sites. This will be most severe at sensitive locations such as Huyton Conservation Area and where the railway line is on embankment. Where the railway line is in cutting, the gantries could be more obvious to receptors on overbridges where vegetation has been removed.
- 5.10.2 Construction impacts will also include demolition and reconstruction of structures, areas of bare earth until reseeding has established, and the presence of plant and machinery. Operational impacts will be reduced over time as vegetation re-establishes, whether planted or naturally regenerating.
- 5.10.3 The proposed scheme will not result in a significant alteration to the landscape character where the rail corridor is situated in cutting or is screened by adjacent development, such as in Liverpool and areas of Wigan. Where the rail corridor is on embankment, the installation of OLE gantries and distribution sites will result in the railway becoming a more defined element in the landscape / townscape. Overall the significance of effect upon landscape/townscape character will be largely slight adverse. The proposed scheme will be visible from some discrete areas of the wider landscape; in particular where views are open, where there is limited screening and where the railway is elevated. The most significant effects will occur where there are likely to be clear, direct and elevated views of OLE equipment and distribution sites residential receptors, such as at Wharf Road, Warrington. There will be some temporary moderate adverse effects at Bridge Road, Knowsley and Albert Road, Salford as a result of bridge works. Overall the significance of effect upon visual amenity effects will be largely neutral to slight adverse.

6. Ecology

6.1 Summary of Findings

- The assessment has identified that potential negative impacts may occur to statutory and non-statutory designated sites of importance for nature conservation and legally protected species including great crested newts, badgers and reptiles and may result in the spread of invasive plant species subject to legal control.
- The scheme will require works adjacent to the Manchester Mosses Special Area of Conservation (SAC) and as such a Habitat Regulations Assessment (HRA) screening will be required and Natural England agreement received before commencement of the works in relation to the Manchester Mosses SAC.
- The scheme will require limited works within the Highfield Moss Site of Special Scientific Interest (SSSI) which will result in the loss of a small area of acid grassland although this will not have a significant impact on the integrity of the SSSI.
- The key mitigation measures identified are:
 - A section 28H (Wildlife & Countryside Act, 1981 (as amended)) notice will need to be submitted to Natural England and a section 28H assent received prior to commencement of works in relation to Highfield Moss. This will include details of how the works are to be undertaken, how the land will be reinstated and pollution prevention measures;
 - The implementation of Precautionary Methods of Working (PMW) in respect of protected species and the implementation of measures to control potential incidents (see Appendix F7).
- The assessment concludes that following the implementation of the mitigation measures identified that the predicted impacts will not be significant for either the construction or operational phases of the scheme.

6.2 Introduction

- 6.2.1 This chapter describes the existing ecological features as they are understood at present and identifies key ecological impacts associated with the proposed electrification of the Liverpool to Manchester line. Mitigation measures have been identified to minimise adverse impacts and this mitigation is taken into account in the assessment of the residual impacts.

Planning and Legislative Context

Planning Policy Statement 9: Biodiversity and Geological Conservation (1994)

- 6.2.2 Planning Policy Statement 9: Biodiversity and Geological Conservation (PPS 9) has been considered as part of the ecological assessment for the EAR. Planning Policy Statements set out the Government's national policies on different aspects of planning in England. PPS 9 sets out policies on protection of biodiversity and geological conservation through the planning system. These policies complement, but do not replace or override, other national planning policies and should be read in conjunction with other relevant statements of national planning policy.
- 6.2.3 Policies within PPS 9 are to be taken into account in the preparation of regional spatial strategies and local development frameworks. They may also be a material consideration in the determination of individual planning applications.
- 6.2.4 PPS 9 states:

"Plan policies and planning decisions should aim to maintain, and enhance, restore or add to biodiversity and geological conservation interests."

6.2.5 It also states:

"The aim of planning decisions should be to prevent harm to biodiversity and geological conservation interests. Where granting planning permission would result in significant harm to those interests, local planning authorities will need to be satisfied that the development cannot reasonably be located on any alternative sites that would result in less or no harm. In the absence of any such alternatives, local planning authorities should ensure that, before planning permission is granted, adequate mitigation measures are put in place." (Paragraph 1 (i) and (vi)).

6.2.6 PPS 9 also makes reference to species of principal importance for the conservation of biodiversity in England. These species are listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 - Habitats and Species of Principal Importance in England and PPS 9 states that planning authorities should ensure that these species are protected from the adverse effects of development, where appropriate.

Legislative Context

6.2.7 The design of the scheme, as well as this assessment, takes account of current wildlife legislation; in particular the following:

- The Conservation of Habitats and Species Regulations 2010);
- Wildlife and Countryside Act 1981 (as amended);
- Badgers Act 1992.

Study Area

6.2.8 To define the total extent of the study area for the ecological assessment the proposed activities were reviewed in order to identify the spatial scale at which ecological features could be affected. The Zone of Influence is the area encompassing all predicted negative ecological effects from the site, both those which will occur by land-take and habitat loss and those which will occur through disturbance such as noise. The scheme extents are shown on Figures 1.1 – 1.18, in Appendix A.

6.2.9 The study area includes a maximum zone of 2km from the railway boundary for the gathering of information during the desk study. Some desk study searches (see Data Gathering) and the habitats and protected species surveys have been undertaken within 500m of the railway boundary.

Temporal Scope

6.2.10 To define the temporal scope for ecological assessment the proposed activities were reviewed in order to establish when impacts could occur and over what duration. Impacts have been assessed in the context of the predicted baseline conditions within the zone of influence during the lifetime of the project (i.e. the assessment takes into account how the existing conditions might change between the surveys and the start of construction and/or operation).

6.3 Assessment Methodology

Data Gathering

6.3.1 A desk study was undertaken in January 2011 to obtain baseline ecological data for the site and its immediate surroundings. This involved a data gathering exercise aimed at confirming the presence of any statutory designated sites for nature conservation within 2km of the proposed works; non-statutory designated sites for nature conservation, legally protected species (fauna and flora), UK Biodiversity Action Plan (BAP) priority species and priority BAP habitats within 500m of the site. The following sources were consulted:

- Biological Records Centre for Cheshire (rECOrd) (covering Warrington);
- Merseyside BioBank (covering Liverpool, Knowsley and St. Helens Council); and
- Greater Manchester Ecology Unit (GMEU) (covering Wigan, Salford and Manchester).

6.3.2 The following websites were also searched for data:

- the 'Multi-Agency Geographic Information for the Countryside' (MAGIC) website: was checked for records and details of statutory designated sites for nature conservation within 2km of the site⁹;
- The National Biodiversity Network Gateway (NBN Gateway) website¹⁰ was searched for records of protected or notable species within the vicinity of the sites (10km grid square).
- the 'Nature of the Map' website, maintained by Natural England: was checked for records and details of UK BAP priority habitats within 500m of the site¹¹;

6.3.3 In addition, a review of Ordnance Survey maps was undertaken to identify any ponds and other water-bodies, e.g. non-flowing ditches and field drains, that may be suitable for great crested newt (*Triturus cristatus*) utilisation, within 500m of the site and to establish the terrestrial connectivity of any such ponds to the site (e.g. woodland and rank grassland). Great crested newts will travel large distances between breeding ponds and terrestrial habitat; as a consequence, following guidance provided by Natural England¹², it is recommended that land within 500m of a great crested newt breeding pond should be treated as potential great crested newt habitat and, therefore, should be evaluated accordingly.

6.3.4 In undertaking this assessment [REDACTED] (Conservation Officer, Manchester Office) of Natural England was consulted regarding the presence of statutory designated sites within close proximity to the site.

6.3.5 The seven local authority areas (listed below) were contacted to find out if they had an ecologist and if so, to ask the ecologists if they had any concerns with the scheme.

- Wigan Council;
- Manchester City Council;
- Liverpool City Council;
- Warrington Borough Council;
- St Helens Council;
- Knowsley Metropolitan Council;
- Salford Council.

6.3.6 The following responses have been received:

[REDACTED], *Senior Ecologist, Wigan Council*

- Potential impacts on the following designated sites: Astley and Bedford Mosses SSSI (part of Manchester Mosses SAC), Highfield Moss SSSI (the designation of which includes part of the rail verges) and local Sites of Biological Importance (SBI) close or adjacent to the rail network. GMEU can provide location and citation details;

⁹ MAGIC <http://magic.defra.gov.uk/>

¹⁰ <http://data.nbn.org.uk/>

¹¹ <http://www.natureonthemap.org.uk/>

¹² English Nature (2001). *Great Crested Newt Mitigation Guidelines*

- There are a number of woodland stretches close to the railway line within the Wigan district. Tree surveys should be considered; particularly where compounds are going to be located and trees are going to be affected. Root protection zones and the potential presence of bats in mature trees should also be considered.

██████████, *Principal Natural Environment Officer, Warrington Borough Council*

- Protection of Colliers Moss Local Nature Reserve (LNR). Broad Lane Bridge demolition working area should be surveyed with respect to bats, badgers, newts and breeding birds in particular. Impacts on protected species should be considered generally throughout the scheme;
- There are known badger setts near ██████████ and potential impacts upon these should be considered as part of the scheme.

Walkover Survey

Jacobs

- 6.3.7 An ecological walkover of the routes between Middlewood Street access point at Salford and the Wavertree Road access point east of Wavertree Technology Park Station was undertaken by Jacobs in January 2010¹³. The survey was aimed at identifying potential ecological constraints associated with the route. Although a Phase 1 Habitat survey plan was not produced, target notes were made of relevant features (refer to Appendix F1).

Whitcher Wildlife Ltd

- 6.3.8 A protected fauna survey was undertaken by Whitcher Wildlife Ltd for the early works at the eastern end of the scheme (see section 2.6 for list of works), covering the bridge works¹⁴ (August 2010) and the track lowering and associated access points¹⁵ (November 2010). Copies of these reports are provided in Appendix F2. These reports relate specifically to the demolition and reconstruction of bridges and track lowering to allow the OLE to pass beneath bridges.
- 6.3.9 The following structures reports were also prepared by Whitcher Wildlife Ltd for the proposed scheme (see Appendix F2) and have been reviewed for this assessment:
- DSE OB39, Queens Drive (Ref 101253/DSE/OB39);
 - DSE OB52, Bridge Road (Ref 101253/DSE/OB52);
 - DSE OB65, Queens Drive (Ref 101253/DSE/OB65);
 - DSE OB67, Cumber Lane (Ref 101253/DSE/OB67);
 - DSE OB72, Rainhill Station Footbridge (Ref 101253/DSE/OB72);
 - DSE OB73, Rainhill Station Footbridge East (Ref 101253/DSE/OB73);
 - DSE OB75, Lea Green Road (Ref 101253/DSE/OB75);
 - DSE OB77 and 77A, Marshalls Cross (Ref 101253/DSE/OB77);
 - DSE OB83, Former Intersection Bridge (Ref 101253/DSE/OB83);
 - DSE OB86, Broad Lane (Ref 101253/DSE/OB86);
 - DSE OB90, Sugar Works Road (Ref 101253/DSE/OB90);

¹³ Ecological Constraints Walkover – Manchester to Liverpool Rev A.doc, February 2010

¹⁴ DSE Railway Line, Protected Fauna Survey, Ref No:- 101104, 15th November 2010

¹⁵ Old Wellington Road Diversions, Protected Fauna Survey, Ref No:- 100803, 18th August 2010

- 6.3.10 Atkins was not involved in the Jacobs or Whitcher Wildlife Ltd assessments and therefore cannot comment on the accuracy of the reports or accept any liabilities associated with these assessments.

Atkins

- 6.3.11 Atkins undertook a review of the available information at project start up (Jacobs information only) and established that additional Extended Phase 1 survey was required to cover the following:

- Proposed access points that were not in regular use and where aerial photos suggested that vegetation clearance may be required to use the access point for the scheme
- Areas of the site within or immediately adjacent to sites of special scientific interest (SSSIs).

- 6.3.12 In addition, protected species surveys for bats, badgers, water voles and otters were also identified as being required at specific locations, to investigate features highlighted by Jacobs in the original walkthrough of the scheme.

- 6.3.13 Details of the Phase 1 and species surveys are provided in the following sections.

Atkins Extended Phase 1 Survey – Access Points

- 6.3.14 Following a review of proposed access points walkover surveys were undertaken by Atkins on the 9th, 14th, 16th, 21st, 23rd and 28th September 2010 by an experienced Atkins ecologist at the four sites along the route where vegetated habitats were present. For all other access points these were identified as being hard standing were therefore not assessed. The survey area covered the extents of the following sites and up to 50m from the site boundary where access was allowed. The sites surveyed included the following potential construction access sites, which are shown on Figures 1.1 – 1.18 in Appendix A:

- Wavertree Station;
- Lea Green Road;
- Kenyon Junction;
- Rainhill Signal Box and Station.

Atkins Extended Phase 1 Survey – SSSIs

- 6.3.15 Phase 1 habitat surveys were also undertaken where the following designated sites border the railway as the proposed works may directly affect their status:

- Highfield Moss SSSI;
- Astley and Bedford Mosses SSSI.

Atkins Extended Phase 1 Survey – Distribution Sites

- 6.3.16 Phase 1 habitat surveys were also undertaken at four distribution sites located at the following locations:

- Huyton (SJ 445906);
- Newton-Le-Willows (SJ 595953);
- Ordsall Lane (SJ 825980);
- Astley (SJ 704972).

Extended Phase 1 Survey Methodology

- 6.3.17 The surveys comprised 'Extended Phase 1' habitat surveys in accordance with the 'Guidelines for Baseline Ecological Assessment'¹⁶ and following the methodology given in the 'Handbook for Phase 1 Habitat Survey'¹⁷. The survey area covered the extents of the site and up to 50m from the site boundary where access was allowed. Phase 1 habitat plans and target notes are provided in Appendix F3.
- 6.3.18 The 'Extended Phase 1' habitat survey records the habitats and their distribution within the survey area, and assesses the potential for legally protected species to occur in or adjacent to the survey area. This information has been used to determine any potential ecological impacts that could affect the proposed development and to identify whether further ecological surveys or assessments are required prior to development.
- 6.3.19 With respect to legally protected species, the following ecological features and resources were searched for where access was allowed:
- habitat suitable for water vole (*Arvicola amphibius*), otters (*Lutra lutra*) and white-clawed crayfish (*Austropotamobius pallipes*);
 - habitat suitable for roosting bats within and immediately adjacent to the site;
 - ponds and other water-bodies suitable for great crested newts within and immediately adjacent to the site and potential great crested newt terrestrial habitat within the site;
 - habitat suitable for reptiles within and immediately adjacent to the site;
 - habitat suitable for breeding birds within and immediately adjacent to the site; and;
 - signs of badger (*Meles meles*) activity (e.g. setts, footprints, trapped hairs, dung-pits/latrines) within 50m of the site.
- 6.3.20 The list of invasive plant species included on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) is extensive and these plants are found in a range of different habitats, including aquatic habitats. The extended Phase 1 survey checked, in particular, for the presence of Japanese knotweed (*Fallopia japonica*), giant knotweed (*Fallopia sachalinensis*), hybrid knotweed (*Fallopia x bohemica*), giant hogweed (*Heracleum mantegazzianum*), rhododendron (*Rhododendron ponticum*) and Himalayan balsam (*Impatiens glandulifera*). There may be other invasive plant species present on the site which were not recorded, but it is considered that this survey is sufficient to identify any significant constraints posed by invasive plants.

Bridge Inspections - Bats

- 6.3.21 A total of 14 overbridge structures were initially identified by Network Rail as having some physical work done to them, of these target notes were provided by Jacobs on six structures and four were not covered by the Jacobs survey and mapping. Where no target notes were provided it was assumed that the bridges provided no suitable roosting opportunities for bats and were therefore not assessed further. For those structures identified as having low potential and those bridges not previously included within the Jacobs scope of work a review of the potential for these bridges to support bat roosts was undertaken.
- 6.3.22 Following the logic set out above Atkins undertook daytime visual inspections of the following bridges to review their potential to support roosting bats:
- DSE 53 (subsequently no longer affected by scheme);
 - DSE 83;

¹⁶ Institute of Environmental Assessment (1995). *Guidelines for Baseline Ecological Assessment*

¹⁷ Joint Nature Conservation Committee (1993). *Handbook for Phase 1 Habitat Survey*

- DSE 86;
- DSE 89
- DSE 123
- DSE 124;
- DSE 125;
- MVM 3;
- MVM 5 (subsequently no longer affected by scheme);
- COL MSJA
- COL 103A;
- COL 103B;

6.3.23 Bridge DSE 71 was identified by Jacobs as being of medium potential to support roosting bats. Therefore, dusk emergence surveys were undertaken on the 31 August 2010 and the 8 September 2010 and a dawn re-entry survey on the 1 September 2010 using heterodyne bat detectors. The level of survey effort and survey techniques were determined using appropriate guidance.^{18,19,20}

Badgers

6.3.24 In the initial assessment undertaken by Jacobs a potential badger sett was recorded at National Grid Reference (NGR) [REDACTED] and potential evidence of badger activity at [REDACTED]. Therefore, three monitoring visits of these locations were undertaken on the 14 September 2010, 4 November 2010 and 11 January 2011. The locations of these survey areas are shown on Figure 1.7 in Appendix A.

Water Vole and Otters

- 6.3.25 In the initial assessment undertaken by Jacobs a total of three watercourses which flow beneath the railway were recorded as providing potential habitat for water vole and otters. These watercourses are an unnamed watercourse at Rainhill (NGR: SJ 49714 91648), Sankey Brook at Newton-le-Willows (NGR: SJ 57029 94712) and Glaze Brook at Glazebury (NGR: SJ 67516 96915) and are shown on Figures 1.5, 1.8 and 1.11 in Appendix A.
- 6.3.26 Therefore these watercourses were monitored for evidence of water vole or otters where access allowed (Health and Safety and access restriction) on the 17 September 2010, 25 October 2010 and 9 November 2010.

Survey Limitations

- 6.3.27 Ecological surveys are limited by factors which affect the presence of plants and animals, such as the time/season of year and the migration patterns and behaviour of animals. Consequently, the walkover of the proposed sites has not produced a complete list of plants and animals; however, it is considered that the results of the walkover survey undertaken have allowed for the identification of the habitats, the potential presence of legally protected species and other valued ecological features and resources within the survey areas.
- 6.3.28 During the production of this report an additional twelve structures were identified as requiring physical works (attachment of OLE). The additional structures identified and their potential to

¹⁸ Bat Conservation Trust (2007) *Bat Surveys Good Practice Guidelines*

¹⁹ Mitchell-Jones, A. J. & McLeish, A. P. (1999) *The Bat Workers' Manual*, JNCC.

²⁰ Mitchell-Jones, A. J. (2004) *Bat Mitigation Guidelines*, English Nature

support roosting bats as assessed by Jacobs and Whitcher Wildlife Ltd (in brackets) are listed below:

- DSE 40 – low/medium bat potential;
- DSE 68 – low bat potential;
- DSE 77 – low bat potential (very little potential);
- DSE 82 – bat potential not quantified;
- DSE 101 – bat potential of unknown level (no potential);
- DES 127a – no mention of bats
- DSE 131 – low bat potential, (no comment on bats);
- DSE 133 – low bat potential, (no comment on bats);
- DSE 135 – no mention of bats
- DSE 136 – low bat potential
- DSE 137 – no mention of bats
- DSE 140 – low bat potential.

6.3.29 Following the same logic as used for the initial structures this identifies up to eight structures where an additional structure inspection is required, and one structure (DSE 40) where dusk emergence and dawn re-entry surveys are required. This additional survey work has not been undertaken as part of the current assessment and will therefore be included as a recommendation.

6.4 Criteria of Assessment

6.4.1 This assessment has been undertaken with reference to current best practice and in particular the *Guidelines for Ecological Impact Assessment in the United Kingdom*.²¹

Nature Conservation Evaluation

6.4.2 A number of criteria have become accepted as a means of assessing the nature conservation value of a defined area of land which are set out in *A Nature Conservation Review*²² and include diversity, rarity and naturalness.

6.4.3 The nature conservation value or potential value of an ecological feature is determined within the following geographic context²¹

- International importance (such as SAC, Special Protection Areas (SPA), Ramsar sites);
- National importance (such as SSSI);
- Regional/county importance (such as LNR, Sites of Importance for Nature Conservation (SINC), ancient woodlands);
- Local (parish) importance (undesigned ecological features such as old hedges, woodlands, ponds);
- The application site and immediate environs e.g. habitat mosaic of grassland and scrub within the application site;

²¹ Institute of Ecology and Environmental Management (2006) *Guidelines for Baseline Ecological Impact Assessment in the United Kingdom*

²² Ratcliffe, D A (1977) *A Nature Conservation Review*

- Negligible importance would usually be applied to areas of built development, active mineral extraction, or intensive agricultural land.

Impact Assessment

- 6.4.4 The assessment of the potential effects of the proposed development takes into account both on-site effects and those that may occur to adjacent and more distant ecological features. Impacts can be permanent or temporary and can include:
- direct gains and losses of wildlife habitats;
 - fragmentation and isolation or enhancement of connectivity of habitats;
 - disturbance to species from noise, light or other visual stimuli;
 - changes to key habitat features;
 - changes to the local hydrology, water quality and/or air quality.
- 6.4.5 The significance of a negative impact (or a beneficial effect) is the product of the magnitude of the impact and the value or sensitivity of the nature conservation features affected. In order to characterise the impacts on each feature, the following parameters are taken account of:
- the magnitude of the impact;
 - the extent of the area over which the impact would occur;
 - the duration of the impact;
 - whether the impact is reversible and over what timeframe;
 - the timing and frequency of the impact.
- 6.4.6 Effects are unlikely to be significant where features of low value or sensitivity are subject to small or short-term impacts. However, where there is a number of small scale effects that are not significant alone, the assessor may determine that, cumulatively, these may result in an overall significant effect. Impacts have been assessed as being either negative or beneficial and significant or not significant. Following current guidance²³, this assessment identifies whether the impacts described are significant, based on the integrity and the conservation status of the ecological feature.
- 6.4.7 The integrity of sites is described as follows and has been used in this assessment to determine whether the effects of the proposals on a designated site are likely to be significant:
- The integrity of a site is the coherence of the ecological structure and function across its whole area that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.*
- 6.4.8 The conservation status of undesignated habitats and species within a defined geographical area is described as follows and has been used in this assessment to determine whether the effects of the proposals are likely to be significant:
- For habitats, conservation status is determined by the sum of influences acting on the habitat and its typical species, that may affect its long term distribution, structure and functions as well as the long term survival of its typical species within a given geographical area;*

²³ Institute of Ecology and Environmental Management (2006) *Guidelines for Ecological Impact Assessment in the United Kingdom* (version 7 July 2006).

For species, conservation status is determined by the sum of influences acting on the species concerned that may affect the long term distribution and abundance of its population within a given geographical area.

- 6.4.9 In addition to assessing whether an impact is significant or not, the confidence in the prediction is also considered, using an appropriate scale and any limitation to certainty is described:
- certain/near certain (probability estimated at 95% chance or higher);
 - probable (probability estimated at between 50% and 95%);
 - unlikely (probability estimated at between 5% and 50%);
 - extremely unlikely (probability estimated at less than 5%).

6.5 Baseline Conditions

- 6.5.1 Data received from the desk study is summarised in Appendix F4. The full list of records is extensive and therefore has not been included as an appendix, however, this information is available if required. Due to the number of records obtained this information has not been graphically produced. For the location of statutory and non-statutory designated sites of importance for nature conservation in relation to the scheme refer to Figures 1.1 – 1.18 in Appendix A.
- 6.5.2 The baseline conditions identified from the desk study and from the site specific surveys detailed in section 6.3 are summarised by local authority area below.

Liverpool

Statutory Designated Sites of Importance for Nature Conservation

- 6.5.3 The Childwall Woods and Fields LNR is located approximately 1.39km south of the railway line at its closest point. The site is noted for its woodland and grass land habitat, including a large population of bluebell.

Non-Statutory Designated Sites of Importance for Nature Conservation

- 6.5.4 The Liverpool Loop Line Local Wildlife Site (LWS) bisects the railway line. No citations are available for Liverpool LWSs. An internet search indicates that it is a disused railway and is now part of the Trans-Pennine Trail.

Protected and Notable Species

- 6.5.5 Three records of bats were identified within 500m of the railway the closest of which is for a probable brown long eared bat (*Plecotus auritus*) located approximately 250m north of the railway. A record of a dead badger was also identified approximately 270m from the railway.
- 6.5.6 This section of the line has features with potential to support roosting bats and nesting birds. These included cracks in cut sandstone bedrock and gaps in mortar between bricks in overbridges and retaining walls. Stands of sycamore have also been noted and these may also offer potential nesting sites for birds. Japanese knotweed stands are present in this section.

Wavertree Junction Station Access Point

- 6.5.7 The land at Wavertree Junction comprised an access track that runs parallel to the railway line and associated vegetation along either side of the track and the rail embankment (refer to Appendix F3 for Phase 1 habitat plan sketch and target notes). The site mostly comprised established trees and scrub with fringing areas of tall ruderals. The track passes the Wavertree Technology Park station where there is mostly ornamental planting. Japanese knotweed is present on the site.

- 6.5.8 The site offered some potential for reptiles, especially where a south facing grassland embankment was present. The site may also have some interest for invertebrates due to the number of flowering plant species present and the structural diversity of the habitat. Breeding birds are also likely to be an issue. The following species were seen on site: chaffinch, magpie, great tit, blue tit, blackbird, robin and goldfinch. Evidence of fox was identified but no fox earths were recorded.

DSE39

- 6.5.9 The Whitcher Wildlife Ltd report of this structure and its immediate surrounds assessed the structure as providing very little roosting opportunities for bats and that there is suitable habitat for breeding birds and reptiles. Two stands of Japanese knotweed were also recorded.

Knowsley

Statutory Designated Sites of Importance for Nature Conservation

- 6.5.10 There are no statutory designated sites of importance for nature conservation within 2km of the railway.

Non-Statutory Designated Sites of Importance for Nature Conservation

- 6.5.11 There are a total of 7 non-statutory designated sites of importance for nature conservation within 500m of the railway. Of these the following three sites are located immediately adjacent to the railway:

- Stadt Moers Q4 LWS;
- Stadt Moers Q2 and Visitor Centre LWS;
- Stadt Moers Q3 LWS.

Protected and Notable Species

- 6.5.12 Two records of common pipistrelle (*Pipistrellus pipistrellus*) were recorded within 500m of the railway the closest being approximately 450m south of the railway. A record of grass snake (*Natrix natrix*) was also identified approximately 350m south of the railway. Three records of schedule 1 birds were also recorded within the 10km grid squares SJ49F and SJ49Q.
- 6.5.13 The rail verge has an increasing amount of vegetation and tree cover as the line passes through Knowsley. This offers potential nesting sites for breeding birds. Japanese knotweed has been recorded along the track verge in this area. Features suitable for use by roosting bats were noted within a number of trees and a bridge. Also recorded were features that could be used by amphibians and reptiles, including a waterbody and log pile.

Huyton Distribution Site

- 6.5.14 The land at the Huyton distribution site comprises an area of mainly young and semi-mature broadleaved woodland of sycamore, bird cherry and ash with bramble/hawthorn scrub (refer to Appendix F3 for Phase 1 habitat plan sketch and target notes). Species poor semi-improved grassland and ruderals lie between the woodland/scrub and ballast; comprising rank grasses, occasional ragwort & rosebay willowherb. At the eastern end of the adjacent car park is a small area of ornamental planting then a small area of broadleaved woodland (mix of young/semi-mature) separated from the railway land by palisade fencing and from the road by a stone wall. A semi-mature bird cherry, two semi mature sycamore trees covered in thick ivy provide moderate bat roost potential.
- 6.5.15 The site offered some potential for bats and nesting birds. Three trees provided moderate potential for bat roosts and there is potential bird nesting opportunities within the site. The rail over-bridge at the eastern end of site appears to provide possible spaces between the concrete slabs and bridge deck, however, the road beneath the bridge is very busy and therefore it is

considered to offer low roost potential. No invasive plant species or evidence of mammal activity including mammal paths was recorded. No non-isolated ponds were recorded within 500m of the site.

DSE 52

- 6.5.16 The Whitcher Wildlife Ltd report of this structure and its immediate surrounds assessed the structure as providing very little roosting opportunities for bats and that there are suitable habitats for breeding birds and reptiles.

DSE 65

- 6.5.17 The Whitcher Wildlife Ltd report of this structure and its immediate surrounds assessed the structure as providing very little roosting opportunities for bats and that there are suitable habitats for breeding birds and reptiles.

DSE 67

- 6.5.18 The Whitcher Wildlife Ltd report of this structure and its immediate surrounds assessed the structure as providing roosting opportunities for bats and that there are suitable habitats for breeding birds and reptiles. One stand of Japanese knotweed was also recorded.

St Helens

Statutory Designated Sites of Importance for Nature Conservation

- 6.5.19 Colliers Moss Common LNR is located immediately north of the railway. The LNR was designated in 2004 and is noted for its raised bog and lowland heath habitat. The site supports water vole, common lizard and a notable dragonfly assemblage.
- 6.5.20 Thatto Heath Meadows LNR is located approximately 1.45km north of the railway line at its closest point and is noted for its unimproved grassland and hedgerows.

Non-Statutory Designated Sites of Importance for Nature Conservation

- 6.5.21 There are a total of 21 non-statutory designated sites of importance for nature conservation within 500m of the railway. Of these Pendlebury Brook LWS and Sankey Brook, Sankey Valley LWS are watercourses that flow beneath the railway. The sites listed below also lie immediately adjacent to the railway:
- Land, west of Gerrards Lane LWS;
 - Grassland, north of Sankey Brook LWS;
 - Grassland south of towpath, Sankey Valley Park LWS.

Protected and Notable Species

- 6.5.22 A total of eight bat records were identified within 500m of the railway the closest being a pipistrelle sp. located approximately 290m south of the railway.
- 6.5.23 One record of great crested newts was recorded approximately 140m south of the railway, however, the record states that the pond is considered to have reduced potential as a breeding pond and appears to be managed for angling purposes. Aerial images indicate no connectivity to the railway line.
- 6.5.24 A total of six records of water voles were identified the closest of which is on Sutton Brook which lies approximately 160m downstream of the railway. Five other water vole records are located on Sutton Brook upstream from the railway line.
- 6.5.25 One record of red squirrel (*Sciurus vulgaris*) was identified approximately 370m south of the railway, however, this is considered to be an incidental record as the location is not within a known breeding population.

- 6.5.26 Four records of schedule 1 birds were also recorded within the 10km grid squares SJ59M, SJ8494, SJ59F and SJ544932.
- 6.5.27 This section of line has potential for a number of protected species. Potential roosting habitat for bats was noted in structures along the route such as disused buildings, signal boxes, station buildings, Sankey Viaduct, overbridges and retaining walls, as well as trees. The presence of ponds, ditches and rubble piles and other potential hibernacula provides potential habitat for amphibians and reptiles. The railway line also crosses or passes near a river and a stream, which were thought to have potential for otter and water vole respectively. Surveys of the relevant watercourses undertaken by Atkins over a three month period did not find any evidence of otter or water vole in the sections surveyed (see Figure 1.5 and 1.8 for locations), although records of water vole and otter have been identified in the wider environment.
- 6.5.28 Nesting birds could potentially use any area of trees or scrub along the route. Japanese knotweed was recorded in this section.

Lea Green Road Access Point

- 6.5.29 The Lea Green Road site comprises an access track and area of access on to the railway line adjacent to an overbridge (refer to Appendix F3 for Phase 1 habitat plan sketch and target notes). The bank adjacent to the access track was predominantly bramble and common nettle with occasional herbaceous species. Bracken was dominant along the opposite margin, between the track and the adjacent field. The access area was predominantly hard standing (compacted ballast) and sloped gently down to the cess, providing an area to get plant machinery on to the track. The bank adjacent to the overbridge had spoil piles of ballast and wood chippings, but was otherwise dominated by dense bramble and creeping thistle. An established semi-mature oak was present close to the bridge abutment wall. Piles of trees trunks and concrete sleepers were present to one end of the access area, surrounded by bramble. Established trees and scrub were also present around the fenced margin of the site.
- 6.5.30 The oak tree was assessed as having low potential for bats as no obvious suitable features i.e. rots holes, splits or lifted bark, could be seen. The bridge had no obvious gaps or crevices and was in a good state of repair. It was therefore assessed as having negligible potential for bats.

Rainhill Station (Tasker Terrace) Access Point

- 6.5.31 The Rainhill site was mostly hard standing and has been used for a number years as a small municipal waste/recycling site(refer to Appendix F3 for Phase 1 habitat plan sketch and target notes). Two small buildings were present on site, in addition to a number of containers. Apart from ornamental hedges, no other vegetation was present within this part of the site. The signal box is located in a small fenced off area at the end of the site. This area was also hard standing with various piles of debris/spoil and partly colonised by opportunistic weed species and tall ruderals such as creeping thistle and tansy. A line of predominantly beech trees border the site.
- 6.5.32 The disused signal box and brick buildings within the waste site have low potential for bats. Birds may nest in the trees along the boundary of the site.
- 6.5.33 The land at Rainhill Station comprised area of predominantly tall ruderal vegetation with patches of bare ground and colonised hard standing. There is no potential for any protected species on this site.

Newton-le-Willows Distribution Site

- 6.5.34 The land at Newton-le-Willows distribution site comprises a well maintained tarmac hard standing with entrance gates at the western end (refer to Appendix F3 for Phase 1 habitat plan sketch and target notes). The northern boundary is separated from the adjacent housing by a fence which has a thick covering of ivy and a well maintained stone wall. A thin band of semi-mature broadleaved woodland, comprising sycamore, willows, ash, birch is present within the site adjacent to the stone wall, with limited ground flora below. A small area of rank grasses and tall

ruderals is growing adjacent to the fence/gate. The southern boundary of the site is separated from the railway by a chainlink fence, with young and semi-mature trees growing adjacent. The eastern boundary is separated from the railway by gates with a small area of ballast and a small patch of bramble scrub and grasses. The trackside at this site comprises young saplings and tall ruderals, including ash, sycamore, birch, willow sp. elder, rowan, bramble scrub, rosebay willowherb and hemp agrimony.

- 6.5.35 The thick ivy covering the fence is considered to offer low potential for bats. The site also offers some potential for nesting birds and the small areas of rubble and ballast present offer some potential for reptiles. No signs of mammal paths or invasive plant species were recorded and there are no non-isolated ponds within 500m.

DSE 72, 73, 75, 77, 77A, 83 and 90

- 6.5.36 The Whitcher Wildlife Ltd reports of these structures and their immediate surrounds assessed the structures as providing very little roosting opportunities for bats and that there are suitable habitats for breeding birds and reptiles. Atkins' inspection of DSE 83 confirmed that it had low potential to support bat roosts.
- 6.5.37 At DSE 83 three stands of Japanese knotweed were recorded.

DSE 71

- 6.5.38 The dusk/dawn bat surveys undertaken by Atkins at DSE 71 recorded common pipistrelle activity in the area of the bridge and utilising the heavily vegetation cutting slopes and gardens of adjacent properties. Due to Health and Safety restrictions associated with working adjacent to the bridge at night this necessitated the survey being undertaken from the top of the bridge on its south side, which provided a limited view of the track. One common pipistrelle was recorded flying at the entrance to the bridge, however, it could not be confirmed if it entered or flew away. No bats were recorded exiting the bridge during the dawn survey, therefore it is considered unlikely that the bat was roosting within the bridge.

DSE 89 Sankey Viaduct

- 6.5.39 A visual inspection of Sankey Viaduct was also undertaken to assess its potential for use by roosting bats. Each of the nine arches provide potential roosting opportunities in the form of gaps in the masonry, however, at the time of the survey water was observed dripping through this gaps with extensive water staining present. On the west and east side of the viaduct dense ivy is present which may provide roosting opportunities for bats. Also the parapets are in a poor condition with numerous exposed joints. There are also small (circa 20cm x 30m) holes in several locations beneath the parapets, although feral pigeons were observed utilising some of these holes. Both the gaps in the parapets and the holes are considered to provide roosting opportunities for bats.

Warrington

Statutory Designated Sites of Importance for Nature Conservation

- 6.5.40 Colliers Moss Common LNR is located immediately north of the railway. The LNR was designated in 2004 and is noted for its raised bog and lowland heath habitat. The site supports water vole, common lizard and a notable dragonfly assemblage.

Non-Statutory Designated Sites of Importance for Nature Conservation

- 6.5.41 Burtonwood Moss SINC/SBI is located immediately north of the railway line and is an example of a derelict raised mire (lowland raised bog). The site is a component of Colliers Moss Common LNR.
- 6.5.42 Hitchfield Wood SINC is located approximately 260m south of the railway line at its closes point and supports a mature mixed woodland with high ecological and community value.

Protected and Notable Species

- 6.5.43 A total of five records of water voles were identified the closest of which is on Glaze Brook approximately 60m upstream from the railway.
- 6.5.44 Three records of schedule 1 birds was also recorded within the 2km of the railway, the closest record being for barn owl (*Tyto alba*) approximately 140m south of the railway.
- 6.5.45 The two sections of line within the Warrington district will be dealt with separately. The first (western most) section had potential for a number of protected species. Roosting potential for bats was identified in trees and bridges. Areas of woodland have been identified with evidence of badgers. A large rabbit warren with potential signs of disturbance by badgers was also noted and recommended for further investigation.
- 6.5.46 A total of three monitoring visits were undertaken of the area identified by Jacobs as a potential sett and area of badger activity over a period of four months. The survey area is shown on Figure 1.7 in Appendix A. The potential sett identified by Jacobs showed no evidence of badger use and is considered to be associated with the rabbit activity in the area. No other evidence of badger activity was recorded. However, badger records exist in the wider environment and therefore it is considered likely that badgers will use the railway for crossing and or foraging activities.
- 6.5.47 Trees and scrub along the route could support nesting birds, with habitats suitable for reptiles. A number of waterbodies were recorded within the vicinity of the railway line, which could support amphibians.
- 6.5.48 The second section had potential for a number of protected species. The habitat was noted as having the potential to support reptiles including piles of sleepers, which could offer refuge. A number of ponds were noted, which could support amphibians. An area of land adjacent to the track was recommended for survey, should it be required as a laying down area as the habitats present have the potential to support amphibians and reptiles (see Kenyon Access below). Potential for bats was recorded in bridges, trees and an underpass. The trees, scrub and hedgerow will offer potential habitat for nesting birds. Occasional stands of Japanese knotweed were also noted.
- 6.5.49 At the far eastern extent on the boundary with Wigan a watercourse with potential to support otters/water voles was noted by Jacobs. Surveys of the relevant watercourse undertaken by Atkins over a three month period did not find any evidence of otter or water vole in the section surveyed (see Figure 1.11 for location), although records of water vole and otter have been identified in the wider environment.

Kenyon Junction Access Point

- 6.5.50 There is a large and open area of existing hard standing that was originally a separate railway line that joined the DSE line at this point (refer to Appendix F3 for Phase 1 habitat plan sketch and target notes). The site is surrounded by trees and scrub. One pond was identified immediately adjacent to the compound access track. No other ponds were visited during the survey as they all lie on private land with no access permission. No other specific issues were identified.
- 6.5.51 This is a large site comprising hard standing, bare partly colonised ground, tall ruderal, marshy vegetation, scrub and established trees. An access track is present from the gated road access to the railway access point at the tip of the site. The undisturbed areas appear to be relatively unimproved with fly agaric and common puffball fungi noted under small stands of birch.
- 6.5.52 A strip of shaded marshy vegetation was noted. This was dominated by hard rush and mosses with small puddles of standing water, shaded either side by oak and silver birch. An area of tall ruderals is present on recolonised rubble (old bricks). The boundary of the site was colonised by established trees (oak, hawthorn and silver birch) and scrub with a fringing ground flora of species such as black medick, selfheal and common field speedwell. Species such as rosebay

willowherb, colt's foot, yarrow and ribwort plantain were colonising bare areas. A small stand of Japanese knotweed was recorded on site.

- 6.5.53 Habitats on site had potential for reptiles and great crested newts. No evidence of badger was recorded and there were no watercourses on site. The site could support an interesting invertebrate assemblage due to the habitat mosaic and structural diversity present. The trees and scrub could provide habitat for nesting birds.

DSE 86

- 6.5.54 The Whitcher Wildlife Ltd report of this structure and its immediate surrounds assessed the structure as providing very little roosting opportunities for bats and that there are suitable habitats for breeding birds and reptiles.
- 6.5.55 Atkins' inspection of this bridge confirmed that it has low potential to support roosting bats.

Wigan

Statutory Designated Sites of Importance for Nature Conservation

- 6.5.56 The Manchester Mosses SAC is located immediately north of the railway line and qualifies by the presence of the Annex I habitat 'degraded raised bogs still capable of natural regeneration'.
- 6.5.57 Astley and Bedford Mosses SSSI is located immediately north of the railway line and is a component of the Manchester Mosses SAC. The site is a lowland raised bog and noted for its modified mire communities, heathland, woodland and acidic grassland. The site is important for wintering raptors and supports breeding curlew, long-eared owl and possibly nightjar.
- 6.5.58 Highfield Moss SSSI is bisected by the railway line. The site is a lowland raised bog and noted for its mixed valley mire communities, acidic marshy grassland and unimproved acidic grassland. The site supports a notable population of marsh gentian and a notable dragonfly assemblage.

Non-Statutory Designated Sites of Importance for Nature Conservation

- 6.5.59 There are four non-statutory designated sites of importance for nature conservation within 500m of the railway. Three of the sites lie immediately north or south of the railway and Highfield Moss SBI is bisected by the railway.

Protected and Notable Species

- 6.5.60 A record of common pipistrelles foraging within 500m of the railway has been identified. There are three records of water voles, the closest of which is approximately 50m south of the railway and one record of common lizard (*Zootoca vivipara*) approximately 400m to the north of the railway.
- 6.5.61 The two sections within the Wigan local authority area are dealt with separately. The section between St Helens and Warrington has the potential to support amphibians due to the presence of a number of waterbodies within close proximity of the route. One tree and a small number of bridges with potential for bats were also recorded. Habitat with a mosaic of scrub and heath and therefore potential for reptiles was noted. The trees and scrub along the railway verge will offer potential habitat for nesting birds. A brown hare (UK species of principal importance for the conservation of biodiversity) and remains of a short eared owl were also recorded within this section.
- 6.5.62 The section with Warrington and Salford districts either side had a number of target notes relating to features suitable for reptiles and amphibians, such as water bodies and habitat with good structural diversity. A number of ditches with both running and standing water were noted. None of these were stated as having potential for water vole, although they may support amphibians. Potential for bats in the section were recorded in trees, bridges, an underpass and a building. A record of brown hare (UK species of principal importance for the conservation of biodiversity) and a mammal crossing point was also identified.

Highfield Moss SSSI

- 6.5.63 Highfield Moss SSSI comprised areas of marshy habitat, with moss, rushes and herbaceous species, areas of heath with bracken, and expanses of grassland dominated by purple moor grass (refer to Appendix F3 for Phase 1 habitat plan sketch and target notes). The designation includes part of the railway verge. The railway verge within the extent of Highfield Moss SSSI comprised either bracken or bramble scrub with scattered individual trees or grassland with tall ruderals. An area of oak woodland over bracken and an area dominated by moss and heather were also present.
- 6.5.64 The moss and verges had potential for reptiles and amphibians. Waterbodies are present within Highfield Moss SSSI. Occasional mature oaks are present within the area of oak woodland and had low potential for bats. Although no evidence of badger was found during the survey, the oak wood within the SSSI and on the railway verge would offer suitable sites for a sett. Nesting birds could use the trees, scrub and open mossland for nesting. A brown hare was seen crossing the track.

Astley and Bedford Mosses SSSI

- 6.5.65 The railway verge adjacent to this site typically comprised established trees with scrub and tall ruderals, such as bracken, rosebay willowherb and Himalayan balsam (refer to Appendix F3 for Phase 1 habitat plan sketch and target notes). Tree species included oak, silver birch and goat willow.
- 6.5.66 Himalayan balsam and rhododendron were recorded on site. A number of drains and waterbodies are present in the surrounding landscape. Given the vegetation present the verges could provide terrestrial habitat for great crested newts and offer refuge for grass snake, although generally the verge habitat was poor for reptiles due to the lack structural diversity and consequently basking opportunities. Mature trees within the verge could offer roost sites for bats, although those noted were of low potential with few suitable features. No evidence of badger was seen on site although the woodland areas would be suitable. The trees and scrub could support nesting birds.

Astley Distribution Site Option 1

- 6.5.67 The land at Astley Option 1 lies within the Network Rail boundary with an entrance gate at the western end of the site with a small line of semi-mature willows with a ground flora of nettles and bracken (refer to Appendix F3 for Phase 1 habitat plan sketch and target notes). At the top of the embankment the vegetation is dominated by tall grasses and ruderals, rosebay willowherb and bramble scrub. On the embankment there are scattered semi-mature broadleaved trees of elder and goat willow with a ground flora of nettles and bracken.
- 6.5.68 The vegetation within the site offers nesting bird habitat with some potential for reptiles on the embankment. There are four drains which were dry at the time of the survey and eight more within 500m which were not viewable. Several ponds are present in the area; however, the closest to the site is approximately 495m away. No signs of mammal paths or invasive plant species were recorded.

Astley Distribution Site Option 2

- 6.5.69 The land at Astley Option 2 lies outside the Network Rail boundary at the edge of an arable field with nettles and bracken forming the boundary between the field and the embankment (refer to Appendix F3 for Phase 1 habitat plan sketch and target notes). A ditch which was dry at the time of the survey lies adjacent to the site and is bordered by semi-mature willows, elder, birch and rowan.
- 6.5.70 The site is within an arable field and therefore offers limited potential for protected or notable species, although the site lies within close proximity to several ditches, some of which were dry at the time of the survey. Several ponds are present in the area; however, the closest to this site is approximately 499m away and is separated from the site by arable fields and a cluster of buildings

and associated hard standing. No signs of mammal paths or invasive plant species were recorded.

Astley Distribution Site Option 3

- 6.5.71 The land at Astley Option 3 lies within the Network Rail boundary to the south of the rail tracks (refer to Appendix F3 for Phase 1 habitat plan sketch and target notes). The top of the embankment comprises rank grasses, bracken and tall ruderals including rosebay willowherb and birch saplings. Further down the embankment semi-mature willows and bracken is present with numerous rabbit burrows. A mature beech is present in the northwest corner of the site behind the signal box. The tree limbs were twisted, although no cracks or crevices were observed.
- 6.5.72 At the toe of the embankment is a drain which appeared to be approximately 30cm deep with deep silts expected and appears to be fed by adjacent field drains. No signs of mammal burrows were recorded on the southern bank of the drain although access restricted views of the northern bank, although Himalayan balsam was present. The drain passes through a brick culvert to the east of the site below the road and appears to be in a good state of repair. A second culvert was recorded below the railway although limited access restricted its view.
- 6.5.73 The vegetation within the site offers nesting bird potential as does the south facing slope of the embankment for reptiles. Although access was restricted the culverts may provide potential bat roosting opportunities and the drain may offer suitable habitat for water voles although the absence of burrows on the southern bank would imply that they are not present.
- 6.5.74 The site lies within close proximity to a number of ditches and ponds. Several ponds are present in the area, however, the closest to this site is approximately 380m away and is separated from the site by arable fields and the railway embankment.

DSE101

- 6.5.75 The Whitcher Wildlife Ltd survey of DSE Bridge 101 recorded that the railway runs through a deep cutting to either side of the railway line with cutting sides that support dense bramble and scattered scrub. The bridge is a brick arched structure with no potential for roosting bats. There are signs at the disused access point adjacent and throughout the cutting warning that this is a legally protected environmental site.

Salford

Statutory Designated Sites of Importance for Nature Conservation

- 6.5.76 Worsley Woods LNR is located approximately 1.99km north of the railway at its closest point and is noted for its woodland ponds.
- 6.5.77 Trafford Ecology Park LNR is located approximately 1.04km south of the railway line at its closest point and exhibits a diverse range of habitats including wetland, woodland. Great crested newts have been introduced to the site.

Non-Statutory Designated Sites of Importance for Nature Conservation

- 6.5.78 There are a total of 3 non-statutory designated sites of importance for nature conservation within 500m of the railway. The Bridgewater Canal SBI flows under the railway, Botany Bay Wood SBI (candidate SSSI) is located immediately north of the railway and Twelve Yards Road SBI lies approximately 40m south of the railway.

Protected and Notable Species

- 6.5.79 Two records of bats were identified within 500m of the railway the closest being a Daubentons spc, located approximately 75m south of the railway.
- 6.5.80 A total of three records of water voles were identified the closest of which is approximately 350m south of the railway.

- 6.5.81 A record of black redstart (*Phoenicurus ochruros*) was identified approximately 325m southeast of the railway.
- 6.5.82 Within the Salford local authority district there is potential for bats in trees, overbridges and retaining walls. A number of ponds, ditches and drains provide potential habitat for amphibians. Also occasional areas of scrub and rough grassland mosaic and potential refuges in the form of piles of sleepers provide habitat for reptiles. Breeding birds could use the trees, scrub and bridges in the section for nesting. Evidence of raptor kills and pellets have been recorded in this section. A mammal crossing, thought to be fox, was also noted and Japanese knotweed is present in this section.

DSE 123

- 6.5.83 The Whitcher Wildlife Ltd survey of DSE Bridge 123 states that the bridge comprises a metal deck with metal parapets and carries a public footpath over the DSE railway line. The brickwork of the bridge appears to be in good condition with no cracks or gaps. The vegetation around the bridge comprises mainly weeds with long grass. There are a number of semi mature trees, including sycamore, hazel, beech and ash growing around the north end of the bridge.
- 6.5.84 Atkins' inspection of this bridge confirmed it has low potential to support roosting bats.

DSE 124

- 6.5.85 The Whitcher Wildlife Ltd survey of DSE Bridge 124 states that the bridge comprises a metal deck with metal parapets and brick abutments and carries the Old Wellington Road over the DSE railway line. The brickwork of the bridge appears to be in good condition with no cracks or gaps. The vegetation around the bridge comprises mainly semi mature trees and scrub including sycamore, ash and elder. There are some weeds and long grass growing along the sides of the railway line.
- 6.5.86 Atkins' inspection of this bridge confirmed it has low potential to support roosting bats.

DSE 125

- 6.5.87 The Whitcher Wildlife Ltd survey of DSE Bridge 125 states that the bridge comprises a metal deck with brick parapets and brick abutments and carries the Albert Road over the DSE railway line. There are brick jack arches under the bridge deck. The brickwork of the bridge appears to be in good condition with no cracks or gaps. The vegetation growing around the bridge is mainly semi mature trees and scrub, including sycamore, rowan and silver birch. There are some weeds and long grass growing along the sides of the railway line.
- 6.5.88 Atkins' inspection of this bridge confirmed it has low potential to support roosting bats.

DSE 129

- 6.5.89 The Whitcher Wildlife Ltd survey of DSE Bridge 129 states that the bridge comprises a steel deck that carries Stott Lane over the DSE railway line. The cutting side on the up side of the line is steep and supports bramble with trees and scrub further up the cutting side. On the down side there is a vehicle access track with overhanging willow and birch trees. Approximately 300m to the east of the bridge there is a clump of Japanese knotweed growing immediately adjacent to the vehicle access track, on the down side of the line.

DSE 131

- 6.5.90 The Whitcher Wildlife Ltd survey of DSE Bridge 131 states that to the east of the bridge there is a retaining wall, then an area of level ground adjacent to the line before another retaining wall. At the far end of that retaining wall, 320 yards past the bridge a very large clump of Japanese knotweed starts. No other ecological issues were identified.

DSE 133

- 6.5.91 The Whitcher Wildlife Ltd survey of DSE Bridge 133 states that on the up side of the line there is a steep cutting side that supports dense bramble and scrub to the east of the bridge. At approximately 80m away from the bridge there is a very large clump of Japanese knotweed that extends all the way towards DSE 131 and the start of the retaining wall.
- 6.5.92 To the east of the bridge there is an access point although this is not listed for use within this project.

DSE 138 and Windsor Street Access Point

- 6.5.93 The Whitcher Wildlife Ltd survey of DSE Bridge 138 states that the access via Windsor Street comprises an existing track and compound, all hard standing surfaces. There are a few small herbs growing through the hard core and the site is surrounded by bramble and scrub. No ecological issues were identified. On the up side of the line there is a steep cutting side supporting scrub with a retaining wall at the top. On the down side of the line there is a wide cess with overhanging willow and birch scrub. To the west of the bridge and access compound there is an old stone bridge with concrete retaining walls either side. This extends for some distance and access was not possible as there was insufficient width of cess. At the far end of the concrete walls there is a clump of Japanese knotweed on the up side of the line.

Eccles Signal Box Access Point

- 6.5.94 The Whitcher Wildlife Ltd survey of Eccles Signal Box access identified the presence of a number of stands of Japanese knotweed on the cutting slope immediately adjacent to the line. No other ecological constraints were noted.

Manchester

A small section at the eastern end of the line falls within the Manchester City Councils area, where the line reaches Victoria Station and the Deansgate branch viaduct. Here the line is located in the developed heart of Manchester and splits at the Liverpool Road junction (SJ 826 979).

Statutory Designated Sites of Importance for Nature Conservation

- 6.5.95 There are no statutory designated sites of importance for nature conservation with 2km of the railway.

Non-Statutory Designated Sites of Importance for Nature Conservation

- 6.5.96 There are no non-statutory designated sites of importance for nature conservation with 500m of the railway.

Protected and Notable Species

- 6.5.97 Two records of bats were recorded within 500m of the railway, these are of pipistrelle bat activity and a possible daubentons bat roost located approximately 20-30m east of the railway on an adjacent bridge. No further detail was provided regarding these records.

Ordsall Lane Distribution Site

- 6.5.98 The land at Ordsall Lane lies within the Network Rail boundary to the north of the rail tracks (refer to Appendix F3 for Phase 1 habitat plan sketch and target notes). The majority of the site comprises scattered and pockets of more densely growing semi-mature broadleaved trees of bird cherry, willow sp., rowan, elder and scrub (scattered broom and more dense pockets of hawthorn and bramble). A palisade fence forms the northern boundary with the road. Between the site and tracks is a mixture of bare ground and grass with rosebay willowherb, cocksfoot, ribwort plantain, ground ivy. Tracksides, are short grasses and occasional young willows.
- 6.5.99 To the north west of the site (non railway land) is an area of fenced off waste ground with ephemeral vegetation, including occasional buddleia and elder scrub. At the western end of the

site is a wall with a thick covering of ivy which may offer some possible bat roost potential. At the eastern end of the site the railway crosses above a road. Crevices in the bridge were present although the road beneath the railway is very busy and is considered to be of low bat roost potential.

- 6.5.100 No evidence of mammal activity was recorded at the site, no suitable waterbodies for great crested newts have been recorded within 500m of the site and no invasive plant species were identified.
- 6.5.101 The site offers potential for nesting birds, reptiles in open areas to the south of the site and the low bat roost potential in the road bridge and ivy covered wall.

MVM 3

- 6.5.102 This structure is of steel construction and was inspected for its potential to support roosting bats by Atkins. The bridge provides some cracks and crevices and is considered to provide low potential for roosting bats.

COL MSJA Viaduct

- 6.5.103 This structure is of a brick construction and was inspected for its potential to support roosting bats by Atkins; however, due to the urban nature of the site and the use of brick arches as workshops a full inspection could not be undertaken. The bridge provides some cracks and crevices and there are arches that have been bricked up, although some entry points remain. The bridge is considered to provide low potential for roosting bats.

COL 103A and COL 103B

- 6.5.104 These structures are both viaducts which run over the Manchester to Liverpool line (also on viaduct) and comprise a metal deck with metal and brick abutments. Due to the urban nature of the surrounding area, with buildings beneath the structures access is greatly restricted, however, the bridges appear to offer low potential for bats.

UK BAP Priority Habitats – Scheme Wide

- 6.5.105 There are 20 UK BAP Priority Habitats within 500m of the site. These include lowland raised bog, lowland heathland, Fen, lowland meadow, lowland acidic dry grassland, purple moor grass and rush pasture, woodland and grassland, with lowland meadow and lowland acidic dry grassland within the railway boundary. The details of the locations of these habitats in relation to the railway are provided in Appendix F5.

Ponds – Scheme Wide

- 6.5.106 Between Liverpool and Manchester the railway runs in the main through rural and urban environments meaning that there are numerous ponds within 500m of the railway with 70 immediately adjacent to or within 250m of the railway boundary.

NBN Gateway Records – Scheme Wide

- 6.5.107 The NBN Gateway provides records of protected or notable species within a 10km square grid. As such due to the linear nature of the site this data has not been identified to a council area but is provided for the appropriate 10km square grid. The species records identified are provided in Appendix F6.

Nature Conservation Evaluation

- 6.5.108 There are eight sites within approximately 2km of the scheme which are subject to statutory designations for nature conservation (refer to Figures 1.1 – 1.18 in Appendix A). The Manchester Mosses SAC is of international importance, the SSSI are of national importance and the LNR are of regional importance.

- 6.5.109 The thirty eight non-statutory designated sites (SBIs, LWS and SINCS) located within 500m of the scheme are of importance for nature conservation within a regional context.
- 6.5.110 Any waterbodies with breeding populations of great crested newts are of importance for nature conservation in a Local (parish) context.
- 6.5.111 The presence of waterbodies including streams and brooks adjacent to the site, the rural environments through in which the site lies and the suitable commuting routes for bats along the railway makes the site (railway) of potential importance for foraging bats within a Local (parish) context.
- 6.5.112 The UK BAP priority habitats adjacent to and within the site (Highfield Moss SSSI) are of importance in a national context.
- 6.5.113 The remaining habitats within the site, including those habitats within the footprint of the works that are not designated, are common and widespread in the UK and of negligible nature conservation value.

6.6 Key Environmental Issues

- 6.6.1 The key ecological issues associated with the proposed scheme, with the exception of specific designated sites listed below, are relevant along the full length of the railway. For this reason these issues have not been separated into different local authority areas.

Key Ecological Construction Issues

Statutory and Non-Statutory Designated Sites of Importance for Nature Conservation

- 6.6.2 Astley and Bedford Mosses SSSI is a component of the larger Manchester Mosses SAC which lies immediately adjacent to the northern boundary of the site. There will be no direct impacts to the SSSI/SAC as it is located outside the boundary of the site, however, due to its close proximity there is the potential for adverse impacts to occur through construction dust, noise and water pollution.
- 6.6.3 At Highfield Moss SSSI the embankments are included within the SSSI boundary. The length of railway within the SSSI is approximately 800m and comprises a total area of approximately 2 hectares, approximately 9% of the overall SSSI. As such, although minor in nature the works will have a direct impact on this site through the permanent loss of land taken up by the footprint of new OLE gantry footings. In addition to the loss of land from within the SSSI there is the potential for adverse impacts to occur through construction dust, noise and water pollution.
- 6.6.4 Colliers Moss Common LNR will not be directly impacted by the proposed scheme. However, due to its close proximity to the site there is the potential for adverse impacts to occur through construction dust, noise and water pollution.
- 6.6.5 There are numerous non-statutory designated sites along the length of the site, several of which lie adjacent to the railway boundary. No land-take will be required outside of the railway boundary and therefore there will be no direct impacts to these sites of importance for nature conservation. However, the construction of the gantries, track lowering and vegetation clearance may result in temporary, indirect impacts through a reduction in air quality, raised noise levels and potential pollution incidents, although it is not anticipated that these would be significant.

Habitats

- 6.6.6 The railway runs through Highfield Moss SSSI with acid grassland present on the railway embankments, which is a UK BAP priority habitat and a feature of the SSSI. As such the proposed works will result in the potential permanent loss of a small area of this habitat due to the construction of gantry footings, although this will be negligible in terms of total area of acid grassland present.

- 6.6.7 With the exception of the Highfield Moss SSSI there are no habitats within the site that are considered to be of particular ecological value as they are widespread and common at a local and national level. For this reason habitats are not discussed further within this assessment.

Great Crested Newts

- 6.6.8 Within 250m of the railway there are numerous waterbodies several of which have records of great crested newts. Although records are limited, these waterbodies may offer suitable breeding habitat for great crested newts and the habitats within the railway boundary also offer suitable places of shelter. The majority of the anticipated work will take place from the track and within the cess, with limited disturbance to the soft estate which proves the highest quality terrestrial habitats for great crested newts within the Network Rail boundary.
- 6.6.9 Therefore, on the basis of specialist knowledge and experience working with the species concerned, it is considered on balance that the proposed works are reasonably unlikely to result in an offence under Regulation 41 of the Conservation of Habitats and Species Regulations 2010 and no Natural England development licence is required. Similarly it is considered reasonably unlikely that works will result in disturbing a great crested newt in its place of shelter or obstructing access to such a place and therefore the proposed works are reasonably unlikely to result in an offence under the Wildlife & Countryside Act 1981.

Bats

- 6.6.10 There are a total of 51 identified structures which will be affected by the proposed works in some form. Of these structures the majority have been confirmed as having low or no potential to support roosting bats (including Broad Lane bridge identified by Helen Lacey of WBC). For DSE 71 the dusk/dawn surveys undertaken were not conclusive for the presence of bats.
- 6.6.11 Therefore, on the basis of specialist knowledge and experience working with the species concerned, it is considered on balance that the proposed works to those bridges which have been inspected are reasonably unlikely to result in an offence under Regulation 41 of the Conservation of Habitats and Species Regulations 2010 and no Natural England development licence is required.
- 6.6.12 For those structures where works have come to light late in the assessment process and as a result confirmation inspections have not been undertaken (see section 6.3.28) further assessment will be required. Should bats subsequently be identified as being present within these structures the proposed works may result in negative impact to occur.
- 6.6.13 In addition to bridge structures the target notes produced by Jacobs identified in the region of 130 trees or groups of trees with potential to support bats. Some of these are further defined as having low, medium or high potential for bats. There is therefore potential for negative impacts to occur if trees containing bat roosts are damaged during vegetation clearance works for new gantries or to provide safety clearance from new electrified wires.

Water Voles

- 6.6.14 No evidence of water voles was recorded along the three watercourses (unnamed watercourse, Sankey Brook and Glaze Brook) surveyed. However, the desk study has identified that there are records of water voles within 500m of the railway. Although there will be no direct works to watercourses associated with the works, there is potential for pollution incidents to occur which may have a detrimental impact on any water vole populations that may be present downstream of the railway.

Otters

- 6.6.15 No evidence of otters was recorded along the three watercourses (unnamed watercourse, Sankey Brook and Glaze Brook) surveyed. Although there will be no direct works to watercourses

associated with the works the potential for pollution incidents to occur remains which may have a detrimental impact on any otters utilising the watercourses.

Breeding Birds

- 6.6.16 The proposed scheme will result in the localised loss of habitat suitable for nesting birds (trees, scrub, etc) up to 7m from the track. Overall the loss of suitable breeding habitat will be minimal in the context of the wider environment for the majority of the route. However, in the short to medium term there will be a slight reduction in available breeding habitat and localised increases in noise levels.

Badgers

- 6.6.17 The surveys undertaken by Jacobs in January 2010 recorded a potential badger sett, however, surveys undertaken by Atkins between September 2010 and January 2011 concluded that this was not a sett, however, records of badgers have been identified within the wider environment.
- 6.6.18 Over 12 months will have elapsed since the Jacobs survey of the route was undertaken before the proposed scheme is commenced and therefore there is the potential that new setts will have been created within the railway boundary. Also, where works involving machinery will be within 20-30m of the railway boundary any setts which lie immediately adjacent to the railway boundary may be disturbed.

Reptiles

- 6.6.19 The surveys undertaken by Jacobs in January 2010 identified suitable habitat for reptiles throughout the stretch of the railway between Liverpool and Manchester and records of common lizard and grass snake were identified outside of the railway boundary. Should reptiles be present within the railway boundary, access and the excavations associated with gantries may have a negative impact on any reptiles present.

Invasive plants

- 6.6.20 The report produced by Jacobs identified Japanese knotweed within the Network Rail boundary at numerous locations between Liverpool and Manchester. The limited Atkins surveys recorded Himalayan balsam and rhododendron within the site and Whitcher Wildlife Ltd recorded Virginia Creeper at DSE 52. Since the Jacobs report was written there have been changes to the species list included within the list of controlled plants in schedule 9 of Wildlife and Countryside Act 1981. In addition, over 12 months will have elapsed since the Jacobs survey was undertaken before the proposed scheme is commenced increasing the probability that new invasive plants will be present and existing invasive species will have spread further.

Key Ecological Operational Issues

- 6.6.21 During the operational phase of the scheme it is not anticipated that there will be any potential key ecological issues because the operational impacts to the identified ecological receptors will be similar to those currently experienced.

6.7 Mitigation

- 6.7.1 The key ecological issues associated with the proposed scheme, with the exception of Manchester Mosses SAC, Astley and Bedford Mosses SSSI and Highfield Moss SSSI, are relevant along the full length of the railway. For this reason these issues have not been separated into different Local Authority areas.
- 6.7.2 A wildlife and habitats management plan will be prepared for the scheme as part of the CEMP. This will capture the mitigation requirements below and facilitate communication to the construction team for implementation on site.

Statutory and Non-Statutory Designated Sites of Importance for Nature Conservation

- 6.7.3 The Manchester Mosses SAC, of which Astley and Bedford Mosses SSSI is a component is located immediately north of the railway line and is a component of the Manchester Mosses SAC. Due to the proximity of the site to the railway a Habitats Regulations Assessment (HRA) screening of the proposed works will be required and approval gained from Natural England.
- 6.7.4 For Highfield Moss SSSI a section 28H notice and a section 28H assent will be required from Natural England prior to the commencement of site works. This will allow the consent of works within the SSSI boundary and the permanent loss of the habitats. In consultation with Natural England it was agreed that although small areas of SSSI habitat will be lost the mitigation measures will be focused on standard working practices in relation to pollution (as detailed below) and the minimisation of disturbance to the SSSI and re-instatement of any disturbance. These issues will be dealt within in the section 28H notice and assent.
- 6.7.5 With regards to the potential for adverse impacts to occur on statutory and non-statutory designated sites of importance for nature conservation adjacent to or within close proximity to the railway boundary through dust, noise and water pollution incidents these will all be appropriately mitigated through strict adherence to the project Noise and Vibration Management Plan and Pollution Incident Control Plan, prepared by the contractor as part of the CEMP. In particular reference will be made to the Environment Agency Pollution Prevention Guidelines (PPGs). Of particular note are the following:
- Environment Agency PPG 1 - General Guide to the Prevention of Pollution;
 - Environment Agency PPG 5 - Works in, near or liable to affect Watercourses;
 - Environment Agency PPG 6 - Working at Construction and Demolition Sites;
 - Environment Agency PPG 8 – Safe Storage and Disposal of Used Oils.
- 6.7.6 These measures will mitigate the potential for pollution incidents that could have negative impacts on the designated sites.

Great Crested Newts

- 6.7.7 As identified above there are numerous waterbodies within 250m of the site, several of which have records of great crested newts. Although records are limited, these waterbodies may offer suitable breeding habitat for great crested newts and the habitats within the railway boundary also offer suitable places of shelter. The majority of the anticipated work will take place from the track and within the cess, with limited disturbance to the soft estate which proves the highest quality terrestrial habitats for great crested newts within the Network Rail boundary. Therefore on the basis of specialist knowledge and experience of working with the species it is considered on balance that the proposed works are reasonably unlikely to result in an offence.
- 6.7.8 However, this cannot be guaranteed and therefore a Precautionary Method of Working (PMW) in respect of great crested newts will be implemented prior to the commencement of works. This will involve hand searches of areas where the risk of great crested newts is increased due to the presence of ponds within 250m. A copy of the draft PMW is provided in Appendix F7 of this report.
- 6.7.9 Based on the location of waterbodies and their connectivity to the railway and subject to the final locations of gantries the PMW will be implemented at the locations listed below where waterbodies lie within 250m of the railway. These areas are shown on Figures 1.1 – 1.18 in Appendix A:
- SJ380900 – SJ382901;
 - SJ459908 – SJ464909;

- SJ478911 – SJ483912;
- SJ501917 – SJ505918;
- SJ514922 – SJ516923;
- SJ527928 – SJ532930;
- SJ538933 – SJ558942;
- SJ561943 – SJ568946;
- SJ575950 – SJ579951;
- SJ599953 – SJ615957;
- SJ625959 – SJ650965;
- SJ658967 – SJ665968;
- SJ680969 – SJ749985;
- SJ790986 – SJ791986.

Bats

- 6.7.10 Further survey work will be undertaken on the following affected structures prior to implementation of the scheme to check that the bat potential is no more than low. This will initially comprise a daytime inspection from track level for all bridges except DSE40, which will include emergence and re-entry surveys due to its potentially greater suitability for bats.
- DSE 40
 - DSE 68
 - DSE 77
 - DSE 82
 - DSE 101
 - DSE 131
 - DSE 133
 - DSE 136
 - DSE 140
- 6.7.11 Should bats subsequently be identified as being present within any of these structures there may be a requirement for a bat licence to be obtained from Natural England. All the above bridges will require attachments for OLE and the precise method of fixing will need to be taken into account in assessing the need or otherwise to undertake works under license.
- 6.7.12 For all bridges identified as having low potential for bats, the works will be undertaken under a PMW (refer to Appendix F7). This applies to the following structures (and any of the above list subsequently confirmed as having low potential):
- DSE 83
 - DSE 86
 - DSE 89
 - DSE 123
 - DSE 124

- DSE 125
- MVM 3
- COL MSJA
- COL 103A
- COL 103B

- 6.7.13 Removal of any trees for the distribution sites, and lineside trees required to ensure sufficient clearance between electrified wires, will be undertaken under a PMW, as set out in Appendix F7.

Water Voles & Otters

- 6.7.14 The mitigation measures outlined above for designated sites will mitigate any potential impacts to water voles and otters as there will be no direct impacts to the watercourses.

Breeding Birds

- 6.7.15 Significant vegetation clearance will be required to ensure the safe running of the railway once overhead lines have been installed. The Work Package Plan (method statement) for this activity will be used to ensure that this clearance is kept to the minimum practicable. For instance low lying vegetation such as small shrub/trees and brambles will be retained where they will not interfere with the electrified lines. Selective clearance will be undertaken by the contractor to maintain as much vegetation as possible.
- 6.7.16 In order to mitigate the potential impact of vegetation clearance on breeding birds, all clearance works or disturbance of vegetation capable of supporting breeding birds should, if practicable, take place outside of the nesting bird season (which is approximately February to September depending on seasonal variation). If this is not possible, the areas to be cleared should be searched immediately prior to clearance works (within 24 hours) by an ecologist to ensure that no nests are present. If active nests are found to be present they must be left in situ and protected with a 4m buffer zone until any young birds have fledged the nest.

Badgers

- 6.7.17 On commencement of the construction works for the scheme over 12 months will have elapsed since the Jacobs survey was undertaken, therefore as badgers are a mobile species there is the potential that new setts will have been created within the railway boundary. Also, where works involving machinery will be within 20-30m of the railway boundary any setts which lie immediately adjacent to the railway boundary may be disturbed. Each sett found will need to be assessed for potential disturbance on a case-by-case basis.
- 6.7.18 For these reasons prior to commencement of works the railway should be checked for evidence of badgers. In addition where works involving machinery will be within 20-30m of the railway boundary a check should be made outside of the railway boundary for setts.
- 6.7.19 Where excavations are to be left open overnight, a means of escape should be provided for any mammals that may become trapped, for example, a plank of wood.
- 6.7.20 These measures are included within the PMW for the scheme in Appendix F7.

Reptiles

- 6.7.21 Due to the nature of the works which will be localised to small areas at approximately 50m intervals immediately adjacent to the line, reptiles may be directly impacted should they be present. It is considered that appropriate mitigation will be for vegetation clearance to be undertaken under a PMW, which will involve hand searching suitable habitats prior to clearance and construction works. A copy of the PMW is provided in Appendix F7 of this report.

Invasive Plants

- 6.7.22 Japanese knotweed is abundant along the proposed works and Himalayan balsam, species of cotoneaster and rhododendron have also been recorded. Therefore, the proposed works could potentially result in the spread of these species which may result in an offence under the Wildlife and Countryside Act, 1981 (as amended). Therefore to mitigate this, prior to commencement of any ground disturbing works within a given worksite, the presence of invasive plant species which may be impacted by the proposed works will be identified and appropriate measures implemented.
- 6.7.23 In dealing with Japanese knotweed and Himalayan balsam, the Environment Agency (EA) guidance document – ‘Managing Japanese knotweed on development sites – the knotweed code of practice’²⁴ will be followed.
- 6.7.24 For rhododendron measures should be implemented to control its spread within the site. In controlling the spread of rhododendron it is recommended that the Forestry Commission (FC) guidance document – ‘Managing and controlling invasive rhododendron’²⁵ is followed and that all contractors have a proven track record and provide indemnity, and if considered necessary, warranties for their work.

Generic Mitigation Measures

- 6.7.25 An ecological toolbox talk will be given to all site personnel prior to the commencement of any works in order to ensure that all site personnel are fully aware of ecological constraints within the site.

6.8 Environmental Impact Assessment

- 6.8.1 An assessment of the significance of the potential impacts outlined above have been undertaken assuming that the mitigation measures described above are fully implemented.

Statutory and Non-Statutory Designated Sites of Importance for Nature Conservation

- 6.8.2 Due to the close proximity of the SAC a HRA screening of the proposed scheme will be required and approval from Natural England obtained prior to commencement of the works. Assuming the HRA screening is consented by Natural England this will confirm that the proposed OLE will not have a negative impact on the features for which the SAC is designated.
- 6.8.3 Within Highfield Moss SSSI the proposed gantries will result in the small loss of acidic grassland as the railway embankments are included within the SSSI boundary. The OLE will result in the direct loss of a small area of acidic grassland from within the SSSI, however, this is likely to be habitat of poorer quality as it is located immediately adjacent to the railway line. If the works are undertaken in accordance with the mitigation outlined above the potential for adverse impacts to occur through pollution incidents will be minimal. Overall, there will be a very localised long term negative impact on the acid grassland, within the SSSI and the site which are not significant in relation to the integrity of the SSSI. The confidence level of this prediction is certain (>95 %).
- 6.8.4 For Highfield Moss SSSI a section 28H notice and a section 28H assent will be obtained from Natural England prior to the commencement of site works.
- 6.8.5 Taking into account the mitigation measures outlined above the residual negative impacts on the designated sites identified above is assessed as not significant in terms of the integrity of each of the sites. The confidence level of this prediction is certain (>95 %).

²⁴ http://environment-agency.co.uk/static/documents/Leisure/japnkot_1_a_1463028.pdf

²⁵ [http://www.forestry.gov.uk/pdf/fcpg017.pdf/\\$FILE/fcpg017.pdf](http://www.forestry.gov.uk/pdf/fcpg017.pdf/$FILE/fcpg017.pdf)

Great Crested Newts

- 6.8.6 Great crested newts are a European Protected Species (refer to Appendix F8 Legislation Summary) and are listed as a principal species for the conservation of biodiversity on the England Biodiversity list.
- 6.8.7 If the works are undertaken in accordance with the mitigation measures identified the overall impact of the scheme on the conservation status of great crested newts within the context of the local area (the Parish) is assessed as having no negative impact. The confidence level of this predication is certain (>95 %).

Bats

- 6.8.8 All species of bats are European Protected Species (refer to Appendix F8 Legislation Summary) and are listed as a principal species for the conservation of biodiversity on the England Biodiversity list.
- 6.8.9 If the works are undertaken in accordance with the mitigation measures identified above the overall impact of the scheme on the conservation status of bats within the context of the local area (the Parish) is considered not significant. The confidence level of this predication is certain (>95 %).

Water Voles

- 6.8.10 Water voles are protected under the Wildlife and Countryside Act, 1981 (as amended) (refer to Appendix F8 Legislation Summary) and are listed as a principal species for the conservation of biodiversity on the England Biodiversity list. If the mitigation measures identified are implemented there will be no negative impact on the conservation status of water voles within the context of the local area (the Parish). The confidence level of this predication is certain (>95 %).

Otters

- 6.8.11 Otters are a European Protected Species (refer to Appendix F8 Legislation Summary) and are listed as a principal species for the conservation of biodiversity on the England Biodiversity list.
- 6.8.12 If the mitigation measures identified are implemented there will be no negative impact on the conservation status of otters within the context of the local area (the Parish). The confidence level of this predication is certain (>95 %).

Breeding Birds

- 6.8.13 All breeding birds are legally protected (refer to Appendix F8 Legislation Summary). If the mitigation measures identified above are implemented there will be no adverse impact on breeding birds in the context of the local area (the Parish). The confidence level of this predication is certain (>95 %).

Badgers

- 6.8.14 Badgers and their setts in the UK receive protection (refer to Appendix F8 Legislation Summary). If the mitigation measures detailed in Section 6.7 are implemented there will be no adverse impact on badgers within the context of the local area (the Parish). The confidence level of this predication is certain (>95 %).

Reptiles

- 6.8.15 All common reptiles in the UK receive legal protection (refer to Appendix F8 Legislation Summary). Native British reptiles are also all principal species for the conservation of biodiversity listed in the England Biodiversity List.
- 6.8.16 If the mitigation measures detailed above are implemented there will be no adverse impact on reptiles within the context of the local area (the Parish). The confidence level of this predication is certain (>95 %).

Invasive Plants

- 6.8.17 Japanese knotweeds, himalayan balsam, species of cotoneaster and rhododendron have been recorded throughout the site. These invasive species are subject to legal controls on their introduction into the wild through inclusion on Schedule 9 of the Wildlife & Countryside Act 1981 (as amended) (refer to Appendix F8 Legislation Summary). Measures will be adopted to prevent the transfer of these species by plant and machinery to other parts of the site.

6.9 Summary

- 6.9.1 Listed below is a summary of the ecological impacts associated with the proposed OLE following mitigation:

- There will be no negative impact on the Manchester Mosses SAC;
- There will be a very localised long term negative impact on Highfield Moss due to the potential loss of acidic grassland to construct the stanchion foundations although this is not significant in terms of the integrity of the SSSI;
- There will be no negative impact on Colliers Moss Common LNR;
- There will be no negative impact on the other statutory and non-statutory designated sites of importance for nature conservation;
- There will be no negative impact on great crested newts;
- There will be no negative impact on bats;
- There will be no negative impact on water voles;
- There will be no negative impact on otters;
- There will be no negative impact on breeding birds;
- There will be no negative impact on badgers;
- There will be no negative impact on reptiles.

6.10 Conclusions

- 6.10.1 There are a total of eight statutory designated sites of importance for nature conservation within 2km of the scheme and a total of thirty eight non-statutory designated sites of importance for nature conservation within 500m of the scheme.
- 6.10.2 The Manchester Mosses SAC is of international importance and lies immediately adjacent to the site. A HRA screening will be required to determine that the features for which the SAC is designated will not be adversely impacted by the proposed works. Through consultation with Natural England it was agreed that with the implementation of mitigation measures there is likely to be no negative impact to the SAC.
- 6.10.3 Within Highfield Moss SSSI the proposed gantries will result in the small loss of acidic grassland as the railway embankments are included within the SSSI boundary. The OLE will result in the direct loss of a small area of acidic grassland from within the SSSI, however, this is likely to be habitat of poorer quality as it is located immediately adjacent to the railway line. If the works are undertaken in accordance with the mitigation outlined above in section 6.7.4 above the potential for adverse impacts to occur through pollution incidents will be minimal. Overall, there will be a very localised long term negative impact on the acid grassland, within the SSSI and the site which are not significant in relation to the integrity of the SSSI. For Highfield Moss SSSI a section 28H notice and a section 28H assent will be obtained from Natural England prior to the commencement of site works.

- 6.10.4 With regards to other statutory and non-statutory designated sites within the vicinity of the site the potential impacts will be mitigated through the CEMP and are therefore not significant.
- 6.10.5 The habitats within the site boundary are abundant at both a local and national level and are therefore not considered to be a significant constraint to the proposed scheme. However, UK BAP priority species are present within 500m of the scheme boundary. Lowland meadow and lowland dry acid grassland are both present within the site, however, these are habitats within Highfield Moss SSSI and are therefore assessed in relation to the SSSI.
- 6.10.6 Although no evidence of protected or notable species has been recorded within the scheme boundary this does not preclude their presence and the habitats within the scheme are suitable for use by protected species, most notably, great crested newts, bats, badgers and reptiles. However, with the implementation of the mitigation measures identified, it is considered that no negative impacts will occur to these species.
- 6.10.7 Invasive plant species, most notably Japanese knotweed are present throughout the scheme and measures will be put in place to prevent their spread during the construction phase.

7. Mitigation Summary

7.1.1 Environmental mitigation or management measures are summarised in the table below. The mitigation measures broadly fall into the following categories:

- Measures to be included within the design - additional environmental design requirements.
- Measures to be undertaken during the construction stage - construction management controls delivered through the Construction Environmental Management Plan (CEMP) which is a mandatory requirement of Network Rail's CRE. The CEMP will:
 - Identify all commitments made in this EAR and collate a full list of significant environmental aspects and impacts for the proposed construction activities, identifying responsibilities for controls and mitigation.
 - Define the mechanism for ensuring all relevant environmental controls and mitigation are incorporated into construction Work Package Plans (method statements).
 - Set environmental objectives and targets.
 - Detail the control plans required (i.e. Noise and Vibration Management Plan, Pollution Incident and Control Plan, Wildlife and Habitats Management Plan)
 - Detail requirements for permits/consents and environmental monitoring.
 - Define roles and responsibilities.
 - Define the means of communication, record keeping, reporting, auditing and review.

Table 7.1 – Table of proposed mitigation

Environmental Aspect/Effect	Additional Mitigation Proposals	Implementation Measure
Noise and Vibration: Construction	<p>Preparation of Noise and Vibration Management Plan. Measures to be incorporated through work package plans. Best practicable methods to include:</p> <ul style="list-style-type: none"> • Breaking and compaction operations should be avoided or minimised during night-time, evening and weekends. • Ancillary pneumatic percussive tools should be fitted with mufflers or suppressers • Where appropriate noise barriers should be in use between noisy activities and noise-sensitive receivers. • All vehicles and mechanical plant used should be fitted with exhaust silencers and should be maintained in good and efficient working order. • All compressors and generators should be 'sound reduced' models fitted with properly lined and sealed acoustic covers which should be kept closed whenever the machines are in use, • Machines in intermittent use should be shut down between work or where this is impracticable, throttled down to a minimum. • The site compound and static machines should be sited to minimise noise to adjacent properties. • Where practicable, plant with directional noise characteristics should be positioned to minimise noise at adjacent properties. • Delivery routes used by trucks and lorries should avoid residential areas as far as possible. 	Implementation through CEMP
Noise and Vibration: Construction	<p>To reduce the vibration impacts foundation piling including percussive piling should not be undertaken within 30m of a structure (or greater for listed buildings).</p> <p>Foundations options involving rotary bored piling, continuous flight auger techniques, or standard slab or gravity pads for shallow foundations should be preferred, to minimise likely vibration impacts (where other engineering constraints allow)</p>	To be considered during detailed design
Noise and Vibration: Construction	Risk assessments to be undertaken for all works to establish if Prior Consent should be sought from the local authority for works under Section 61 of the Control of Pollution Act.	Agreement prior to construction.

Environmental Aspect/Effect	Additional Mitigation Proposals	Implementation Measure
Noise and Vibration: Operation	None required	
Historic Environment: Construction	<p>Potential design mitigation measures could include re-siting structures, altering the form of structures and altering fixings etc.</p> <p>The following should be considered as part of the design:</p> <ul style="list-style-type: none"> • Vegetation clearance should be avoided in Conservation Areas. • Works to trees within Conservation Areas should only occur following the statutory notification period • Gantries and other equipment should be sensitively sited in relation to the setting of listed structures and Conservation Areas. They should also be designed with sensitivity to these settings. • Works to listed structures should be designed in consultation with the local authority and with input from an accredited conservation architect. They will require listed building consent. • Works to unlisted, but important historic structures should be designed and undertaken sensitively with the structures treated as listed buildings. • If historic structures require removal, surviving historic fabric should be retained where possible. • All historic structures will be subject to recording prior to commencing in consultation with English Heritage. 	To be carried out during detailed design
Historic Environment: Operation	None required.	Not applicable
Landscape: Construction	Avoid loss or damage to landscape/townscape features by restricting the clearance of vegetation to the minimum required for the safe construction and operation of the railway.	Implemented through CEMP
Landscape: Operation	<p>The mitigation measures to be included as part of the design include:</p> <ul style="list-style-type: none"> • Restricting the clearance of existing vegetation. • Replace trees and shrub species where possible. • Sow any new grass areas with low maintenance species rich grass seed mix. 	To be considered during detailed design

Environmental Aspect/Effect	Additional Mitigation Proposals	Implementation Measure
Ecology: Construction	<p>The following will need to be undertaken in order to ensure that appropriate mitigation is considered and approved by Natural England:</p> <ul style="list-style-type: none"> • HRA screening will be required and approved by Natural England for works in the proximity of the Manchester Mosses SAC. • Obtain a section 28H notice and 28H assent from Natural England for works near Highfield Moss SSSI. 	Carried out once detailed designs are available and prior to construction in relevant areas
Ecology: Construction	Undertake additional surveys of identified bridges to confirm bat presence/absence.	Implemented prior to construction
Ecology: Construction	<p>Prepare Ecology and Habitats Management Plan to include:</p> <ul style="list-style-type: none"> • Implementation of a precautionary method of working for great crested newts, reptiles, badgers, bats and nesting birds • Implementation of measures to prevent the spread of invasive species <p>Ecological toolbox talks to be given to site personnel to make them fully aware of ecological constraints within the site.</p>	Implemented through CEMP
Ecology: Construction	<p>Prepare Pollution Incident and Control Plan. Integrate measures into work package plans for construction activities. Best practice measures to include:</p> <ul style="list-style-type: none"> • Application of regulatory requirements for storage of fuels and oils, compliance with Environment Agency PPGs, and best practice for control of water pollution. • Minimise dust raising activities, dust suppression, stockpile management. 	Implemented through CEMP
Ecology: Operation	None required	Not applicable

Environmental Aspect/Effect	Additional Mitigation Proposals	Implementation Measure
Contaminated Land and Waste Management: Construction (see Appendix H)	<p>Intrusive ground investigations will be undertaken at the locations of proposed distribution sites to inform foundation design, health and safety risk assessments, waste classification and potential re-use of materials on or off site.</p> <p>The Ordsall Lane site is in the proximity of a former landfill site, the contents of which are currently unknown. Depending upon the proposed infrastructure and relative elevations etc., gas mitigation measures (e.g. monitoring, venting and breaking the potential gas pathway) will be employed as necessary.</p> <p>No significant impacts with regard to contaminated land risks are anticipated. However, during construction the following good site practices will be adhered to and will be detailed in a CEMP:</p> <ul style="list-style-type: none"> • Construction workers will wear appropriate PPE following risk assessments. • A system will be developed to ensure that surface water cannot run off uncontrolled into adjacent surface watercourses where present in close proximity to each site. • Dust control measures will be put in place. • Any on site fuel storage will be located away from surface watercourses in accordance with EA guidance notes PPG2 and PPG6. • A methodology shall be developed in the event that any unsuspected contamination is encountered during the works – this will detail what remedial actions will be undertaken and how such actions will be validated and recorded. 	Implemented through CEMP

Environmental Aspect/Effect	Additional Mitigation Proposals	Implementation Measure
Flood Risk: Construction	<p>Risks to the water environment during construction will be managed through implementation of a Pollution Incident Control Plan (PICP) as part of the CEMP.</p> <p>The following legislation and guidance should be followed in order to mitigate the scheme construction impacts on the water environment:</p> <ul style="list-style-type: none"> • Good working practices for site activities should be adopted and carried out in accordance with the Water Resources Act²⁶; • The Environment Agency's Pollution Prevention Guidance (PPG) should be followed; • Environment Agency (2001) Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination; • Guidance on Pollution Prevention, National Groundwater & Contaminated Land Centre report NC/99/73; and • Environment Agency (2002) Piling into Contaminated Sites. <p>Accidental spills should be mitigated during the construction phase by:</p> <ul style="list-style-type: none"> • Provision of oil spill clean-up equipment, drip trays under mobile plant; daily visual inspections of the ground for evidence of contamination, suitable bunding for oils or chemicals used on site and refuelling should only occur in designated areas. • Preparation of PICP; and • Machinery and equipment should be stored in designated areas. 	Implemented through CEMP
Flood Risk: Construction of Astley distribution site (see Appendix I)	Further liaison with the Environment Agency should be undertaken to make sure the local modelling is satisfactory, understand if consent for aspects of the works will be required and that there are no known local flood risk issues to consider.	Liaison with EA during design

²⁶ The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009: Statutory instruments 3104 2009

8. Conclusions

- 8.1.1 This EAR sets out the potential environmental impacts associated with the construction and operation of the Liverpool to Manchester overhead line electrification. The report assesses the potential significant impacts of the scheme on landscape and visual receptors, noise and vibration receivers, ecology and the historic environment. As part of the assessment process consultation was undertaken with Natural England and local authorities. Further consultation will be required once the scheme designs have been finalised.
- 8.1.2 The scheme covers approximately 50km of railway that runs through seven local authorities comprising Liverpool City Council, Knowsley Metropolitan Council, St Helens Council, Warrington Borough Council, Wigan Council, Salford Council and Manchester City Council.
- 8.1.3 Detailed design of the scheme has not yet been completed, therefore some of the precise scheme details and methods of construction have yet to be determined. However, the key components of the scheme have been established and these are set out in this report.
- 8.1.4 Once the mitigation measures included in this report are implemented there are no significant adverse impacts anticipated to occur as a result of the scheme on ecology.
- 8.1.5 The potential construction noise impacts of the scheme would be spread across the scheme area during different stages of the works. However, the impacts on any one location are likely to be limited in duration. Some significant noise effects are predicted for certain types of construction activities, in particular from breaking, drilling, cutting and compaction operations where dwellings are within 100m and in direct line-of-sight of the activities. Significant noise effects would also be expected from piling operations at dwellings within 50m and in direct line of sight of the activities. No significant noise effects would be expected from most of the remaining activities where the construction activities take place at least 30m away from noise-sensitive receivers. There is potential for significant impacts from vibration which can be mitigated as part of the detailed design process.
- 8.1.6 No significant adverse noise and vibration effects are expected during operation of the scheme.
- 8.1.7 With regards to impacts of the scheme on the historic environment it is not considered that temporary construction impacts would constitute a significant impact to the historic environment.
- 8.1.8 The permanent electrification of the railway would be beneficial for the historic Liverpool to Manchester railway as it will safeguard its future operation which is critical for its historic significance. The works could impact on the character and setting of Conservation Areas and Listed Buildings in the study area as well as altering the character of the wider historic urban environment in Liverpool and Manchester/Salford. These impacts can only be partially minimised during the detailed design process.
- 8.1.9 Landscape and townscape effects and visual amenity effects are largely minor, and will mostly arise from the removal of screening vegetation to allow for the installation of gantries and wiring. This would be most severe where the railway line is on embankment or on bridges or viaducts as the railway would become a more defined element in the landscape/townscape. The operational impacts will reduce over time as vegetation re-establishes. Impacts can be minimised by limiting the amount of screening vegetation removed. Design and locations of distribution sites should also be considered during detailed design in order to limit the visual and heritage impacts of the scheme.

