Transport for Greater Manchester

URS Infrastructure & Environment UK Limited
4th Floor, Bridgewater House
Whitworth Street
Manchester
M1 6LT
United Kingdom

Telephone: +44(0)161 907 3500

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TABLE OF KEY ABBREVIATIONS

Abbreviation	Meaning
AADT	Annual Average Daily Traffic
AC	Alternating Current
AEP	Annual Exceedance Probability
AOD	Above Ordnance Datum
AQMA	Air Quality Management Area
ASHE	Annual Survey of Hours and Earnings
AStGWF	Agency Areas Susceptible to Groundwater Flooding
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
BAP	Biodiversity Action Plan
BBC	British Broadcasting Corporation
bgl	Below ground level
BGS	British Geological Society
BIS	Business, Innovation and Skills
BRE	Building Research Establishment
BRES	Business Register and Employment Survey
BRP	Bat Roost Potential
BS	British Standard
BSI	British Standards Institute
CAFE	Clean Air for Europe
CCTV	Closed Circuit Television
CDA	Critical Drainage Area
CEMP	Construction Environmental Management Plan
CH_4	Methane
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
CL:AIRE	Contaminated land: Applications in Real Environments
CLR11	Model Procedures for the Management of Land Contamination
CO	Carbon Monoxide

Abbreviation	Meaning
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide equivalent
CoCP	Code of Construction Practice
COSHH	Control of Substances Hazardous to Health
CPBF	Cheshire Pebble Bed Formation
CRoW	Countryside and Rights of Way
CSM	Conceptual Site Model
dB	Decibel (measure of the magnitude of sound)
DCLG	Department for Communities and Local Government
DDRG	Disability Design Reference Group
DfT	Department for Transport
CLR	Contaminated Land Regime
CSO	Combined sewer overflow
DMRB	Design Manual for Roads and Bridges
CRTN	Calculation of Road Traffic Noise
EC	European Commission
EcIA	Ecological Impact Assessment
EDR	Environmental Damage Regulations
EH	English Heritage
EIA	Environmental Impact Assessment
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Act
ES	Environmental Statement
EU	European Union
EVC	Proposed EventCity tram stop
FRA	Flood Risk Assessment
g	Grams
gCO_2e	Gram of carbon dioxide equivalent
gCO_2e/p-km	Grams of carbon dioxide equivalent per passenger kilometre
GCSE	General Certificate of Secondary Education
GHG	Greenhouse Gas

Abbreviation	Meaning
GI	Green Infrastructure
GIS	Geographical Information Systems
GLVIA	Guidelines for Landscape and Visual Assessment
GMAAS	Greater Manchester Archaeological Advisory Service
GMAU	Greater Manchester Archaeological Unit
GMBAP	Greater Manchester Biodiversity Action Plan
GMBRG	Greater Manchester Birds Recording Group
GMEU	Greater Manchester Ecology Unit
GMPTE	Greater Manchester Passenger Transport Executive
GMTF	Greater Manchester Transport Fund
GOMMMS	Guidance on the Methodology for Multi-Modal Studies
GPLC	Guiding Principles for Land Contamination
GTA	Guidance on Transport Assessment
GVA	Gross Value Added
ha	Hectare
HAP	Habitat Action Plans
HCA	Homes & Communities Agency
HER	Historic Environment Record
HFC	Hydrofluorocarbons
HGV	Heavy Goods Vehicle
HM	Her Majesty
HMSO	Her Majesty's Stationery Office
Hz	Hertz (unit of frequency)
IBC	Intermediate Bulk Container
IEEM	Institute of Ecology and Environmental Management
IEMA	Institution of Environmental Management and Assessment
IfA	Institute for Archaeologists
IPC	Integrated Pollution Control
IWM	Proposed Imperial Wharf Museum tram stop
IWMN	Imperial Wharf Museum North
JNCC	Joint Nature Conservation Committee

Abbreviation	Meaning
km	Kilometre
km/ hr	Kilometres/ hour
kWh	Kilowatt hour
L_{A1}, L_{A5}, L_{A10}, L_{A50}, L_{A90}, L_{A99}	A-weighted sound pressure level exceeded for 1, 5, 10, 50, 90 and 99% of the measured time respectively
L_{Aeq}	Equivalent continuous A-weighted sound pressure level over a given period of time
L_{Amax}	The maximum A-weighted sound pressure level over a given period of time
LAQM	Local Air Quality Management
LBAP	Local Biodiversity Action Plan
LDV	Light Duty Vehicle
LNR	Local Nature Reserve
LPA	Local Planning Authority
LRT	Light Rapid Transit
LSOA	Lower Super Output Areas
LTP	Local Transport Plan
LVIA	Landscape and Visual Impact Assessment
L_w	Sound Power Level. Sound power is the rate per unit time at which airborne sound energy is radiated by a source. L_w values are preferred for noise prediction purposes as their value is independent of distance or environment
m	Metre
m^3	Cubic metre
MAGIC	Multi-Agency Geographic Information for the Countryside
mg/m^3	Milligrams (of pollutant) per cubic meter (of air)
mms	Millimetres per second
MRDL	Metrolink RATP Dev UK Ltd
MW	Megawatt
NATA	New Approach to Transport Appraisal
NCA	National Character Area
NERC	Natural Environment and Rural Communities
NF_3	Nitrogen trifluoride
NGR	National Grid Reference
NPPF	National Planning Policy Framework

Abbreviation	Meaning
N_2O	Nitrous Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
NTS	Non-Technical Summary
NVQ	National Vocational Qualification
OLE	Overhead Line Equipment
ONS	Office for National Statistics
ORR	Office of Rail Regulation
OS	Ordnance Survey
p-km	Passenger kilometre
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PFC	Perfluorocarbons
PKW	Proposed Parkway tram stop
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5µm
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10µm
ppb	Parts per billion
PPE	Personal Protective Equipment
PPG	Pollution Prevention Guidance
ppm	Parts per million
PPV	Peak particle velocity
PT	Public Transport
RBMP	River Basin Management Plan
RIF	Revolving Infrastructure Fund
RIGS	Regionally Important Geological Site
RoC	Review of Consents
RSPB	Royal Society for the Protection of Birds
SAC	Special Area(s) of Conservation
SAP	Species Action Plans
SATURN	Simulation and Assignment of Traffic in Urban Road Networks
SBI	Sites of Biological Importance

Abbreviation	Meaning
SFRA	Strategic Flood Risk Assessment
SF_6	Sulphur hexafluoride
SI	Statutory Instrument
SLBG	South Lancashire Bat Group
SL	Strategic Locations
SO_2	Sulphur Dioxide
SO	Strategic Objective
SoS	Secretary of State
SPM2-PT	Strategic Planning Model – Public Transport
SPZ	Source Protection Zone
SSG	Sherwood Sandstone Group
SSSI	Site(s) of Special Scientific Interest
STEAM	Scarborough Tourism Economic Activity Monitor
SUDS	Sustainable Drainage Systems
SuRF-UK	Sustainable Remediation Forum
SWMP	Surface Water Management Plan
t	Tonnes
TA	Transport Assessment
TAG	Transport Analysis Guidance
tCO_2e	Tonnes of carbon dioxide equivalent
TCPA	Town and Country Planning Act
TFC	Proposed Trafford Centre tram stop
TfGM	Transport for Greater Manchester
TG	Technical Guidance
The Board	Trafford Park Business Neighbourhood Shadow Board
TMBC	Trafford Metropolitan Borough Council
TPH	Total Petroleum Hydrocarbons
TPO	Tree Preservation Order
TWAO	Transport and Works Act Order
$\mu g/m^3$	Micrograms (of pollutant) per cubic metre (of air)
uFMfSW	Updated Flood Maps for Surface Water Flooding

Abbreviation	Meaning
UDP	Unitary Development Plan
UU	United Utilities
URS	URS Infrastructure & Environment UK Limited
UXO	Unexploded Ordnance
v-km	Vehicle kilometre
VEM	Visual Envelope Map
VDV	Vibration Dose Value
VLG	Proposed Village tram stop
WebTAG	Web based Transport Analysis Guidance produced by the Department for Transport
WFD	Water Framework Directive
WHF	Proposed Wharfside tram stop
WRA	Water Resources Act
WSF	Wilmslow Sandstone Formation
ZVI	Zone of Visual Influence

GLOSSARY

Term	Meaning
Air pollutants	Amounts of foreign and/ or natural substances occurring in the atmosphere that may result in adverse effects on humans, animals, vegetation and/ materials.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedences within a specific timescale (see also air quality standard).
Air Quality Sensitive Receptors	People, property or designated sites for nature conservation that may be at risk from exposure to air pollutants that could potentially arise as a result of the proposed development/ project.
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Ambient air quality	The concentrations of gases and particles in the atmosphere (tropospheric boundary layer) to which the general population would be exposed, as opposed to the concentration of pollutants emitted by a specific source.
Annual Average Daily Traffic flows	A daily traffic flow (24 hrs), expressed as a mean daily flow across all 365 day of the year (AADT) in units of vehicles per hour
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between 2 years, which is useful for pollutants that have higher concentrations during the winter months.
Carbon sequestration	The process by which atmospheric carbon dioxide is captured and placed in long term storage.
Combined effect	The mechanism by which the effect of one impact is exacerbated by another i.e. the combined effect of two or more pollutants is greater than the sum of their separate effects. Combined effects in this ES are considered on any single receptor arising from the regeneration proposals alone (i.e. not from other developments).
Committed Development	Developments where construction has already started, planning permission has been granted or is likely to be granted or those developments that have specific planning policies that will ensure that they will be built out within the next five years.
Constraints map	Map showing the location of important resources and receptors that may form constraints to development.

Term	Meaning
Construction Footprint	The area within which site clearance, demolition and construction activities will take place.
Construction Phase	The period of time within which the site will be cleared, any required demolition undertaken and the proposed scheme constructed.
Cumulative effect	Effects that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project.
Current Baseline	A description of the environmental conditions, resources and receptors that currently exist on the site and in the surrounding area.
dB (decibel)	Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of noise i.e. whether it is high pitched, low pitched or with no distinct tonal character. These measurements are usually undertaken in octave or 1/3 octave frequency bands. If these values are logarithmically summed a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.
dB L_A	Instead, the dB L_A figure is used, as this is found to relate better to the loudness of the sound heard. The dB L_A figure is obtained by subtracting the appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or 1/3 octave band values, before logarithmically summing them. As a result the single dB L_A value provides a good representation of how loud a sound is. It is common to see the A-weighted value identified by dB(A). This is an old description and should be avoided as it now conflicts with other SI unit nomenclature.
Effect	A consequential effect of an impact upon an identified receptor or resource.
EIA Study Area	The area assessed for impacts and effects during this assessment, including all land within the estimated construction footprint and all permanent land take required to construct and operate the Metrolink Trafford Park Line (including land for ancillary works, such as highway works and service diversions).
Element	A component part of the landscape (for example, roads, hedges, woods).
Emission factor	The greenhouse gas emissions associated with a unit of energy/ fuel/ materials etc. used in the product lifecycle e.g. kg CO_2-e produced per kWh of electricity used.
Enhancement	Landscape improvement through restoration, reconstruction or creation.
Environment	Our physical surroundings including air, water and land.

Term	Meaning
Environmental appraisal	A generic term for the evaluation of the environmental implications of proposals (used by the UK Government in respect of policies and plans).
Exceedence	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
Fast/ slow time weighting	A sound level meter can be set to log noise levels on a 'fast' or 'slow' time weighting. A 'fast' time weighting corresponds to a response time of 125 milliseconds whereas a 'slow' time weighting corresponds to a response time of 1 second. A 'slow' time weighting damps the variation in noise levels logged whereas a 'fast' time weighting is more sensitive to variations in noise
Flood Zone	These are areas, also known as flood plains, which could be affected in the event of flooding from rivers and the sea.
Fluvial flooding	Flooding from a river or other water source.
Fossil carbon	Carbon derived from fossil fuel or another fossil source, including peat.
Free-field/ façade noise	Noise measurements are typically carried out under free-field or façade conditions. Free-field noise is measured at least 3.5m away from a reflecting surface whereas façade noise includes a contribution from façade reflections and is measured at a distance of 1m from a reflecting façade
Future Baseline	A projected future baseline scenario to enable consideration of future Do Minimum traffic scenarios and to assess how the establishment of proposed mitigation (e.g. landscaping works) will reduce the significance of predicted effects.
Ground water flooding	Flooding caused by ground water escaping from the ground when the water table rises.
Global Warming Potential	Factor describing the radiative forcing impact of one mass-based unit of a given greenhouse gas relative to an equivalent unit of carbon dioxide over a given period of time (100 Years).
Greenhouse Gases (GHG)	Greenhouse gases are gases that contribute to the greenhouse effect and anthropogenic climate change. Those identified within the IPCC 4th Assessment Report (2007) as direct greenhouse gases are considered within the scope of the assessment, in line with PAS 2050:2011 requirements.

Term	Meaning
Greenhouse Gas Protocol	The Greenhouse Gas Protocol (GHG Protocol) is the most widely used international accounting tool for governments and business leaders to understand, quantify and manage greenhouse gas emissions. The GHG Protocol is a partnership between the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). The GHG Protocol published a corporate standard called the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard during September 2011. Recognising that this is the most relevant standard available to Reckitt Benckiser, alignment against the Total Carbon Footprint methodology is assessed (refer to Technical Appendix H).
Indirect GHG emissions	Emissions that are a consequence of the activities of the company but occur at sources owned or controlled by another company.
Indirect Impact	Impacts on the environment, which are not a direct result of the project, often produced away from or as a result of a complex pathway. Sometimes referred to as second or third level impacts, or secondary impacts.
Impact	A change in the physical, natural or cultural environment.
Interactive Impact	The reactions between impacts whether between the impacts of just one project or between the impacts of other projects in the areas.
L_{Aeq}	As almost all sounds vary or fluctuate with time it is helpful instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The $L_{Aeq,\ 07:00\text{-}19:00}$ for example, describes the equivalent continuous noise level over the 12 hour period between 7am and 7pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower than the $L_{Aeq,\ 07:00\text{-}19:00}$
Landscape	Human perception of the land conditioned by knowledge and identity with a place.
Landscape character	The distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement. It creates the particular sense of place of different areas of the landscape.
Landscape effects	Change in the elements, characteristics, character and qualities of the landscape as a result of development. These effects can by positive or negative.
Landscape feature	A prominent eye-catching element, for example, wooded hilltop or church spire.
Landscape quality/ condition	Is based on judgements about physical state of the landscape, and about its intactness, from visual, functional, and ecological perspectives. It also reflects the state of repair of individual features and elements which make up the character in any one place.

Term	Meaning
Landscape sensitivity	The extent to which a landscape can accept change of a particular type and scale without unacceptable adverse effects on its character.
Land use	The primary use of the land, including both rural and urban activities.
Life cycle	Consecutive, inter-linked stages of a product system, from raw material generation to final disposal (or recycling).
Life Cycle Assessment (LCA)	Compilation and evaluation of inputs, outputs and potential environmental impacts of a product system throughout its life cycle.
Long term impact	Any impact with duration of at least ten years.
Metrolink Trafford Park Line	The proposed scheme.
Mitigation	Measures, including any process, activity or design to avoid, reduce, remedy or compensate for adverse landscape and visual effects of a development project.
Modal Shift	This term refers to shifting from a conventional mode or modes of transport to a different mode or modes providing maximum transport efficiency (for example car users transfer to using the tram for their journey).
Operational Phase	The period of time within which the Metrolink Trafford Park Line is operational.
Operational Phase Footprint	The area of land that will be permanently affected by the proposed scheme and will comprise land required for the track, support structures, overhead line equipment and tram stops, park and ride facility, highway works and ancillary infrastructure.
Overhead Line Equipment (OLE)	Overhead electrical lines are used to transmit electrical energy to trams. Overhead line equipment is the infrastructure associated with these overhead lines.
Overland flow	The flow of rainwater or snowmelt over the surface of the land toward stream channels. After it enters a watercourse, it becomes runoff.
Physico-chemical	The joint action of physical and chemical processes.
ppb (parts per billion)	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppb means that for every billion (10^9) units of air, there is one unit of pollutant present.
ppm (parts per million)	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppm means that for every billion (10^6) units of air, there is one unit of pollutant present.
Residual flood risk	Risks remaining after taking mitigation actions.

Term	Meaning
Return period	A term sometimes used to express flood probability. It refers to the estimated average time gap between floods of a given magnitude, but as such floods are likely to occur very irregularly, an expression of the annual flood probability is to be preferred.
River Basin Management Plan (RBMP)	River Basin Management Plans are drawn up for the 10 river basin districts in England and Wales as a requirement of the water framework directive. They set out measures to improve water in rivers, lakes, estuaries, coasts and in groundwater.
Secondary impact	Impacts on the environment, which are not a direct result of the project, often produced away from or as a result of a complex pathway. Sometimes referred to as second or third level impacts, or indirect impacts.
Technical Study Area	The topic area within which that particular assessment is focused (e.g. the 'Air Quality Study Area')
SUDS	Sustainable drainage systems or sustainable (urban) drainage systems: a sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques (may also be referred to as SUDS).
Surface water runoff	Also known as Overland Flow. Water flowing over the ground surface that has not entered a natural or artificial drainage channel Environment.
Short term impact	Any impact with duration of two years or less.
$\mu g/m^3$ (micrograms per cubic metre)	A measure of concentration in terms of mass per unit volume. A concentration of $1ug/m^3$ means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
Validation (modeling)	Refers to the general comparison of modeled results against monitoring data carried out by model developers.
Verification (modeling)	Comparison of modeled results versus any local monitoring data at relevant locations.
Visual amenity	The value of a particular area or view in terms of what is seen.
Visual envelope	Extent of potential visibility to or from a specific area or feature.
Zone of Approximate Visual Influence (ZVI)	Area within which a proposed development may have an influence or effect on visual amenity.

Transport for Greater Manchester

Non-Technical Summary

Transport for Greater Manchester

1 INTRODUCTION

1.1.1 In 2008 Transport for Greater Manchester embarked on a £1.5 billion expansion and enhancement programme for Greater Manchester's Metrolink. Since 2008, the programme has seen the network almost triple in size with the Metrolink network extended to Oldham and Rochdale, Ashton-under-Lyne and East Didsbury. An extension to Manchester Airport is anticipated to open on 3rd November 2014 and a second tramway across the city is currently being constructed.

1.1.2 Transport for Greater Manchester is now proposing a Metrolink extension through Trafford Park. The proposed Metrolink Trafford Park Line is a key part of the planned expansion programme and is anticipated to improve public transport and access to employment, business, leisure and retail opportunities in the Trafford Park area, as well as connections to the wider, expanded Metrolink network. The route of the Metrolink Trafford Park Line is shown in Figure NTS-1 and described in Section 2 below.

1.1.3 Transport for Greater Manchester is applying to the Secretary of State for Transport for a Transport and Works Act Order (TWAO) to enable them to construct and operate the Metrolink Trafford Park Line.

1.2 Environmental Impact Assessment

1.2.1 As part of the TWAO application process, Transport for Greater Manchester has commissioned an Environmental Impact Assessment (EIA) of the Metrolink Trafford Park Line. The findings of the EIA are reported in detail in an Environmental Statement (ES).

1.2.2 The ES is split into four documents:

- Non-Technical Summary (this document);
- Volume I – Environmental Statement: Main Report;
- Volume II – Environmental Statement: Technical Appendices; and
- Volume III – Environmental Statement: Figures.

1.2.3 This document provides a Non-Technical Summary (NTS) of the ES. Its purpose is to provide an overview of the main findings of the ES in an easily understood format.

1.2.4 The ES will allow the Secretary of State for Transport to understand the beneficial (positive) and adverse (negative) effects that the proposed scheme may have on the environment and, together with the other supporting documents submitted with the TWAO application (such as the Transport Assessment), will assist in the decision on whether the Metrolink Trafford Park Line should be permitted to go ahead.

1.3 EIA Scope

1.3.1 The technical scope of the EIA was agreed through the submission of a Scoping Report in May 2014 to the Secretary of State for Transport. The Secretary of State for Transport consulted with a number of environmental organisations such as the Environment Agency, Natural England, English Heritage and Trafford Metropolitan Borough Council (TMBC), and agreed that the EIA should cover the following environmental topics:

- Planning Policy;
- Noise and Vibration;
- Air Quality;
- Landscape and Visual;
- Ecology;
- Ground Conditions;
- Water Resources;
- Cultural Heritage; and
- Socio-Economics.

1.3.2 Subsequent to the EIA scoping process, Transport for Greater Manchester elected to include a carbon assessment within the ES.

1.4 Assessment of Effects

1.4.1 Once the scope of the EIA had been agreed, technical information was collected to enable the likely impacts and effects of the Metrolink Trafford Park Line to be predicted and considered. Effects are described in the ES as major/ substantial, moderate, minor or negligible (adverse or beneficial) as based on the consideration of the scale of the impact (i.e. the change) and the sensitivity of the affected environmental feature (e.g. a listed building). Major/ substantial and moderate effects are considered to be 'significant' and are therefore material considerations in the decision-making process.

1.4.2 The avoidance of adverse environmental impacts has been considered throughout the planning and design of the Metrolink Trafford Park Line, including during the consideration of alternatives. Where appropriate, additional mitigation measures are proposed within the ES to reduce or remedy significant adverse effects identified during the EIA process.

2 THE PROPOSED SCHEME

2.1 The Need for the Scheme

2.1.1 Trafford Park is a major centre of employment for all of Greater Manchester, employing approximately 35,000 people. The area has historically been served by relatively weak transport links and local policy directs that improved sustainable transport links should be secured between Trafford Park, Manchester city centre, and other employment areas.

2.1.2 Trafford Park has a low residential population and the people who work there mostly travel by private car or public transport. However, congestion and a lack of public transport choice will be limiting factors to future sustainable development within Trafford Park and the Trafford Centre Rectangle.

2.2 Alternatives Considered

2.2.1 A number of alternatives to the Metrolink Trafford Park Line have been considered, including a 'do nothing' option and upgrades to the public highway, which would improve the existing and future bus services through Trafford Park. These options were rejected in favour of an extension to the Metrolink network.

2.2.2 In addition, a number of potential Metrolink routes through Trafford Park were considered, including a previously consented Metrolink line. Following the consideration of these route options, it was determined that a centralised route along Village Way would best serve the Trafford Park area (as shown in Figure NTS-1).

2.3 Description of the Proposed Scheme

2.3.1 The Metrolink Trafford Park Line is a 5.5 kilometre (km) track extension to the existing Metrolink network that would cross Trafford Park between the existing Pomona Stop to a proposed Trafford Centre Stop. The proposed scheme has been designed to accommodate Metrolink vehicles. The tram line, tram stops and other associated infrastructure (such as overhead lines, stop furniture, substations, drainage and lighting) have been designed to a similar specification as the existing Metrolink network.

2.3.2 The route of the Metrolink Trafford Park Line and stop locations are shown on Figure NTS-1. The proposed tram stops[1] are:

- Wharfside;
- Imperial War Museum;

[1] The names of proposed stops are subject to further approval and could change.

- Village;
- Parkway;
- EventCity; and
- Trafford Centre.

2.3.3 The tramway would mainly be located immediately adjacent to the existing highway network (except in certain locations where the tramway has to cross the highway). It is intended to segregate the tramway from other road traffic to minimise delays during times of peak traffic congestion and to deliver a reliable tram service.

2.3.4 The Metrolink Trafford Park Line would require some permanent road closures and changes to the direction of traffic flow along some sections of the existing highway network. In addition, some existing junctions and property accesses would need to be remodelled or altered.

2.3.5 The Metrolink Trafford Park Line would provide facilities for cyclists and pedestrians at all tramway crossings and remodelled junctions. In addition, it is proposed to create some new cycleways alongside the Metrolink Trafford Park Line, such as between the proposed Park Way intersection and Barton Dock Road and along Village Way.

2.3.6 A new Park and Ride site is proposed to the south of the Parkway Stop.

2.3.7 A detailed landscape design would be produced for the Metrolink Trafford Park Line which would include hard landscaping works to the tramway, stops and immediately adjacent areas. Soft landscaping (planting) designs, which would include replacement tree planting, would be produced for the areas between stops (as appropriate).

2.3.8 The Metrolink Trafford Park Line is anticipated to operate five trams per hour in each direction. A greater service frequency may be used at weekends and for special events, where possible.

2.4 Construction Works

2.4.1 Construction of the Metrolink Trafford Park Line is anticipated to start in 2016, with the tram line likely to be operational by 2020.

2.4.2 Prior to the start of the main construction works, a number of trees and areas of vegetation will be cleared from within the construction works area. The loss of trees and vegetation will be minimised as far as possible.

2.4.3 Statutory utilities (such as electricity, gas, water, waste water and telecommunications equipment) affected by the proposed scheme, would be diverted or modified as appropriate before the main construction works are undertaken.

2.4.4 Most construction activities would be restricted to the existing highway corridor. The Metrolink Trafford Park Line would, however, require some landtake adjacent to the highway and a number of properties would need to be demolished, namely: Samuel Platts Public House (Trafford Wharf Road); the Wharfside Business Centre Units (1 – 9) (Trafford Wharf Road); the factory building on the plot next to Quay West (Trafford Wharf Road); and the Subway franchise on Village Way.

2.4.5 Temporary construction compounds, including storage areas, portable cabins and welfare facilities would be required along the construction route. It is currently anticipated that construction traffic would use the local highway network to access the construction compounds and works areas as necessary.

2.4.6 The majority of construction works are likely to take place between 08:00 and 18:00, Monday to Saturday. Some activities may be undertaken outside of these working hours and would need to be approved by TMBC.

2.4.7 Permanent road closures required for the Metrolink Trafford Park Line would be implemented during the construction phase of the proposed scheme. In addition, temporary road closures and diversions of traffic, footpaths and cycle ways would be required and planned to coincide with the works programme. The construction works would be carefully managed in order to reduce disruption and maintain access routes where possible.

2.4.8 Construction activities would be managed by working closely with TMBC and other stakeholders prior to, and during, construction in order to plan the construction programme. All works would be carried out in accordance with Transport for Greater Manchester's Code of Construction Practice (CoCP), a Traffic Management Plan, and a scheme-specific Construction Environmental Management Plan (CEMP) prepared and implemented by the appointed contractor.

3 ENVIRONMENTAL IMPACT ASSESSMENT

3.1 Introduction

3.1.1 This section of the NTS provides a summary of the technical assessments contained in the ES (Chapters 1 – 15) and reports the potentially significant environmental effects identified.

3.2 Planning Policy Context

3.2.1 The ES provides an overview of the planning policy (national and local) of most relevance to the Metrolink Trafford Park Line taking into account the proposed scheme characteristics. A wide range of planning policies are of relevance to the proposed scheme and these have been taken into account when defining the scheme objectives, whilst the technical chapters presented within the ES also refer to the various planning policies that are of relevance to each discipline.

3.3 Noise and Vibration

3.3.1 The noise and vibration assessment considered the effects of construction noise and vibration, changes to road traffic, and the noise and vibration anticipated to be produced by the operation of the Metrolink Trafford Park Line.

3.3.2 Noise monitoring was carried out at a number of potentially noise and vibration sensitive locations along the proposed scheme alignment to establish the current noise levels along the route. Noise along the route is currently dominated by road traffic noise and activities associated with various commercial and industrial premises.

Construction

3.3.3 Given the already high levels of traffic in the area, it is assessed that construction traffic would not increase road traffic noise; however, construction activities would potentially have significant adverse noise effects on some receptor locations along the proposed route. Whilst such effects would be temporary, it is recommended that consideration be given to the use of localised acoustic screens when works are carried out close to noise sensitive receptors. Construction vibration is not considered to be significant.

Operation

3.3.4 The operation of the tram would generally produce noise levels less than road traffic noise levels. Changes to road traffic noise due to the Metrolink Trafford Park Line are not expected to have a significant effect at identified noise sensitive receptors along the proposed route. The assessment identifies that the combined noise effects of changes to road traffic noise and the operation of the

trams has the potential to generate negligible to moderate adverse effects upon receptors in the study area. During the detailed design stage, further consideration would be given to mitigating potentially significant noise effects.

3.3.5 Vibration generated by the operational Metrolink Trafford Park Line is not considered to have significant effects on the identified receptors (people and buildings).

3.4 Air Quality

3.4.1 The air quality assessment considered the potential effects on air quality receptors during the construction and operation of the Metrolink Trafford Park Line. The assessment considered the effects of dust generated during construction and changes in road traffic emissions during the operation of the proposed scheme.

3.4.2 Existing air quality conditions were established through a review of available air quality data for the local area and by undertaking three months of air quality monitoring at selected receptor locations along the proposed route.

3.4.3 The Metrolink Trafford Park Line is located within an area defined as an Air Quality Management Area (AQMA) due to high levels of nitrogen dioxide. A review of current air quality conditions indicated that existing nitrogen dioxide levels exceed air quality objectives at some locations, whilst levels of dust in the area are below the applicable air quality objective.

Construction

3.4.4 Construction activities have the potential to generate dust emissions. During the construction of the Metrolink Trafford Park Line, dust emissions would be controlled through the adoption of good working practices. The effect of dust would be, at worst, minor adverse at the nearest sensitive receptors and therefore not significant.

Operation

3.4.5 Changes in traffic movements due to the Metrolink Trafford Park Line have the potential to change long term and short term local air quality. Air quality modelling indicates that the overall effect of the proposed scheme on local air quality would be, at worst, minor adverse on surrounding receptors and therefore not significant.

3.5 Landscape and Visual

3.5.1 The landscape and visual assessment considered effects of the Metrolink Trafford Park Line on the local landscape and changes to views from 20 viewpoint locations within the study area. The study area for the assessment was determined by the Zone of approximate Visual Influence (ZVI) of the Metrolink Trafford Park Line - this is the area over which the proposed scheme is potentially visible to receptors.

3.5.2 Three landscape character zones are identified within the study area: the Waterside Zone, the Trafford Park Industrial Zone, and the Leisure and Residential Zone.

3.5.3 The majority of the study area comprises the industrial area of Trafford Park and the commercial and leisure area of the Trafford Centre Rectangle. Due to the location of the Metrolink Trafford Park Line within an industrial area, there are few residential receptors that would be affected by the proposed scheme. Potential sensitive visual receptors therefore include:

- Visitors to local attractions including Old Trafford football stadium, Imperial War Museum North, Salford Quays, EventCity and the intu Trafford Centre;
- Users of the Bridgewater Canal;
- Users of the local footpath and cycle network;
- Users of the local road network; and
- Longer distance views from taller residential blocks around the Salford Quays area.

Construction

3.5.4 Significant tree losses would occur within the Waterside and Trafford Park Industrial Zones resulting in a substantial adverse effect on the landscape.

3.5.5 In addition, the demolition of buildings between Trafford Wharf Road and the Manchester Ship Canal waterfront would significantly alter the character and built structure of the Waterfront Zone.

8.1.1 Visual impacts are assessed as being adverse during the construction phase, with effects upon viewpoints closest to the construction works being significantly adverse. However, such effects would be temporary and would become beneficial during the proposed scheme operational phase.

Operation

3.5.6 Once the tram has been constructed and the soft landscaping works (including replacement trees and offsite planting) have matured, the Metrolink Trafford Park Line would have moderate beneficial effects upon the quality and value of the landscape in all three of the defined landscape character zones.

3.5.7 There would also be substantial beneficial effects on human interactions with the landscape as a result of improved pedestrian access.

8.1.2 The visual effects of the Metrolink Trafford Park Line, once the proposed scheme has bedded into the environment, would be almost entirely beneficial. The exceptions to this being:

- The impact on the central canal corridor section to the east of Trafford Road Bridge, where the tram alignment would result in significant loss of mature trees to the canal bank; and
- The impact on the Bridgewater Canal corridor through the increased width of the bridged section and the inclusion of an overhead line on the skyline.

3.6 Ecology and Nature Conservation

3.6.1 The EIA has considered the direct and in-direct effects of the Metrolink Trafford Park Line on ecology and nature conservation. Ecological information has been gathered through desk-based study and a range of field surveys.

3.6.2 The Trafford Ecology Park Local Nature Reserve (LNR) is located approximately 500 metres (m) to the north of the Metrolink Trafford Park Line and is of National Importance. There are four other non-statutory designated sites within 2 km of the Metrolink Trafford Park Line. Protected and/ or notable species recorded during the field surveys include black poplar, bat, and breeding birds. A number of invasive plant species were also identified.

Construction

3.6.3 The construction of the proposed scheme would not result in any direct effects on the Trafford Ecology LNR or the other non-statutory designated sites within 2 km of the Metrolink Trafford Park Line.

3.6.4 Potential effects on protected and/ or notable species would be mitigated through appropriate scheme design, programming of construction works to avoid sensitive breeding seasons, and the implementation of good site practices. The loss of trees and habitats (including black poplars) would be mitigated through replacement planting and landscaping works. A watching brief is

recommended during the demolition of buildings to avoid potential effects on roosting bats.

3.6.5 Following mitigation, ecological effects during construction of the Metrolink Trafford Park Line are not considered to be significant.

Operation

3.6.6 No significant ecological effects are predicted during the Metrolink Trafford Park Line operational phase.

3.7 Ground Conditions

3.7.1 An assessment of the effects of the Metrolink Trafford Park Line on ground conditions and hydrogeology was carried out. The assessment established the existing ground conditions within the footprint of the proposed scheme, with respect to soil, groundwater and ground-gas and used this information to identify potential risks to human health and environmental receptors. The assessment also considered how significant risks identified would be mitigated.

Construction

3.7.2 Construction of the Metrolink Trafford Park Line has the potential to impact upon ground conditions, such as the accidental release of oils and hydrocarbons from construction machinery and potential disturbance of historic contamination. However, with the implementation of good site practices, construction works are assessed as not resulting in any significant adverse effects on geology, soils and hydrogeology.

3.7.3 The assessment identified that during construction there is a risk to site workers, surrounding land uses, ecological sites, geology and groundwater associated with Unexploded Ordnance (UXO); the effect of which would potentially be moderate adverse and therefore significant. The appointed contractor would define an applicable UXO risk mitigation strategy in order to eliminate risks or reduce risks to an acceptable level.

Operation

3.7.4 With the appropriate scheme design, significant adverse effects on geology, soils and hydrogeology along the scheme route would be negligible during the Metrolink Trafford Park Line operational phase.

3.8 Water Resources

3.8.1 The effects of the Metrolink Trafford Park Line on surface waters and flood risk have been assessed. The proposed scheme would run adjacent to the Manchester Ship Canal off Trafford Wharf Road and cross the Bridgewater Canal south west of Parkway Circle.

3.8.2 The majority of the Metrolink Trafford Park Line is located in Flood Zone 1, meaning that it is considered to be at a low risk of flooding. A small area of the tram route adjacent to the intu Trafford Centre is located within Flood Zone 2, which is considered to be at medium risk of flooding.

Construction

3.8.3 Construction works could impact upon area water resources through the discharge of silt-laden site runoff, the spillage of construction material, the disturbance of historic contamination and via the disturbance of the existing drainage systems and water supply network.

3.8.4 With the implementation of good site practices, impacts on the Manchester Ship Canal and the Bridgewater Canal would be avoided such that any effects would not be significant.

Operation

3.8.5 During tram operation, sources of water pollution include oil leaks and petrol spillages from vehicles, car parks or storage facilities and from the application of fertilisers and pesticides to landscaped areas. With an appropriate drainage system and adherence to good site maintenance procedures, effects on water resources would not be significant.

3.8.6 Taking account of the proposed drainage strategy, the Flood Risk Assessment for the Metrolink Trafford Park Line shows that the proposed scheme would not increase flood risk. Therefore, effects on flooding due to the Metrolink Trafford Park Line are not considered to be significant.

3.9 Cultural Heritage

3.9.1 The cultural heritage assessment considered the potential effects of the Metrolink Trafford Park Line on historic buildings/ structures and archaeology (below ground remains).

3.9.2 Within the study area there are three designated listed buildings (Trafford Road Bridge, Trafford Park Hotel, and the Entrance Portal and Lodges to the Former White City Greyhound Track), ten non-designated assets and 16 non-designated structures. There are no World Heritage Sites, Scheduled Monuments,

Conservation Areas, Registered battlefields or Registered Parks and Gardens within the study area.

3.9.3 A review of the ground conditions along the Metrolink Trafford Park Line suggests there is a potential for archaeological features to be present at Parkway Circle and along Village Way.

Construction

3.9.4 During construction of the Metrolink Trafford Park Line, the 'Silent Cargoes' public art work adjacent to the Manchester Ship Canal would need to be relocated. A new location for the Silent Cargoes would be agreed with TMBC.

3.9.5 Following mitigation, the construction of the Metrolink Trafford Park Line would not have significant effects on cultural heritage assets or buried archaeology.

Operation

3.9.6 The operation of the Metrolink Trafford Park Line would change the setting of the Trafford Road Bridge and Trafford Park Hotel. The redevelopment of the area beneath Trafford Road Bridge (which currently shows signs of fly-tipping, graffiti and arson), and improvement to the character of the streetscape outside of the Trafford Park Hotel would have a moderate (and therefore significant) beneficial effect.

3.9.7 The setting of the Entrance Portal and Lodges to the Former White City Greyhound Track would not change as a result of the Metrolink Trafford Park Line as there is no visual relationship with the proposed scheme.

3.10 Socio-Economics

3.10.1 The Metrolink Trafford Park Line has the potential to generate an impact upon the local economy, employment, local businesses, the local population and visitors.

Construction

3.10.2 The construction of the Metrolink Trafford Park Line would require land to be acquired adjacent to the existing highway network. Transport for Greater Manchester would act in accordance with statutory guidance to minimise effects on affected businesses as far as practicable.

3.10.3 A number of commercial buildings would need to be demolished to construct the Metrolink Trafford Park Line. Where businesses would be required to relocate, Transport for Greater Manchester would endeavour to assist with the identification of relocation options within Trafford Park.

3.10.4 Several cycle routes within the proposed construction area are likely to be closed or diverted during the construction works. The effect of these temporary closures/ diversions on the local community is not considered to be significant.

3.10.5 Construction works would provide employment opportunities, the effect of which would be major beneficial and therefore significant.

Operation

3.10.6 The operation of the Metrolink Trafford Park Line would create job opportunities and would provide greater accessibility to employment sites in Trafford Park. The effect of the proposed scheme on the local population would be moderate beneficial, and therefore significant.

3.10.7 Operation of the Metrolink Trafford Park Line would improve accessibility to visitor attractions and accommodation. This could increase visitor numbers in the area and thus result in a moderate, and therefore significant, beneficial effect.

3.10.8 Operation of the Metrolink Trafford Park Line would provide better accessibility for staff, customers and clients of businesses. The effect of Metrolink Trafford Park Line operation on businesses would be moderate beneficial, and therefore significant.

3.10.9 The proposed scheme would enhance and provide new cycle ways, which would result in a moderate, and therefore significant, effect.

3.10.10 The Metrolink Trafford Park Line is anticipated to facilitate changes in land use in Trafford Park and is expected to encourage development. The operation of the proposed scheme would have a moderate, and therefore significant, beneficial effect on land use.

3.11 Carbon Assessment

3.11.1 It is estimated that construction of the Metrolink Trafford Park Line would result in a carbon footprint of approximately 5,730 tonnes of carbon dioxide equivalent (tCO_2e). Such a footprint would contribute an approximate 0.05% increase in Greater Manchester's total greenhouse gas emissions.

3.11.2 During the operation of the Metrolink Trafford Park Line, the estimated annual carbon footprint (for 2020) is 654 tCO_2e, mainly associated with electricity usage. This footprint is equivalent to approximately 0.2% of Manchester's total rail carbon emissions. However, it is anticipated that the proposed scheme would result in modal shift, with people opting to use the tram rather than private cars. Such a switch is estimated to result in a total greenhouse gas emission reduction of approximately 20,300 tCO_2e over the 60 year assessment period.

3.11.3 The Metrolink Trafford Park Line thus presents a strong case for low carbon transport within Greater Manchester and would make a measurable contribution to the city's carbon reduction targets.

3.12 Cumulative Assessment

3.12.1 Cumulative effects are those that can occur when two or more proposed developments affect the same environmental feature. Nine other developments in the vicinity of the Metrolink Trafford Park Line were identified as having the potential to result in cumulative effects with the proposed scheme.

3.12.2 The cumulative assessment indicates that moderate beneficial cumulative landscape and visual effects are expected to occur with respect to the former Kratos Site and the Monde Trading Estate developments. In addition, major beneficial cumulative socio-economic effects are expected to occur as a result of employment generation in the local area.

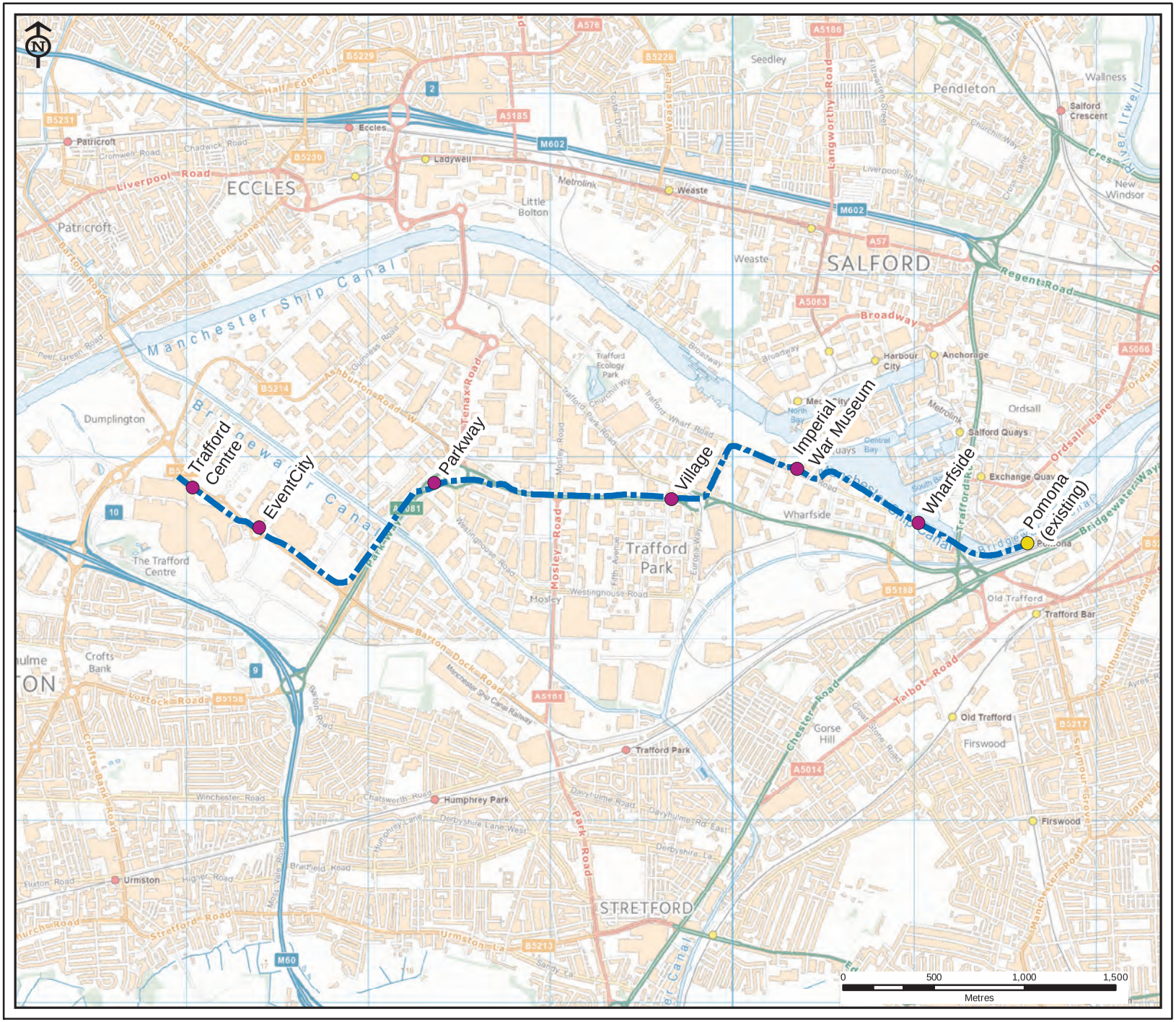
4 SUMMARY OF ENVIRONMENTAL EFFECTS

4.1.1 The ES identifies that appropriate design of the Metrolink Trafford Park Line and adherence to good site practices assist in avoiding significant environmental effects. A number of potentially significant residual effects (adverse and beneficial) associated with construction and operation of the Metrolink Trafford Park Line have been identified as follows:

- Temporary significant adverse construction noise effects in some locations along the route;
- Moderate adverse noise effects in some locations due to the combination of road traffic noise and operational tram noise;
- Temporary substantial adverse landscape and visual effects along the route during the construction phase as a result of tree losses;
- Substantial adverse visual effects resulting from the Bridgewater Canal crossing and the loss of mature trees to the east of Trafford Road Bridge;
- Moderate to substantial beneficial landscape effects during tram operation as a result of the proposed scheme being in keeping with the character of the area, improved pedestrian accessibility and tree planting;
- Risk to site workers, surrounding land uses, ecological sites, geology, and groundwater as associated with encountering UXO;
- Moderate beneficial effects on the setting of the listed Trafford Road Bridge and Trafford Park Hotel;
- Moderate and major beneficial socio-economic effects during both the construction and operational phases; and
- Moderate and major beneficial cumulative effects in terms of improved landscape effects and employment generation.

Transport for
Greater Manchester

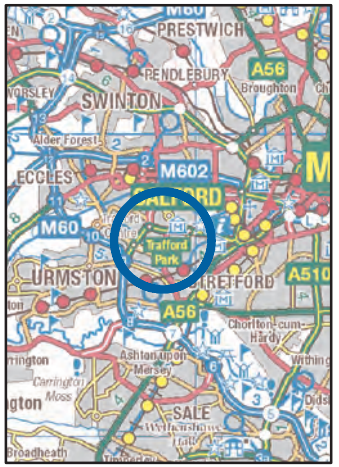
FIGURE NTS 1



Transport for Greater Manchester

Legend

- Indicative Route Centreline
- Existing Stop Location
- Proposed Stop Location



Location of Metrolink Trafford Park Line

Drawn	Checked	Approved	Date
G.Bloomer	K.Williams	K.Hands	Oct 2014

Project: TRANSPORT FOR GREATER MANCHESTER (LIGHT RAPID TRANSIT SYSTEM) (TRAFFORD PARK EXTENSION) ORDER

Document Ref: ENVIRONMENTAL STATEMENT

Figure Number: FIGURE NTS1

Figure Title: LOCATION PLAN

Scale:	Original Size:
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Transport for Greater Manchester

Chapter 1:

Introduction

1 INTRODUCTION

1.1 Background

1.1.1 Transport for Greater Manchester is submitting an application for a Transport and Works Act Order (TWAO), to construct and operate an extension of its Metrolink light rapid transit (LRT) system through Trafford Park (herein referred to as the 'Metrolink Trafford Park Line').

1.1.2 The proposed Metrolink Trafford Park Line comprises approximately 5.5 kilometres (km) of new LRT infrastructure between the existing Pomona Metrolink stop (National Grid Reference (NGR) SJ 8165 9655), the employment and regeneration areas of Trafford Park, and the intu Trafford Centre retail and leisure complex (NGR SJ 7705 9681) where the route would terminate (see Figures 1.1 and 1.2, Volume III of this Environmental Statement (ES)).

1.2 Purpose of this Document

1.2.1 URS Infrastructure & Environment UK Limited (URS) has been commissioned by Transport for Greater Manchester to undertake an Environmental Impact Assessment (EIA) for the proposed Metrolink Trafford Park Line. The findings of the EIA are reported in full within this ES, which accompanies the application for a TWAO.

1.2.2 The ES is designed to inform readers of the nature of the proposals; the potential beneficial and adverse environmental impacts arising from the construction and operation of the Metrolink Trafford Park Line; and the mitigation measures designed to avoid and reduce potentially significant adverse environmental effects. Residual effects (i.e. the environmental effects following mitigation measures) are also presented.

1.2.3 The ES is set out in three separate volumes:

- Volume I: Main Text (this document) – the main report;
- Volume II: Technical Appendices – contains supplementary details of environmental studies conducted during the EIA process (including relevant reports, data tables, figures and photographs); and
- Volume III: Figures – contains supporting figures.

1.2.4 A Non-Technical Summary (NTS) of the ES, a summary of the findings and conclusions of the ES presented in non-technical language, is provided as a standalone document. The NTS is also included in Volume I of the ES.

1.3 Overview of the Proposed Scheme

1.3.1 The proposed Metrolink Trafford Park Line would be a twin track extension to the existing Metrolink network (Figures 1.1 and 1.2, Volume III of this ES). A detailed description of the Metrolink Trafford Park Line proposals is provided in Chapter 4: Development Description.

1.3.2 The proposed alignment route would traverse an area south-west of Manchester city centre, comprising a mixture of commercial and industrial trade outlets and offices.

1.3.3 The extension would be approximately 5.5 km in length and would provide a link between the existing Pomona Metrolink stop, the employment and regeneration areas of Trafford Park, and the intu Trafford Centre. The extension is expected to comprise of mostly segregated tramway which would be integrated into the existing streetscape.

1.3.4 Six new tram stop locations are proposed in the vicinity of:

- Wharfside (referred to in this ES as the 'Wharfside stop');
- Imperial War Museum North (referred to in this ES as the 'Imperial War Museum stop');
- Village (referred to in this ES as the 'Village stop');
- Parkway Circle (referred to in this ES as the 'Parkway stop');
- EventCity (referred to in this ES as the 'EventCity stop'); and
- intu Trafford Centre (referred to in this ES as the 'Trafford Centre stop').

1.3.5 The list above provides provisional names for the tram stops for use within the TWAO application. The final stop locations and names are subject to detailed design and confirmation.

1.3.6 In addition to the track, support structures, overhead line equipment and stops, a variety of ancillary infrastructure is proposed to support the proposed services (e.g. public realm landscaping works, substations, stop equipment rooms, stabling sidings, boundary treatments, and signage etc.).

1.3.7 The proposals also include changes to the local road network, local accesses and provision for a Park and Ride facility which is expected to be located in the vicinity of the proposed Parkway tram stop.

1.4 Scheme Objectives

1.4.1 Extending the existing Metrolink network through Trafford Park would provide a quality, efficient and reliable public transport alternative to private cars. The

Metrolink Trafford Park Line would improve public accessibility to the existing employment, leisure and tourism market within Trafford Park and could be a catalyst for future development in the local area.

1.4.2 The main objectives of the Metrolink Trafford Park Line are thus:

- Stimulate regeneration and growth;
- Increase the potential employment catchment of Trafford Park by increasing its level of connectivity; and
- Provide viable alternatives to car travel.

1.5 Consenting Process

Transport and Works Act Order

1.5.1 Authority to construct the first Metrolink route in Greater Manchester was granted in January 1988 with the passing of the Greater Manchester (Light Rapid Transit System) Act 1988 (Ref. 1-1) and (No 2) Act 1988 (Ref. 1-2). Subsequent extensions have been consented by means of further Acts of Parliament and, from 1993, via TWAOs obtained under the Transport and Works Act 1992 (Ref. 1-3).

1.5.2 Under the Greater Manchester (Light Rapid Transit System) Act 1992 (Ref. 1-4), Transport for Greater Manchester obtained powers to construct, operate and maintain a Metrolink extension from Cornbrook to the Trafford Centre. In 1998, a TWAO application was submitted to the Secretary of State (SoS) for Transport to renew the powers of compulsory purchase and the associated Greater Manchester (Light Rapid Transit System)(Trafford Park) Order was made in 2001 (Ref. 1-5). Compulsory purchase powers obtained by way of the 2001 Order expired in March 2006.

1.5.3 In order for the Metrolink Trafford Park Line to proceed, Transport for Greater Manchester must obtain a new TWAO under the Transport and Works Act 1992 from the SoS for Transport. The new TWAO will grant powers to construct, operate, and maintain the whole length of the Metrolink Trafford Park Line, including powers to cross the Bridgewater Canal.

Other Consents Required

1.5.4 In tandem with the application for a TWAO, Transport for Greater Manchester has requested that the SoS for Transport issues a Planning Direction under section 90(2A) of the Town and Country Planning Act 1990 (Ref. 1-6). The Planning Direction will deem that planning permission is granted for any development authorised by the TWAO.

1.6 The Requirement for EIA

1.6.1 LRT systems fall within Annex II of the European Commission (EC) Directive 2011/92/EC (the 'EIA Directive') on the assessment of effects of certain public and private projects on the environment (Ref. 1-7) (amended by EC Directive 2014/52/EU) (Ref. 1-8), under Section 10 part (h):

"Tramways, elevated and underground railways, suspended lines or similar lines of a particular type, used exclusively or mainly for passenger transport".

1.6.2 The requirements of the EIA Directive in relation to TWAOs are implemented in England and Wales by the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 (Ref. 1-9) (the TWAO Rules) and by Regulations made under the European Communities Act 1972 (Ref. 1-10) (Statutory Instrument (SI) Nos. 1995/1541, 1998/2226, 2000/3199 and 2006/958).

1.6.3 Under the TWAO Rules, an EIA must be carried out for Annex II type projects where significant effects on the environment are predicted to occur. EIA is also more likely to be required where the proposed LRT system exceeds 2 km in length and or where the area of works is greater than 1 hectare (ha). As the proposed Metrolink Trafford Park Line exceeds this length and area, Transport for Greater Manchester has elected to undertake an EIA and produce an ES to accompany the TWAO application.

1.7 EIA Team

1.7.1 This ES has been compiled by URS and presents the results of the assessment of environmental impacts undertaken by technical specialists as presented in Table 1.1.

Table 1.1 EIA Team and Responsibility

Organisations	Expertise / EIA Input
Transport for Greater Manchester	Transport for Greater Manchester is the Applicant and has provided input into the ES introductory chapters (Chapters 1 - 4).
URS	ES coordinators; Authoring the ES introductory chapters (Chapters 1, 2, 3 and 4) and concluding chapter (Chapter 16); Authors of the following technical chapters and accompanying figures and technical appendices: - Planning Policy Context (Chapter 5); - Noise and Vibration (Chapter 6); - Air Quality (Chapter 7); - Ecology (Chapter 9); - Ground Conditions (Chapter 10); - Water Resources (Chapter 11); - Cultural Heritage (Chapter 12); - Socio-Economics (Chapter 13); and - Carbon Assessment (Chapter 14). Preparation of the NTS.
Steer Davies Gleave (SDG)	Input to Chapter 3: Alternatives
Austin – Smith: Lord	Authoring of the Landscape and Visual chapter (Chapter 8), associated figures and technical appendix.

1.7.2 The EIA process has been informed by a set of illustrative Technical Development Scheme Plans produced by Mott MacDonald, traffic modelling of the proposed Metrolink Trafford Park Line as carried out by SYSTRA, and a Transport Assessment (TA) authored by Mott MacDonald (Ref. 1-11). These documents and data have been submitted with the TWAO Application and are not reproduced within this ES.

1.8 References

Ref. 1-1 Her Majesty's (HM) Government (1988). 'Greater Manchester (Light Rapid Transit System) Act 1988'. Her Majesty's Stationery Office (HMSO), London.

Ref. 1-2 HM Government (1988). 'Greater Manchester (Light Rapid Transit System) Act (No 2) 1988'. HMSO, London.

Ref. 1-3 HM Government (1992). 'Transport and Works Act 1992'. HMSO, London.

Ref. 1-4 HM Government (1992). 'Greater Manchester (Light Rapid Transit System) Act 1992'. HMSO, London.

Ref. 1-5 HM Government (2001). 'Greater Manchester (Light Rapid Transit System) (Trafford Park) Order'. HMSO, London.

Ref. 1-6 HM Government (1990). 'Town and Country Planning Act'. HMSO, London.

Ref. 1-7 European Union (2011). 'Council Directive on the Assessment of the Effects of Certain Public and Private Projects on the Environment (2011/92/EU)'. Official Journal No. L 2012.026.0001.0021.

Ref. 1-8 European Union (2014). 'Amending Directive 2011/92/EU on the Assessment of the Effects of Certain Public and Private Projects on the Environment (2014/52/EU)'. Official Journal No. L 2012.026.0001.0021.

Ref. 1-9 HM Government (2006). 'Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006'. HMSO, London.

Ref. 1-10 HM Government (1972). 'European Communities Act 1972', HMSO, London.

Ref. 1-11 Transport for Greater Manchester (2014). 'Transport for Greater Manchester (Light Rapid Transit System) (Trafford Park Extension) Order: Transport Assessment'.

Transport for Greater Manchester

Chapter 2:

EIA Assessment Methods

2 EIA ASSESSMENT METHODS

2.1 Introduction

2.1.1 This chapter of the Environmental Statement (ES) sets out the overall approach and methodology for undertaking the Environmental Impact Assessment (EIA) of the proposed Metrolink Trafford Park Line, including the process for determining issues to be included within the scope of the assessment and the approach to assessing the significance of predicted environmental effects.

2.1.2 The EIA methodology used accords with applicable legislation and guidance and has been tailored to each environmental discipline (e.g. noise and vibration, socio-economics and ecology) using industry standard methods and criteria. The overall approach and methodology is described in this chapter, with further detail on the application of the methodology to each environmental topic presented in the respective ES technical chapter.

2.1.3 This chapter is supported by Technical Appendix A (Volume II of this ES).

2.2 The EIA Process

2.2.1 The EIA process is a formalised procedure for identifying significant environmental effects (beneficial and adverse) associated with a proposed development. The EIA process comprises three key stages: screening, scoping and assessment.

2.2.2 The screening stage determines if EIA is required for a particular scheme, and may involve the promoter requesting a screening opinion from the relevant authority. In this case, a Screening Direction was not requested from the Secretary of State (SoS) for Transport because the proposed Metrolink Trafford Park Line exceeds 2 km in length and 1 ha in area (Ref. 2-1) (the stipulated footprint over which LRT systems are likely to require EIA). Transport for Greater Manchester has, therefore, elected to undertake an EIA and produce an ES to accompany the TWAO application.

2.2.3 The scoping stage aims to define the technical, temporal and spatial scope required to assess the potentially significant effects of a scheme. The proposed scope of assessment may be set out in an EIA Scoping Report and an EIA Scoping Opinion requested from the relevant authority (in this case the SoS for Transport). The EIA Scoping Report produced for the Metrolink Trafford Park Line is described in Section 2.4.

2.2.4 The assessment stage involves data collection, prediction and assessment of likely scheme impacts and effects, and preparation of an ES to report the findings of the assessment. The ES aims to present information in a form that provides an opportunity for public scrutiny and assist stakeholders in the evaluation of the likely effects of the proposed scheme.

2.3 General Assessment Approach

2.3.1 The requirements of the EIA Directive (Ref. 2-1) in relation to TWAOs are implemented in England and Wales by the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 (Ref. 2-2) (the 'TWAO Rules') and by Regulations made under the European Communities Act 1972 (SI Nos. 1995/1541, 1998/2226, 2000/3199 and 2006/958) (Ref. 2-3).

2.3.2 As discussed in Chapter 1 (Introduction), the Metrolink Trafford Park Line falls within Annex II of the EIA Directive, under Section 10 part (h) (Ref. 2-1).

2.3.3 In preparing this ES, reference has been made to the following guidance:

- Department for Communities And Local Government (DCLG) 2014 – National Planning Practice Guidance (NPPG) (Ref. 2-4);
- Department for Transport (DfT) 2006 – A TWA Guide to Procedures (Ref. 2-5);
- Institute of Environmental Management and Assessment (IEMA) 2004 – Guidelines for Environmental Impact Assessment (Ref. 2-6); and
- Environment Agency 2002 – Scoping Guidance on the Environmental Impact Assessment of Projects (Ref. 2-7).

2.3.4 Additional guidance on assessment procedures is provided within best practice guidance relevant to each technical discipline. These documents are identified within the relevant technical chapters of this ES (i.e. Chapters 6 - 14).

2.3.5 The ES is based on a number of related activities, as follows:

- Establishing the baseline conditions for the ES;
- Consultation with statutory and non-statutory consultees;
- Consideration of relevant local, regional and national planning policies, guidelines and legislation relevant to EIA;
- Consideration of technical standards for the development of effect significance criteria;
- Design review;

- Review of secondary information, previous environmental studies, publicly available information and databases;
- Expert opinion;
- Physical surveys and monitoring;
- Desk-based studies;
- Modelling; and
- Reference to current guidance in relation to sustainability.

2.4 Determining the Scope of the Assessment

2.4.1 Establishing the scope of the assessment is a key step in the assessment process. An EIA scoping exercise for the Metrolink Trafford Park Line was carried out by URS and a formal request for a Scoping Opinion from the SoS for Transport (pursuant to Rule 8 of the TWAO Rules) was submitted in May 2014. The EIA Scoping Report satisfies the requirements of Rule 8 by providing a plan of the area, a description of the nature and purpose of the proposed works, and a description of the possible effects on the environment.

2.4.2 The EIA Scoping Report identified environmental receptors that could be affected by the Metrolink Trafford Park Line and made recommendations on what technical environmental disciplines should be scoped in and out of the assessment stage. The EIA Scoping Report also identified the proposed temporal scope of the assessment by defining various assessment scenarios (i.e. during the construction works and during the operational phase).

2.4.3 The SoS for Transport's Scoping Opinion was received on 26th June 2014. A copy of the Scoping Request, Scoping Opinion and any other correspondence received from stakeholders, are included in Technical Appendix A, Volume II of this ES.

2.4.4 Stakeholder comments and formal responses to the SoS for Transport's consultation on the EIA Scoping Report have been addressed within this ES.

EIA Scoping Consultation

2.4.5 The process of consultation is critical to the development of a scope of assessment that is comprehensive and balanced. The views of interested parties, as articulated through the Scoping Opinion, serve to focus the environmental studies upon those issues of potential significant effect and to identify specific issues which require further investigation.

2.4.6 As part of the scoping exercise, the SoS for Transport consulted with a total of four statutory/ non-statutory consultees, as follows:

- English Heritage;
- Environment Agency;
- Natural England; and
- Trafford Metropolitan Borough Council (TMBC).

2.4.7 This ES includes consideration of topics/ issues raised by the SoS for Transport and other consultees, as summarised in Table 2.1.

Table 2.1 EIA Scoping Consultation Summary

Consultee	Summary of Response
SoS for Transport	The SoS for Transport agreed that the scope of the assessment outlined in the Scoping Report would be appropriate and agreed that environmental aspects not identified in the Scoping Report can be scoped out of the EIA. The response included the following comments: Ground Conditions: Where historic uses have led to contamination of the soils and/ or ground water beneath the site, the risk management framework provided in 'Model Procedures for the Management of Land Contamination (Contaminated Land Regime (CLR) 11)' should be followed in relation to identification of risks and remediation options. Water Resources: The Flood Risk Assessment (FRA) should take account of the 'Manchester City, Salford City and Trafford Councils Strategic Flood Risk Assessment (SFRA)' and indicate how its aims would be met, in relation to control of surface water run-off. The ES should consider the potential for detrimental impacts on nearby licensed groundwater abstractions and on any private groundwater abstractions in the area which abstract less than 20 m^3, and should identify suitable mitigation methods. The ES should include an assessment of the impacts from the proposed scheme on all water bodies (surface and groundwater) to ensure there is no deterioration in status under the Water Framework Directive (WFD). Cultural Heritage: The assessment of the visual impact of the proposed scheme on the setting of designated heritage assets should also take account of English Heritage guidance in 'Seeing the History in the View'.

Table 2.1 EIA Scoping Consultation Summary	
Consultee	**Summary of Response**
English Heritage	English Heritage noted that the proposed scheme could potentially have an impact upon designated heritage assets and their settings in the area around the site. In line with the National Planning Policy Framework (NPPF), English Heritage would expect the ES to contain a thorough assessment of the likely effects which the proposed scheme might have upon these elements, which contribute to the significance of these assets. They went on to note that there is potential for the proposed scheme to impact upon the setting of four Grade II Listed Buildings. If a formal application is made it is likely that the Local Planning Authority would determine the impacts of the development on these buildings. English Heritage recommended that: • The Conservation Officer of Trafford Council and the archaeological staff at Greater Manchester Archaeological Advisory Service should be involved during the development of this assessment; • The assessment of the visual impact of the proposed scheme on the setting of designated heritage assets should also take account of English Heritage advice provided in their guidance document 'Seeing the History in the View'; • The assessment should also take account of the potential impact that associated activities (such as construction activity, servicing and maintenance, and associated traffic) might have upon perceptions, understanding and appreciation of heritage assets in the area; and • The assessment should also consider, where appropriate, the likelihood of alterations to drainage patterns that might lead to *in situ* decomposition or destruction of below ground archaeological remains and deposits, and can also lead to subsidence of buildings and monuments.

Table 2.1 EIA Scoping Consultation Summary	
Consultee	**Summary of Response**
Environment Agency	The Environment Agency recommended that the FRA should consider the content of the Council's SFRA and meet its aims in relation to control of surface water run-off. Regarding contamination, the Environment Agency expects the EIA to consider the impacts the proposed scheme may have in relation to contamination at the site and detail any required mitigation measures to prevent adverse effects on the water environment. They state that if a Preliminary Risk Assessment (as defined in CLR11) highlights potential risks to the water environment, the developer will be required to: • Undertake a site investigation to determine the nature and extent of contamination; • Carry out a risk assessment to identify any unacceptable risks to the water environment; and • Prepare a remediation strategy to ensure that any unacceptable risks are appropriately mitigated both during and post construction. Regarding water resources, the Environment Agency state that the proposed scheme should not have any detrimental impacts on nearby licensed groundwater abstractions. If an impact is identified suitable mitigation methods must be put into place. The proposed scheme should also consider any private groundwater abstractions in the area which abstract less than 20 m^3. As part of the EIA, the Environment Agency expect that an assessment is made of the impacts from the proposed scheme against all water bodies (surface and groundwater) to ensure there is no deterioration in status under the WFD. Reference should also be made to the North West River Basin Management Plan.
Natural England	Natural England advise that it is not a priority for them to advise on the detail of this EIA as the proposed scheme does not appear, from the information provided, to affect any national designated geological or ecological sites or landscapes (National Parks, Areas of Outstanding Natural Beauty (AONBs), Heritage Coasts, National Trails), or have significant impacts on the protection of soils (particularly of sites over 20 ha of best or most versatile land), nor is the proposed scheme a mineral or waste site of over 5 ha. A list of standard requirements was provided with the response. This is included with a copy of the consultation responses in Technical Appendix A (Volume II of this ES).
TMBC	No response received at the time of publication.

2.4.8 The Scoping Opinion received from the SoS for Transport was used to define the scope of the EIA carried out and reported in this ES. The following topics were identified as requiring detailed assessment and these have been addressed in following chapters of this ES:

- Planning Policy Context (Chapter 5);
- Noise and Vibration (Chapter 6);
- Air Quality (Chapter 7);
- Landscape and Visual (Chapter 8);
- Ecology and Nature Conservation (Chapter 9);
- Ground Conditions (Chapter 10);
- Water Resources and Flood Risk (Chapter 11);
- Cultural Heritage (Chapter 12); and
- Socio-economics (Chapter 13).

2.4.9 Subsequent to the Scoping process, it has been determined that in accordance with the 2014 amendment (Directive 2014/52/EU) (Ref. 2-8) to the EIA Directive (2011/92/EC) (Ref. 2-1), the effects of the Metrolink Trafford Park Line on climate (for example greenhouse gas emissions) should be considered in the EIA process. In line with emerging best practice, a carbon assessment is provided in Chapter 14 (Carbon Assessment) of this ES.

2.4.10 Impacts on road traffic are assessed and reported within the Transport Assessment (TA) produced by Mott MacDonald, which accompanies the TWAO application under separate cover (Ref. 2-9). Where transport, traffic and access impacts could cause knock-on environmental effects (i.e. noise, air quality, views and severance), these are considered within Chapters 6 (Noise), 7 (Air Quality), 8 (Landscape and Visual) and 13 (Socio-economics) respectively.

2.4.11 A Flood Risk Assessment (FRA) has been undertaken for the Metrolink Trafford Park Line (and is reported in Technical Appendix F2, Volume II of this ES). Relevant conclusions of the FRA are summarised within Chapter 11 (Water Resources and Flood Risk).

2.4.12 Cumulative effects are considered in Chapter 15 (Cumulative Assessment).

2.4.13 A summary of significant effects, mitigation measures and residual effects (effects that remain following the implementation of defined mitigation measures) is provided in Chapter 16 (Summary).

Post-Scoping EIA Consultation

2.4.14 As part of the EIA process, the views of consultation bodies and the local community have been sought to focus the environmental studies and to identify specific issues that require further investigation as well as to inform aspects of the design of the Metrolink Trafford Park Line.

2.4.15 In addition to consultation undertaken during the EIA scoping process, consultation with statutory EIA consultees and non-statutory bodies has been on-going throughout the EIA process as detailed below.

EIA Consultation

2.4.16 In July 2014, EIA consultation letters were issued to a number of parties considered likely to be interested in the proposed Metrolink Trafford Park Line, such as neighbouring local councils, Trafford's Parish Councils, the Highways Agency, Sustrans and wildlife groups. The stakeholders issued with the EIA consultation letter are listed in Table 2.2. A copy of this consultation letter is provided in Technical Appendix A (Volume II of this ES).

2.4.17 The consultation letter served to introduce the proposals and the EIA process to the consultees and to invite their comments. Respondents were asked to respond by the 15th July 2014 and extensions to 25th July 2014 were granted upon request.

2.4.18 At the time of publication of this ES, four responses have been returned. A summary of the responses and the way in which this has been considered in the EIA is provided in Table 2.2.

Other Related Consultation

2.4.19 Transport for Greater Manchester also undertook consultation with TMBC's Planning Service regarding the need for Listed Building consent in respect of the Grade II listed Trafford Road Bridge. Representatives from both parties met on site on 25th September to discuss the likely civil engineering works where the Metrolink would pass beneath the structure and determine the requirement for Listed Building consent. It was subsequently confirmed by TMBC's Planning Service (via email on 2nd October 2014) that fixings to the bridge structure to support overhead wires for the Metrolink would not require an application for Listed Building consent. A copy of this email correspondence is provided in Technical Appendix A (Volume II of this ES).

Table 2.2 Post Scoping Consultation: Summary of Responses			
Consultee	**Date of Response**	**Summary of Response**	**Consideration in the EIA**
Altrincham Town Centre Partnership	No response		
Carrington Parish Council	No response		
Dunham Massey Parish Council	No response		
Highways Agency	No response		
Lancashire Wildlife Trust	No response		
Bridgewater Canal Company Ltd. (formerly Manchester Bridgewater Canal Company)	15th July 2014	Their response outlines design and construction requirements for the crossing and requests that potential aesthetic issues such as noise and visual effects should be considered.	Design and construction issues are dealt with by the design team. Noise and visual effects are considered in Chapters 6 (Noise and Vibration) and 8 (Landscape and Visual) of this ES respectively.
Manchester City Council	22nd September 2014	Manchester City Council supports the overall scheme. They are supportive of improving access to employment opportunities at the western section of the regional centre including Salford/ Trafford Quays, Trafford Park and the Trafford Centre, and support the park-and-ride proposals. They also note that they would like to see good provision for cyclists in line with facilities being provided on the other new tram lines currently being constructed.	Provision for cyclists is considered in the TA, which accompanies the TWAO application under separate cover (Ref. 2-9). A summary is provided in Chapter 4 (Development Description) of this ES.

Table 2.2 Post Scoping Consultation: Summary of Responses			
Consultee	**Date of Response**	**Summary of Response**	**Consideration in the EIA**
Partington Parish Council	No response		
Royal Society for the Protection of Birds (RSPB)	No response		
Salford City Council	No response		
South Lancashire Bat Group (SLBG)	30th August 214	The SLBG response confirms that their records for the area had been provided to the LRC. Their response states that the view of the SLBG is that if buildings, structures and trees along the route and inside an appropriate buffer zone around it are surveyed for bat potential in accordance with appropriate guidelines, then this will guide any mitigation required and preserve or hopefully enhance the ecology of this area. SLBG do not have any specific observations about the proposals and its effects on the bat populations.	Potential effects on the bat population in the area are considered in Chapter 9 (Ecology and Nature Conservation) of this ES.
Stretford Town Centre Partnership	No response		

Table 2.2 Post Scoping Consultation: Summary of Responses			
Consultee	**Date of Response**	**Summary of Response**	**Consideration in the EIA**
Sustrans	15th July 2014	Requests that cycle ways be designed with journey time and the safety of riders in mind, in particular at crossings and junctions. Provides suggestions for cycle route improvements for consideration during the detailed design of the proposed scheme.	Transport and Access issues are dealt with in detail in the TA, which accompanies the TWAO application under separate cover (Ref. 2-9). A summary is provided in Chapter 4 (Development Description) of this ES.
TMBC (Planning Service)	2nd October 2014	Confirms that the proposed fixings to the Trafford Park Bridge would not require an application for Listed Building consent.	Impacts and effects on Listed Buildings are considered in Chapter 12 (Cultural Heritage) of this ES.
United Utilities	No response		
Urmston Partnership	No response		
Warburton Parish Council	No response		

Topic-Specific EIA Consultation

2.4.20 The technical authors have undertaken topic-specific consultation during the assessment process. Each technical chapter within this ES (Chapter 6 - 14) provides an account of this process.

Transport for Greater Manchester Stakeholder Engagement

2.4.21 Separate to the EIA process, Transport for Greater Manchester has engaged with a range of stakeholders and businesses within the Trafford Park area. Feedback from the stakeholder engagement process was provided to the engineering and design team at weekly project team meetings and has informed both the design of the Metrolink Trafford Park Line and the EIA.

2.4.22 Further information pertaining to Transport for Greater Manchester's stakeholder engagements is reported within Transport for Greater Manchester's

Report Summarising Consultations Undertaken, which accompanies the TWAO application under separate cover.

Spatial Scope of the EIA: Study Areas

2.4.23 The ES considers the potential impacts on all land that may be affected by the Metrolink Trafford Park Line. As such, an overarching EIA Study Area has been defined in consideration of the nature of potential impacts and the location of potentially affected environmental resources or receptors. The EIA Study Area includes all land within the estimated construction footprint and all permanent land take required to construct and operate the Metrolink Trafford Park Line (including land for ancillary works, such as highway works and service diversions).

Construction Footprint

2.4.24 The construction footprint is the area within which site clearance, demolition and construction activities are expected to take place. It includes areas requiring vegetation clearance and ground preparation works, land that would be built upon, and land used for temporary construction compounds, working space and access.

Operational Phase Footprint

2.4.25 This is the area of land that is expected to be permanently affected by the Metrolink Trafford Park Line and comprises land required for the track, support structures, overhead line equipment and tram stops, park and ride facility, highway works and ancillary infrastructure.

Technical Study Areas

2.4.26 The technical chapters of this ES (Chapters 6 - 14) describe as necessary their topic specific spatial scope including their rationale for determining the specific area within which the assessment is focused (the 'Technical Study Area').

Temporal Scope of the EIA: Assessment Scenario Years

2.4.27 The approach to assessment has been to assess the environmental impacts of the Metrolink Trafford Park Line at key stages in its construction and operation. These are, where appropriate, then compared to the situation prevailing before the construction of the Metrolink Trafford Park Line has commenced (i.e. the baseline), and, if relevant, to the situation that would prevail in the future without the Metrolink Trafford Park Line (referred to in this ES as the 'Do Minimum' scenario).

2.4.28 The assessment scenarios considered within this ES are described in the following sections.

Current Baseline

2.4.29 Typically, the current baseline year described within this ES is 2014; however, as necessary, a topic-specific baseline year has been selected for the purposes of each technical assessment, depending on their individual requirements. For example, chapters that are based on the traffic modelling outputs (Noise and Vibration and Air Quality) use a baseline year of 2013.

Future Baseline

2.4.30 A number of chapters in the ES have used a projected future baseline to enable consideration of future Do Minimum traffic scenarios and to assess how the establishment of proposed mitigation (e.g. landscaping works) would reduce the significance of predicted effects.

Construction Phase

2.4.31 The construction phase is the period of time within which the site would be cleared, any required demolition undertaken and the proposed Metrolink Trafford Park Line constructed. The construction phase is anticipated to extend from 2016 to 2020 and is described in further detail in Chapter 4: Development Description of this ES.

Operational Phase

2.4.32 The operational phase of the Metrolink Trafford Park Line is anticipated to commence in 2020 (the 'Opening Year'), which represents the current assumption regarding commencement of full operation of Metrolink Trafford Park Line services (assumed to be following completion of the construction of the Metrolink Trafford Park Line).

Scope of the EIA Cumulative Assessment

2.4.33 As required by Schedule 1 of the TWAO Rules (Ref. 2-2), this ES considers the potential for cumulative effects with other developments (Chapter 15 (Cumulative Assessment) of this ES).

2.4.34 A total of nine proposed and consented developments located in the vicinity of the Metrolink Trafford Park Line were identified as having potential to result in cumulative effects:

- Land adjacent to west of Trafford Boulevard, Trafford Park (74815/O/2010);
- Former Kratos Site, Barton Dock Road/ Mercury Way, Trafford Park (H/OUT/70189);

- Former Kratos Site, Barton Dock Road, Trafford Park (80470/O/2013);
- Former Kratos site, Mercury Way, Davyhulme (82046/FULL/2013);
- Demolition Direct, Tenax Circle, Tenax Road, Trafford Park (H/70807 and 78816/RENEWAL/2012);
- Vacant land at Mosley Road/ Mellors Road, Stretford (81497/O/2013 and 82696/RM/2014);
- Mode Wheel Locks, Trafford Wharf Road, Trafford Park (81863/FULL/2013);
- Monde Trading Estate, Westinghouse Point, Trafford Park (82525/O/2014); and
- Land known at Trafford Quays, bound by Trafford Way and Trafford Boulevard, Urmston (75931/FULL/2010).

2.4.35 The information and planning status of the cumulative schemes was compiled using publically available online sources[1] and was understood to be correct as of 2nd September 2014.

2.5 Assessment of Effects and Defining Significance

2.5.1 This ES identifies and assesses the likely significant environmental effects of the Metrolink Trafford Park Line in relation to both the construction and operational phases. Environmental effects have been evaluated with reference to definitive standards and legislation where available.

Resources and Receptors

2.5.2 This EIA assesses environmental effects on resources and receptors, which are generally defined as follows:

- Resources are defined as features or items of 'environmental capital'; examples include heritage assets, aquifers, access routes and community facilities; and
- Receptors comprise the biophysical features of the environment including human beings, either individually or collectively, and other organisms, including habitats.

2.5.3 In a few cases these terms can be used interchangeably, an example being where potential effects of pollution would impact on a resource such as a water body,

[1] Planning application information has been obtained from the TMBC website (http://www.trafford.gov.uk/planning/planning.aspx)

which would also be a receptor of the pollution (as well as being a pathway to organisms which would be considered to be receptors).

2.5.4 The EIA process has included the identification of resources and receptors/ receptor groups likely to be impacted during the construction phase and once the Metrolink Trafford Park Line is complete and operational.

Significance Criteria

2.5.5 The significance of residual effects has been evaluated with reference to legislation, definitive standards, and accepted criteria relevant to the individual technical studies. Where it has not been possible to quantify effects, qualitative assessments have been carried out, based on available knowledge and professional judgment. Where uncertainty exists, this has been noted in the relevant technical chapter.

2.5.6 The significance criteria generally lead to a common outcome of classifying the significance of effects as major, moderate, minor or negligible. Effects are also described according to whether they are considered to be adverse, neutral or beneficial. Methodologies and criteria definitions necessarily differ between different technical studies, but where possible the same language is used, such that the significance of the residual effects can be compared.

2.5.7 Specific significance criteria for effects have been developed, giving due regard to the following:

- Extent and magnitude of the impact;
- Duration of effect (whether short, medium or long-term);
- Nature of effect (whether direct or indirect, reversible or irreversible);
- Whether effects occur in isolation, are cumulative or interactive;
- Performance against environmental quality standards;
- Sensitivity of resources/ receptors; and
- Compatibility with environmental policies.

2.5.8 For effects where definitive quality standards do not exist, significance has been based on the:

- Local, regional or national scale of the effect;
- Number of resources/ receptors affected;
- Sensitivity of these resources/ receptors;
- Duration of the effect; and

- Professional experience and judgement of the assessor.

2.5.9 In order to provide a consistent approach to the treatment of different technical effects, the following terminology has been used in the ES to define residual effects:

- Adverse - Detrimental or negative effects to an environmental resource/ receptor;
- Neutral - Effects to an environmental resource/ receptor that are neither advantageous or detrimental; and
- Beneficial - Advantageous or positive effect to an environmental resource/ receptor.

2.5.10 Where adverse or beneficial effects have been identified, these generally have been assessed against the following scale:

- Negligible - Imperceptible effects to an environmental resource/ receptor;
- Minor - Slight, very short or highly localised effect;
- Moderate - Limited effect (by extent, duration or magnitude); and
- Major - Considerable effect (by extent, duration or magnitude) of more than local scale or in breach of recognised acceptability, legislation, policy or standards.

2.5.11 In cases where this scale has not been applied (for example, the ecology impact assessment), the alternative approach used has been described in the relevant technical chapter.

2.5.12 Unless otherwise stated in the technical chapters, the matrix provided in Table 2.3 has been applied to assign effect significance.

Table 2.3 Significance of Effect Matrix

Sensitivity of Resource/ Receptor		Magnitude of Impact			
		Negligible	**Low**	**Medium**	**High**
	High	Minor	Moderate	Major	Major
	Medium	Negligible	Minor	Moderate	Major
	Low	Negligible	Negligible	Minor	Moderate
	Negligible	Negligible	Negligible	Negligible	Minor

2.5.13 For the purposes of this EIA, **moderate** and **major** effects are considered to be significant.

2.5.14 Each technical chapter provides details of the significance criteria used for quantifying residual effects, including data sources and justifications. Where possible, this has been based upon quantitative and accepted criteria, together with the use of value judgement and expert interpretation to establish to what extent an effect is significant. Potential interactive and in-combination effects have been considered as appropriate (e.g. the effect of construction traffic upon noise effects).

2.5.15 In the context of the Metrolink Trafford Park Line, short term effects are considered to be those associated with the construction phase; long term effects are those associated with the completed, operational development; and permanent effects are those that extend beyond the operational lifetime of the scheme (i.e. the post-operational phase).

2.5.16 Effects on areas on the scale of the Trafford Borough region are considered to be at a regional level. Smaller scale effects are considered to be at a local level. Effects that cover different parts of the country, or England as a whole, are considered to be at a national level.

2.6 Assumptions and Limitations

2.6.1 As required by Schedule 1 of the TWAO Rules (Ref. 2-2), the ES provides an indication of any difficulties encountered during the EIA process.

2.6.2 A number of assumptions have been made during preparation of this ES, which are set out as follows:

- The principal land uses within the EIA Study Area remain as they are at the time of the ES submission;
- Assumptions have been made regarding proposed use of construction plant, working hours and phasing of works paying due regard to Transport for Greater Manchester's draft Code of Construction Practice, a final draft of which accompanies the TWAO application under separate cover; and
- Information provided by third parties, including publicly available information and databases, is correct at the time of ES publication.

2.6.3 The EIA has been subject to the following limitations:

- Baseline conditions are accurate at the time of physical surveys but, due to the dynamic nature of the environment, conditions may change during the construction and operational phases;

- Final information regarding the construction phase of the proposed works was not available at the time of ES publication;
- Reliance upon traffic modelling data and the TA (Ref. 2-9), which have been produced by third parties;
- The EIA has been undertaken based on the Metrolink Trafford Park Line indicative designs and information available at the time of ES publication; and
- The assessment of cumulative effects has been reliant on the availability of information on the proposed and consented development schemes identified.

2.6.4 Where appropriate, assumptions and limitations specific to certain environmental aspects are discussed in the relevant technical chapters of this ES (Chapters 6 - 14).

2.7 ES Composition

2.7.1 The ES contains the environmental information required by Rule 11 and Schedule 1 of the TWAO Rules (Ref. 2-2) and comprises three volumes and a standalone Non-Technical Summary (NTS).

2.7.2 **Volume I (Environmental Statement - Main Text)** - Chapters 1 to 5 describe the Metrolink Trafford Park Line, the EIA assessment methods and the legal and policy framework within which the application will be determined. These chapters include details of how the route was selected and how the design and layout has evolved to reflect and mitigate potential environmental effects. Chapters 6 to 14 contain the individual technical assessments undertaken for identified environmental issues scoped into the EIA. The assessment of the likely significant effects of the Metrolink Trafford Park Line is contained within this principal document. The contents of Volume I of this ES are listed in Table 2.4.

Table 2.4 Contents of the ES (Volume I)

Chapter Number	Title
-	Non-Technical Summary (NTS)
1	Introduction
2	EIA Assessment Methods
3	Alternatives and Design Evolution
4	Development Description

Table 2.4 Contents of the ES (Volume I)	
Chapter Number	**Title**
5	Planning Policy Context
6	Noise and Vibration
7	Air Quality
8	Landscape and Visual
9	Ecology and Nature Conservation
10	Ground Conditions
11	Water Resources and Flood Risk
12	Cultural Heritage
13	Socio-economics
14	Carbon Assessment
15	Cumulative Assessment
16	Summary

2.7.3 **Volume II (Technical Appendices)** – This volume contains supplementary details of the environmental studies conducted during the EIA process (including relevant reports, data tables, figures and photographs) which support the individual technical assessments. The contents of Volume II are listed in Table 2.5.

Table 2.5 List of Appendices (Volume II)		
Technical Appendix ID	**Corresponding Chapter**	**Title**
A1	Chapter 2: EIA Assessment Methods	EIA Scoping Report
A2		EIA Scoping Opinion
A3		Other Stakeholder EIA Consultation
B	Chapter 6: Noise and Vibration	Noise and Vibration

Table 2.5 List of Appendices (Volume II)		
Technical Appendix ID	**Corresponding Chapter**	**Title**
C	Chapter 8: Landscape and Visual	Landscape and Visual Assessment Methodology
D1	Chapter 9: Ecology and Nature Conservation	Phase 1 Habitat Survey Report
D2		Water Vole and Otter Appraisal
D3		Bat Roost Potential Appraisal
D4		Schedule 9 Plant Species Survey Report
D5		Bat Survey Report
E1	Chapter 10: Ground Conditions	Land Contamination Regulations and Guidance
E2		Site Photographs
E3		Historic mapping Data Review
E4		Walkover Survey
E5		Bedrock BGS Borehole Review
F	Chapter 11: Water Resources and Flood Risk	Flood Risk Assessment
G	Chapter 12: Cultural Heritage	Cultural Heritage Baseline Information
H	Chapter 14: Carbon Assessment	Carbon Assessment Supporting Information

2.7.4 **Volume III (Figures)** – This volume contains the figures which support the individual technical assessments. The contents of Volume III are listed in Table 2.6.

Table 2.6 List of Figures (Volume III)		
Corresponding Chapter	**Figure Number**	**Title**
1	1.1	Location Plan
	1.2	Location Plan (Aerial Photograph)

Table 2.6 List of Figures (Volume III)		
Corresponding Chapter	**Figure Number**	**Title**
6	6.1	Measurement Locations
	6.2	Receptor Locations
7	7.1	Diffusion Tube Locations and Air Quality Receptor Locations
8	8.1	Character Areas
	8.2	Tree Removal Plan (Sheets 1 – 4)
	8.3	Visual Envelope Map
	8.4	Viewpoint Location Plan
	8.5a	Viewpoint 1
	8.5b	Viewpoint 2
	8.5c	Viewpoint 3
	8.5d	Viewpoint 4
	8.5e	Viewpoint 5
	8.5f	Viewpoint 6
	8.5g	Viewpoint 7
	8.5h	Viewpoint 8
	8.5i	Viewpoint 9
	8.5j	Viewpoint 10
	8.5k	Viewpoint 11
	8.5l	Viewpoint 12
	8.5m	Viewpoint 13
	8.5n	Viewpoint 14

Table 2.6 List of Figures (Volume III)		
Corresponding Chapter	**Figure Number**	**Title**
	8.5o	Viewpoint 15
	8.5p	Viewpoint 16
	8.5q	Viewpoint 17
	8.5r	Viewpoint 18
	8.5s	Viewpoint 19
	8.5t	Viewpoint 20
9	9.1	Designated Sites (East) Sheet 1 of 2
		Designated Sites (West) Sheet 2 of 2
	9.2	Phase 1 Habitat Survey (Sheets 1 -13)
10	10.1	Ground Conditions Study Area (East) Sheet 1 of 2
		Ground Conditions Study Area (West) Sheet 2 of 2
	10.2	Geology (East) Sheet 1 of 2
		Geology (West) Sheet 2 of 2
	10.3	Potential Contaminating Historic Land Uses (East) Sheet 1 of 2
		Potential Contaminating Historic Land Uses (West) Sheet 2 of 2
11	11.1	Waterbodies (East) Sheet 1 of 2
		Waterbodies (West) Sheet 2 of 2
12	12.1	Heritage Assets (East) Sheet 1 of 2
		Heritage Assets (West) Sheet 2 of 2

Table 2.6 List of Figures (Volume III)		
Corresponding Chapter	**Figure Number**	**Title**
13	13.1	Socio-Economic Study Area
	13.2	Lower Super Output Area
	13.3	Visitor Attractions
	13.4	Visitor Accommodation
	13.5	Local Community Assets
	13.6	Other Businesses
	13.7	Residential
15	15.1	Cumulative Developments

2.8 Structure of the ES Technical Chapters

2.8.1 For ease of reference, the assessment of each topic in the ES is presented within a common chapter structure as presented in Table 2.7. As deemed necessary by the chapter author, the structure of the ES chapters might vary from this.

Table 2.7 Common ES Chapter Structure	
Section	**Contents Description**
Introduction	The introduction details the authorship of the technical assessment chapter, provides a brief summary of what is considered in the chapter and provides any relevant background information.
Legislation and Planning Policy Context	A short summary of the legislation, plans and policy relevant to the technical assessment is provided in each technical chapter.

Table 2.7 Common ES Chapter Structure	
Section	**Contents Description**
Assessment Methods and Effect Significance Criteria	The methodology section of chapters includes: • Topic specific guidance or standards which have been utilised; • The basis for the scope of assessment, including details of consultation which has provided data and informed the scope and methods of assessment; • Details of research carried out and the methodology for determining baseline data and sensitive receptors (including any desk study, surveys and modelling undertaken) to inform the assessment; • The method of assessing impacts and determining whether effects are likely to be significant; and • A description of any limitations regarding methodology, data availability or assumptions made during the assessment.
Baseline Description	In order to assess the potential impacts of the Metrolink Trafford Park Line, it is necessary to determine the environmental conditions that currently exist on the Site and in the surrounding area. The Study Area relating to the specific discipline is defined in each technical chapter. The environmental conditions within the Study Area are known as 'baseline conditions' and are considered in the context of each assessment. Technical chapters include details regarding any baseline data acquired by research or survey and the identification of resources or receptors that could be impacted by the development.
Impacts Avoidance Measures	This section of the technical chapters describes the way in which environmental impacts relating to that particular technical study have been mitigated through design and/ or management. Impact avoidance measures are typically: • Standard and not new/ untested (e.g. routing of the line to avoid environmental designations, ornamental planting to minimise visual impacts); and • Deliverable (e.g. through a planning condition).
Assessment of Impacts and Effects	This section considers the potential environmental impacts resulting from the Metrolink Trafford Park Line during Site preparation, construction and operation. The assessment addresses short-term (construction phase), long-term (operational phase) and permanent impacts (post-operational phase). The section describes each identified potential impact and discusses the significance of resultant effects on the stated receptors. Quantitative assessments of magnitude of each identified impact are made as far as possible.

Table 2.7 Common ES Chapter Structure	
Section	**Contents Description**
Additional Mitigation	The chapters report on any mitigation measures which are designed to prevent, reduce or offset any significant adverse effects identified in the assessment of impacts and effects. Mitigation may also include a recommendation for any future monitoring and environmental management that could be considered necessary to verify predictions and/ or fine tune mitigation measures, or to ensure that potential effects are adequately controlled.
Residual Effects and Conclusions	The effects of a development that remain following the implementation of available mitigation measures are known as 'residual effects'. This section assesses the significance of identified effects following implementation of the proposed mitigation measures and considers whether the Metrolink Trafford Park Line is likely to cause significant residual effects.

2.9 References

Ref. 2-1 European Union (2011). 'Council Directive on the Assessment of the Effects of Certain Public and Private Projects on the Environment (2011/92/EU)'. Official Journal No. L 2012.026.0001.0021.

Ref. 2-2 HM Government (2006). 'Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006'. Her Majesty's Stationery Office (HMSO), London.

Ref. 2-3 HM Government (1972). 'European Communities Act 1972'. HMSO, London.

Ref. 2-4 DCLG (2014). 'National Planning Practice Guidance'. Available from: http://planningguidance.planningportal.gov.uk/blog/guidance/

Ref. 2-5 DfT (2006). 'A TWA Guide to Procedures'.

Ref. 2-6 IEMA (2004). 'Guidelines for Environmental Impact Assessment' (and the 2006 update on legal matters contained within the Guidelines).

Ref. 2-7 Environment Agency (2002). 'Scoping Guidance on the Environmental Impact Assessment of Projects'.

Ref. 2-8 European Union (2014). 'Council Directive on the Assessment of the Effects of Certain Public and Private Projects on the Environment (2014/52/EU)'. Official Journal No. L 2014.124.01.0001.01.

Ref. 2-9 Mott MacDonald (2014). 'Metrolink Trafford Park Line Transport Assessment'.

Transport for Greater Manchester

Chapter 3:

Alternatives and Design Evolution

3 ALTERNATIVES AND DESIGN EVOLUTION

3.1 Introduction

3.1.1 This chapter of the Environmental Statement (ES) describes the background to the development of the proposed Metrolink Trafford Park Line and the considerations and constraints that have influenced the selection of the proposed route as well as the scheme design principles and considerations of environmental effects. This chapter outlines the alternatives that have been considered and details how the proposals have evolved.

3.1.2 The consideration of alternatives and a design evolution process has been undertaken, which has included consideration of environmental effects (following the hierarchy to avoid, reduce and, if possible, remedy), while maintaining a high-quality mode of public transport that ensures Trafford Park is accessible from across Greater Manchester.

3.1.3 The Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 (Ref. 3-1) states that the ES should include an outline of the main alternatives that have been studied and an indication of the main reasons for the decisions made, taking into account potential environmental effects.

3.1.4 This chapter is supported by Figure 3.1 provided in ES Volume III.

3.2 Background

3.2.1 Statutory powers to construct and operate a 'Trafford Park Line Metrolink Extension' were first acquired under the Greater Manchester (Light Rapid Transit System) Act 1992 (Ref. 3-2) (herein referred to as the 'Formerly Authorised Route'). Compulsory Purchase powers were subsequently renewed through the Greater Manchester (Light Rapid Transit System) (Trafford Park) Order 2001 (Ref. 3-3). The Formerly Authorised Route extended from the existing Metrolink at the Pomona stop to the intu Trafford Centre via Wharfside Way, Third Avenue, Westinghouse Road and alongside the Bridgewater Canal before terminating at the intu Trafford Centre (as shown in Figure 3.1, ES Volume III). The compulsory purchase powers obtained by way of the 2001 Order expired in March 2006.

3.2.2 During 2007 and 2008, a range of options were considered during the development of the Transport Innovation Fund (TIF) Package. These options included a shorter route via Village Way (instead of Westinghouse Road) and a southern alternative utilising the Trafford Park freight railway alignment to the south of the Bridgewater Canal (see the Subsequent Route Variations A and B on

Figure 3.1, ES Volume III). Options considered at this stage also included the provision of a Park and Ride scheme adjacent to Junction 9 of the M60 motorway. Further details of these formerly proposed alignments are provided in Section 3.5.

3.2.3 Since the Formerly Authorised Route and the Subsequent Route Variations that were proposed, the nature and focus of development within Trafford Park has changed. In response to these changes, and in order to maximise scheme benefits, the Formerly Authorised Route has been reviewed and a new alignment proposed, which is the subject of this ES (see Figure 1.1, ES Volume III).

3.3 Need for the Development

3.3.1 Trafford Park is a major economic engine and centre of employment for all of Greater Manchester. Trafford Park employs approximately 35,000 people from across the conurbation, yet has historically been served by relatively weak transport links (Ref. 3-4). As noted in chapter 5 of this ES, there is a policy direction to secure improved sustainable transport links to the Regional Centre, Trafford Park and other employment areas. Trafford Park also has a low residential population which means that those who are employed in Trafford Park need to be able to travel there by either private car or public transport. However, congestion and a lack of public transport choice will contribute to constraining future sustainable development within Trafford Park and the Trafford Centre Rectangle, both of which are currently major generators of car trips.

3.4 Options for Development

3.4.1 The sections below summarise other options, to the Metrolink Trafford Park Line, that have been considered, including a 'Do Nothing' option (i.e. the Metrolink Trafford Park Line is not built), lower cost alternatives and revisions to the Formerly Authorised tram Route.

'Do Nothing' Scenario

3.4.2 The X50 bus service operates a 28 minute service between Piccadilly Gardens in Manchester city centre and the intu Trafford Centre. However, during busy periods this service can be subject to delay, with particularly severe congestion in and around the intu Trafford Centre at peak shopping times causing pronounced effects. Future traffic growth is expected to cause further delay to this service, especially when taking account of the projects in development in the Salford City Council (SCC) and Trafford Metropolitan Borough Council (TMBC) areas that are scheduled for completion prior to 2031 and within 1 kilometre (km) of an existing Metrolink stop.

3.4.3 The Do Nothing option was rejected because:

- Without improved access to the employment and regeneration areas of Trafford Park, the full economic potential of Trafford Park's redevelopment may not be met;
- It would not result in a shift in transport provision to encourage higher use of public transport; and
- It would not improve accessibility to the intu Trafford Centre, in line with other similar shopping centres across the UK.

Lower Cost Alternative

3.4.4 A Lower Cost Alternative (LCA) to the development of the Metrolink Trafford Park Line has been considered, involving infrastructure investments to improve bus performance. This option consisted of a bus service from Piccadilly Gardens in Manchester city centre to the intu Trafford Centre; and

3.4.5 The LCA would entail a package of upgrades to highway infrastructure in Trafford Park, allowing a significant improvement to the existing X50 bus service (which currently runs at a frequency of 4 buses per direction per hour) and other potential bus services. These services would take advantage of the considerable investment in highway links in Trafford Park, and would be further enhanced by bus priority measures, junction modelling and road space reallocation to create a quality route through Traffic Park for buses. This reallocation would be at the expense of some highway traffic capacity.

3.4.6 The existing Metrolink network is a well-established and successful public transport service within Greater Manchester. A tram route through Trafford Park would provide a connection from Manchester city centre (via the existing Pomona stop) to the employment, leisure and tourism market within Trafford Park as well as the intu Trafford Centre, which would provide an efficient and reliable public transport alternative to private cars and increase the choice in public transport. A Metrolink Trafford Park Line could also act as a catalyst for future development and growth in the local area.

3.4.7 For these reasons, the LCA was therefore rejected in favour of an extension to the Metrolink network.

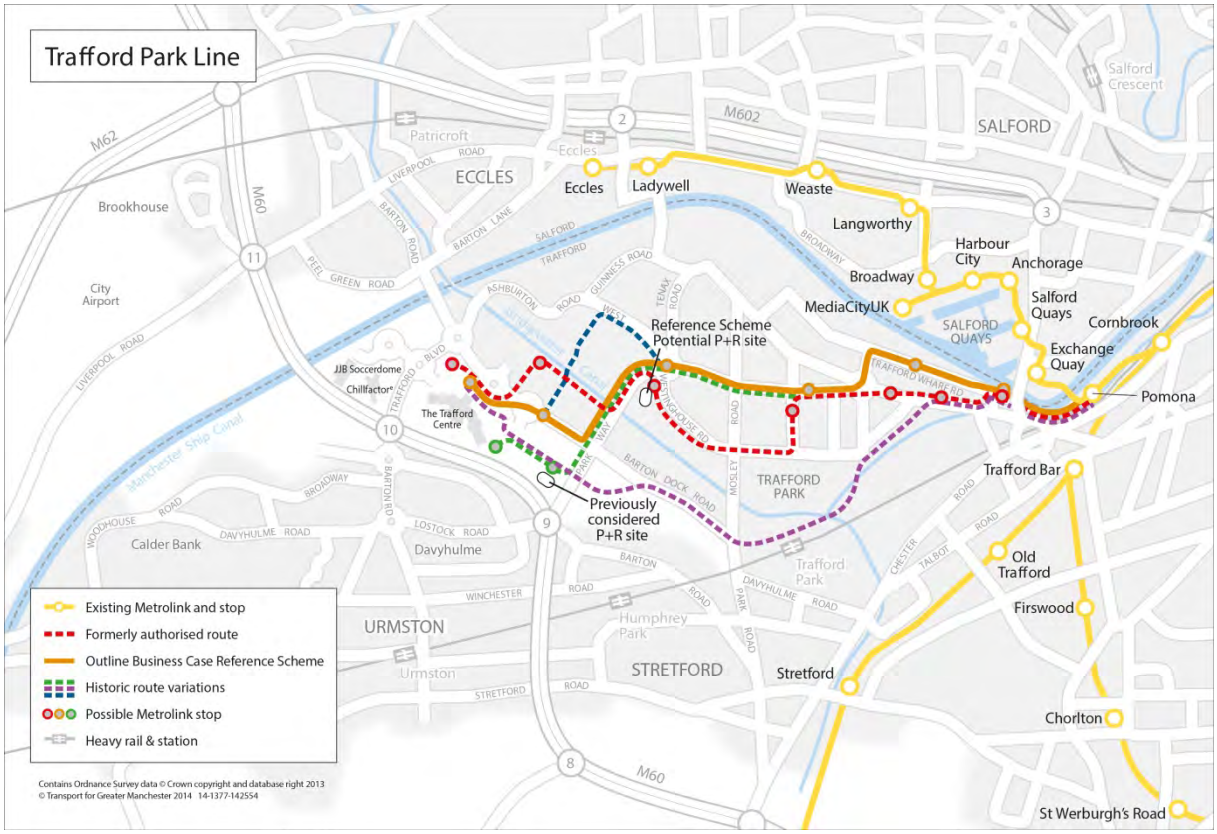
3.5 Evolution of the Scheme

Historic Trafford Park Route Options

3.5.1 The Formerly Authorised Route (shown in red on Figure 3.1, ES Volume III) was an integral part of the Trafford Park Development Corporation's proposal to

redevelop Trafford Park. It comprised seven stops and served the Village area of Trafford Park.

Plate 3.1 Historic Route Options



3.5.2 Since the development of the Formerly Authorised Route, the nature and focus of development within Trafford Park has changed. Key changes include:

- Further development within Trafford Park to the north, associated in particular with the development of MediaCityUK and ITV Studios on the northern and southern banks of the Manchester Ship Canal respectively; and
- Continuing development within the Trafford Centre Rectangle, such as the Barton Square development and the opening of the EventCity exhibition venue.

3.5.3 A number of alternative route options were considered during the development of the scheme (refer to Section 3.2). To reflect the change in development focus, the Formerly Authorised Route was amended to run more centrally within Trafford Park, via Village Way (see Subsequent Route Variation A, Figure 3.1, ES Volume III). This also provided improved run times.

3.5.4 A southern route (see Subsequent Route Variation B, Figure 3.1, ES Volume III) was also considered because it potentially offered quicker overall journey times to the Trafford Centre Rectangle area from Pomona and made use of the existing freight railway alignment serving the Container Depot on Barton Dock Road. The

southern route also made provision for a Park and Ride scheme adjacent to Junction 9 of the M60. Whilst this option achieved the objectives of shorter journey times, it did not offer any real benefits to Trafford Park itself as it failed to provide access to the central core of the area. This southern route option was therefore rejected.

Route Refinement

3.5.5 As detailed above, the nature and focus of development within Trafford Park has changed. As such, the Formerly Authorised Route was reconsidered with the aim of maximising scheme benefits and ensuring that key centres of demand are served. In defining a new route for the Metrolink Trafford Park Line, the following objectives have been considered:

- Stimulate regeneration and growth;
- Increase the potential employment catchment of Trafford Park by increasing its level of connectivity; and
- Provide viable alternatives to car travel.

3.5.6 Taking into account the above objectives, the previous refinements to the Formerly Authorised Route were further refined resulting in the definition of the 2013 Metrolink Trafford Park Line alignment.

3.5.7 Refinements made include the following:

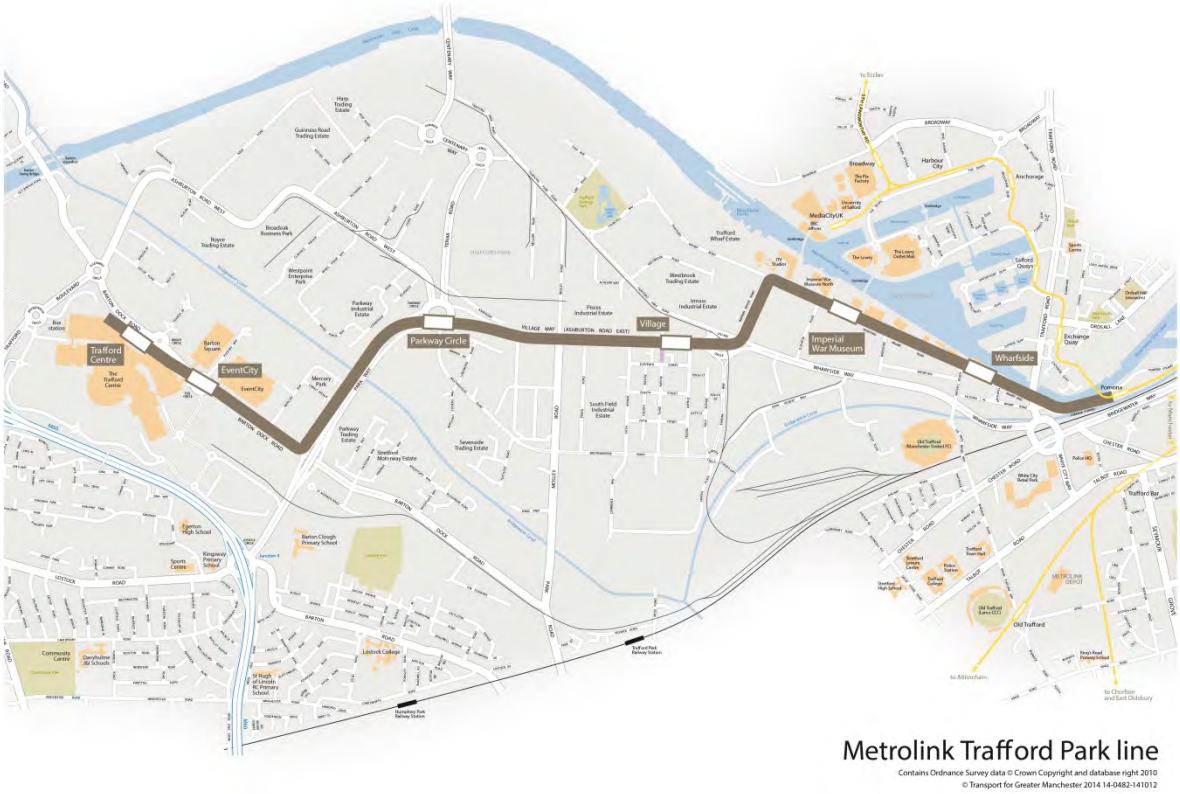
- By running along Trafford Wharf Road (rather than Wharfside Way), the proposed alignment provides better access to the further development of MediaCityUK as it connects to the development and footbridges in the area;
- The Metrolink Trafford Park Line alignment along Barton Dock Road will also provide a stop to serve EventCity, a major new attraction and exhibition venue.

3.5.8 The Metrolink Trafford Park Line travels along Barton Dock Road to a proposed stop serving EventCity, providing convenient access to the Barton Square development. This enables the proposed Trafford Centre stop to be positioned to the north eastern edge of the intu Trafford Centre, closer to the main shopping attractions than a stop to the south eastern edge.

3.5.9 The Metrolink Trafford Park Line alignment (as illustrated in Plate 3.2) was chosen as the preferred route because it:

- Allows an efficient journey through Trafford Park from Manchester city centre;
- Provides a more central alignment through Trafford Park which would serve key centres of demand, such as the intu Trafford Centre, Barton Square, EventCity, ITV Studios on Trafford Wharf Road (which is part of MediaCityUK) the Imperial War Museum North and Old Trafford football ground; and
- Enables a potential Park and Ride scheme in the vicinity of Parkway Circle.

Plate 3.2 Proposed Alignment (May 2014)



Tram Stop Locations and Junction Improvements Considered

3.5.10 In developing the Metrolink Trafford Park Line scheme, a range of alternative solutions for the layout and location of the proposed stop, Wharfside, Imperial War Museum, Village, Parkway, EventCity and Trafford Centre stops are considered to be strategically located and provide convenient access to the Metrolink network. A number of alternative junction layouts for Parkway Circle and Peel Circle were also examined.

Refinement to the Alignment post Stakeholder Consultation

3.5.11 Further optimisation of this alignment has been carried out during the public consultation period and a refinement to the reference scheme alignment is proposed as a result of stakeholder issues along Trafford Wharf Road.

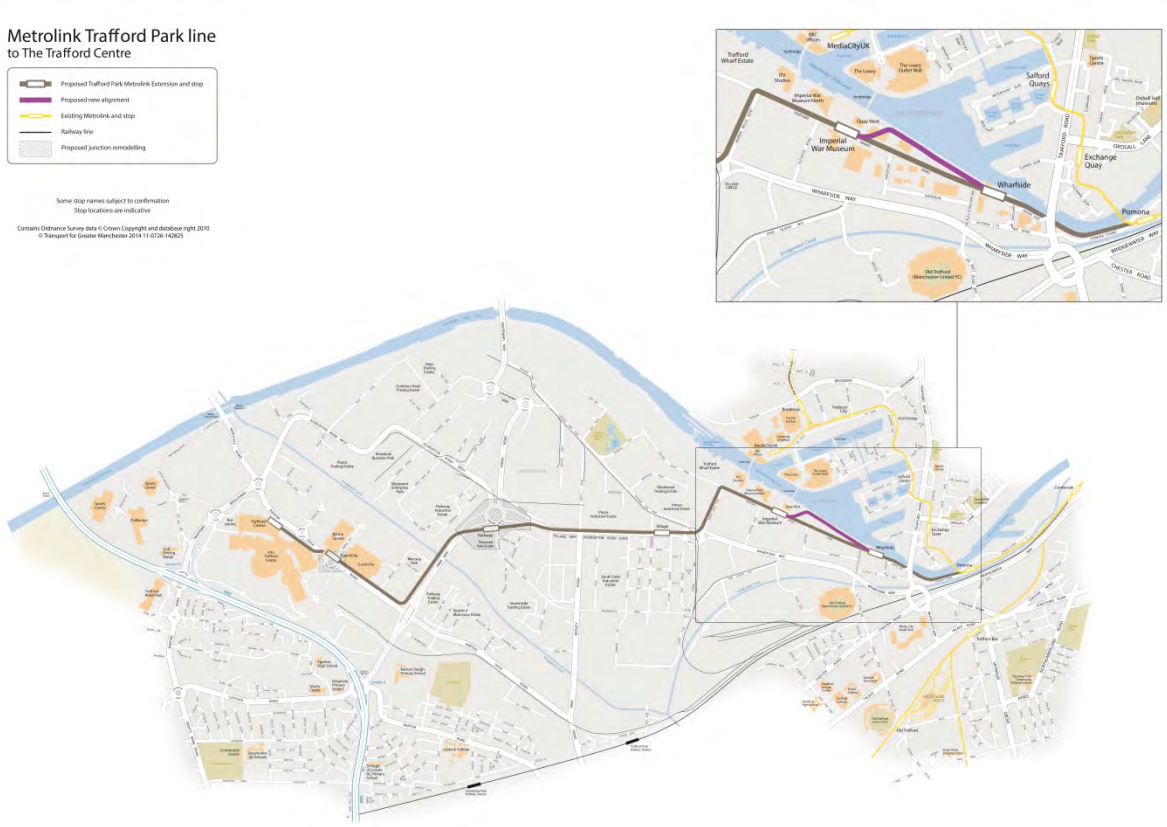
3.5.12 Throughout the consultation TfGM has been engaging with businesses along the route to discuss the proposals and understand their operational requirements. As stakeholder meetings have progressed, an issue has emerged with one frontage on Trafford Wharf Road, Kratos Analytical, who manufactures equipment which is sensitive to vibration and Electromagnetic Compatibility (EMC). As a result of the consultation and following technical assessments of the Kratos site, it was found that a southern alignment along Trafford Wharf Road would run too close to their business for it to operate successfully under these restrictions and the route has had to be reconsidered. The tram line needs to be a greater distance from their building than proposed in the consultation in order for them to continue their existing operations in that location.

3.5.13 As a result of this significant impact to a company employing over 200 people, a refinement to the alignment is proposed in the Wharfside area, by continuing to run the tram line along the frontage of the Manchester Ship Canal westwards from the Wharfside stop (refer to plate 3.3).

3.5.14 In addition, a response was received from Telecity on Trafford Wharf Road, which mentioned specific concerns in regard to the proposals. A major concern for Telecity is the location of the incoming power and telecommunications cables to their building from Trafford Wharf Road. As a result of the modifying of the route to a canal side alignment, the incoming telecommunications fibres to their building would not be affected.

3.5.15 The proposed locations of the Wharfside stop and the Imperial War Museum stop were also adjusted slightly to accommodate the refined alignment, whilst some modifications to the highway along Trafford Wharf Road as previously proposed were also no longer necessary. This revised Metrolink Trafford Park Line alignment is the subject of this ES.

Plate 3.3 Refined Alignment (October 2014)



3.6 References

Ref. 3-1 Her Majesty's (HM) Government (2006). 'Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006'. HMSO, London.

Ref. 3-2 HM Government (1992). 'Greater Manchester (Light Rapid Transit System) Act 1992'. HMSO, London.

Ref. 3-3 HM Government (2001). 'Greater Manchester (Light Rapid Transit System) (Trafford Park) Order'. HMSO, London.

Ref. 3-4 Transport for Greater Manchester (2013). 'Transport for Greater Manchester Committee Report for Information'.

Transport for Greater Manchester

Chapter 4:

Development Description

4 DEVELOPMENT DESCRIPTION

4.1 Introduction

4.1.1 This chapter of the Environmental Statement (ES) describes the proposed Metrolink Trafford Park Line. The chapter describes proposals for the route alignment; the key physical components of the scheme; the site preparation and construction activities that are likely to be undertaken; scheme operational details and the expected programme for the delivery of the scheme.

4.1.2 The chapter also provides a summary of the traffic modelling and Transport Assessment (Ref. 4-1) carried out for the proposed scheme and submitted with the Transport and Works Act Order (TWAO) Application.

4.1.3 The chapter is supported by Figures 1.1 and 1.2 (ES Volume III), which show the indicative route centreline of the Metrolink Trafford Park Line.

4.2 Overview of the Metrolink Trafford Park Line Route

4.2.1 The Metrolink Trafford Park Line is proposed to consist of approximately 5.5 km twin track extension to the existing Metrolink network between the existing Pomona stop and the intu Trafford Centre retail and leisure complex. The route would provide a link between Manchester city centre and the employment and regeneration areas of Trafford Park.

4.2.2 Six new stops (the names of which are subject to further approval and could be changed) are proposed as follows:

- Wharfside (NGR 381033, 396618);
- Imperial War Museum (NGR 380365, 396930);
- Village (NGR 379578, 396783);
- Parkway (NGR 378484, 396852);
- EventCity (NGR 377380, 396598); and
- Trafford Centre (NGR 377002, 396859).

4.2.3 The route of the Metrolink Trafford Park Line and the proposed stop locations are shown on Figures 1.1 and 1.2 (ES Volume III).

4.2.4 A set of illustrative Technical Development Scheme Plans, which provide further details of the proposed alignment, are included within the TWAO Application.

Metrolink Trafford Park Line Service

4.2.5 Light rail vehicles (LRVs) to be operated on the Metrolink Trafford Park Line would enter and exit the scheme at the existing Pomona stop. The service proposed to operate along the route is currently expected to originate/ terminate at Crumpsall on the existing Bury line and use the existing Metrolink network through Manchester city centre to Pomona. This will be subject to future operational and demand assessments.

4.2.6 The construction and operation of the existing operational Metrolink infrastructure and the consented Metrolink infrastructure (such as the Second City Crossing) have been subject to discrete consenting processes (as described in Chapter 1: Introduction). As part of the consenting process, and where required by UK legislation, the environmental effects of the existing and consented Metrolink network has been subject to Environmental Impact Assessment (EIA).

4.2.7 The EIA for the Second City Crossing scheme included consideration of the need for future changes to services through Manchester city centre, and the traffic modelling work undertaken (and allied technical assessments) took future expansion of the Metrolink network into account. It is, therefore, not necessary to consider the environmental impacts as associated with the operation of the Metrolink Trafford Park Line service on existing and consented Metrolink routes.

Land Use along the Trafford Park Line

4.2.8 The predominant land uses along the Metrolink Trafford Park Line route are industrial and commercial business. However, the western end of the route is characterised more by retail and leisure land uses such as the intu Trafford Centre and EventCity.

4.2.9 Land to the north of the Metrolink Trafford Park Line mainly comprises the industrial area of Trafford Park and the Manchester Ship Canal; the centre of which forms the Metropolitan Borough boundary between Trafford (to the south) and Salford (to the north). The commercial area of Salford Quays and the residential area of Ordsall lie to the north of the Manchester Ship Canal. Manchester city centre lies to the north east of the proposed scheme.

4.3 Metrolink Infrastructure

4.3.1 The sections below provide a description of the Metrolink Trafford Park Line infrastructure, including the tramway, line equipment, tram stops, ancillary infrastructure, the LRVs and provisions for pedestrians and cyclists.

Design Standards

4.3.2 Transport for Greater Manchester has defined standards for the design of tram alignments and stops in order to meet operational, health and safety requirements, and standards for disabled access.

4.3.3 The Metrolink Trafford Park Line has been designed to accommodate Metrolink vehicles and has a similar specification to the existing and consented Metrolink network. The Metrolink Trafford Park Line design has taken full account of relevant design standards and guidance, including the Office of Rail Regulation (ORR) 'Guidance on Tramways – Railway Safety Publication 2' (Ref. 4-1) which sets out guidance on issues to be considered in the design and operation of tramways.

4.3.4 In advance of construction, Transport for Greater Manchester would work with Trafford Metropolitan Borough Council (TMBC) to develop a design guide for the Metrolink Trafford Park Line. This scheme-specific design guide would inform the design of the installed tramway infrastructure and fittings in accordance with the discharge of conditions process.

Tramway

4.3.5 The Metrolink Trafford Park Line is proposed to comprise a segregated tramway (apart from where it crosses highway junctions). The segregation of the tramway would minimise the interaction with, and delay from, other road traffic; providing resilience and reliability of tram operations during times of highway congestion, such as those that can arise from frequent events in the area.

4.3.6 The tramway is proposed to cross the highway at-grade at some junctions that are anticipated to be re-modelled.

4.3.7 It is currently assumed that the rails would generally be supported by a concrete track slab, where not integrated into the highway. The tramway would be incorporated into the existing urban realm through the use of appropriate design and finishes in accordance with the discharge of conditions process.

Overhead Line Equipment

4.3.8 Overhead Line Equipment (OLE) would be installed along the length of the Metrolink Trafford Park Line to power the tramway. The OLE comprises 750 volt dc power lines, which are typically supported by poles (centre pole or side poles).

Tram Stops

4.3.9 The six Metrolink Trafford Park Line stops would comprise raised platforms. The platforms are anticipated to be at least 54.0 m in length, 3.0 m wide and 915 mm above the level of the rails.

4.3.10 The stops are proposed to have ramped access, with maximum gradients of 1 in 20 (5%) to facilitate access by all users.

4.3.11 The following infrastructure is anticipated to be provided at each stop location:

- Canopies to provide shelter;
- Display boards, passenger information displays and speakers to provide both static and real-time travel information;
- Passenger help points;
- Ticket vending machines and smart-card readers;
- Appropriate lighting; and
- CCTV cameras for passenger safety and security.

4.3.12 Metrolink stops are provided with a stop equipment room (or stop equipment cabinets) comprising a stand-alone structure housing essential equipment associated with the systems on the stop, including a connection to the local low voltage power supply. The stop equipment rooms would be designed in accordance with the discharge of conditions process.

4.3.13 Each stop would be designed to integrate with the local urban realm through the use of appropriate design and finishes in accordance with the discharge of conditions process.

Ancillary Infrastructure and Landscaping Works

4.3.14 The Metrolink Trafford Park Line would likely require the installation of up to four substations; however, the exact number and locations of these substations have not been finalised.

4.3.15 A detailed landscape design would be produced for the Metrolink Trafford Park Line which would include hard landscaping works to the tramway, stops and immediately adjacent areas and boundary treatments. Soft landscaping

(planting) designs would be produced for the areas between stops (as appropriate).

4.3.16 Replacement tree planting and tree management is anticipated to be undertaken in accordance with Transport for Greater Manchester's Wildlife Habitat and Tree Replacement Policy (Ref. 4-3) and in accordance with the discharge of conditions process.

Light Rail Vehicles (LRVs)

4.3.17 The current fleet of Metrolink LRVs (tram units) has been designed with consideration to their potential environmental effects, specifically energy consumption and energy loss.

4.3.18 The vehicles have the ability to regenerate braking energy (kinetic energy) into electrical energy. A proportion of this kinetic energy can be reused to power the LRVs auxiliaries, whilst the remaining energy can be sent back to the network and recovered if a LRV is accelerating nearby.

4.3.19 The LRV fleet is being expanded and following the withdrawal of the older design of Metrolink LRVs, now comprises a single vehicle type only, namely the Bombardier Flexity Swift LRV (or M5000). These modern LRVs have been designed to minimise environmental impact in a number of ways, including:

- During operation, energy consumption is reduced due to the lighter weight of the Flexity Swift LRVs compared to the older design of Metrolink LRVs trams;
- Alternating Current (AC) traction motors and other energy efficient systems are being utilised, such as regenerative braking, light emitting diode (LED) exterior lamps and light sensor controlled interior lighting; and
- Passenger saloon heat is retained in cool weather by the doors closing automatically after a short period of inactivity.

Provision for Pedestrians and Cyclists

4.3.20 The Metrolink Trafford Park Line proposes the introduction of facilities for cyclists and pedestrians at all proposed tramway crossings and improved traffic intersections. The Metrolink Phase 3 expansion programme includes the provision of at least 5 cycle stands at the vast majority of new stops. It is anticipated similar provisions would be made on the Metrolink Trafford Park Line.

4.3.21 In addition, it is proposed to create new cycleways alongside the Metrolink Trafford Park Line, such as between the proposed Park Way intersection and Barton Dock Road and along Village Way.

4.4 Description of Route and Proposals

4.4.1 This section describes the current proposed Metrolink Trafford Park Line scheme. Detailed design work would be undertaken by the appointed contractor in consultation with Trafford Metropolitan Borough Council.

Section 1 - Pomona to Wharfside

4.4.2 The Metrolink Trafford Park Line would diverge from the existing Metrolink network at the elevated Pomona Metrolink stop. From here, the proposed alignment continues along the south bank of the Manchester Ship Canal and down to existing ground level via a new ramp structure (anticipated to comprise a viaduct and earth retained structure). From the base of the ramp the route continues westwards and passes under the Trafford Road Bridge through the purpose built opening of the modern bridge, and the refurbished and enhanced opening, for Metrolink in the late 1990s, of the older Trafford Road Bridge. Beyond the bridges, the route follows the canal side to the proposed Wharfside stop.

Wharfside stop

4.4.3 The Wharfside stop is proposed to be located to the north of Trafford Wharf Road. The proposed stop would serve local businesses and amenities (e.g. hotels, Victoria Warehouse event space, and the canal side footpaths) located within the northern part of Trafford Park. The stop would also provide additional public transport for visitors to Old Trafford football ground (located 200m south of the stop) and the cricket ground on event days at the stadiums. As such, in addition to the stop infrastructure as described above, the Wharfside stop would be designed to incorporate event crowds, such as by providing crowd management areas and ticket barriers to control boarding and alighting.

Engineering and Highway Works

4.4.4 The viaduct part of the structure is likely to be of a similar form of construction to the existing Pomona Viaduct (i.e. piled foundations, supporting columns and cross head beams with steel longitudinal beams supporting a concrete deck).

4.4.5 A new retaining wall would be required along the canal path to accommodate the level difference between the tramway and Pomona Strand, and the existing earthwork slope is anticipated to be modified. Further retaining walls/embankments are likely to be required on the approaches to the Wharfside stop.

4.4.6 The proposed location of the stop would require some land acquisition and demolition (Samuel Platts Public House).

4.4.7 Trafford Wharf Road, between its junctions with Victoria Place and Sir Alex Ferguson Way and Wharf End is anticipated to be closed to road traffic. Both roads would remain open to pedestrians and cyclists.

4.4.8 To mitigate the prohibition of vehicular access referred to above it is proposed to:

- Relocate the affected property accesses to Victoria Place;
- Relocate the existing on-street parking from Wharf End to the remodelled junction of Trafford Wharf Road / Victoria Place; and
- Re-open the junction of Victoria Place and Sir Alex Ferguson Way for east – west movements. On highway safety grounds, this would require Sir Alex Ferguson Way to be closed at its junction with Wharfside Way for all movements with the exception of the left turn from Wharfside Way onto Sir Alex Ferguson Way. Access from the east would remain, albeit directly onto Trafford Wharf Road rather than via Wharfside Way.

Section 2 - Wharfside to Imperial War Museum

4.4.9 From the proposed Wharfside stop the alignment continues along the canal side before turning southwest to a second proposed stop (Imperial War Museum) located on the north side of Trafford Wharf Road.

Imperial War Museum stop

4.4.10 The proposed Imperial War Museum stop would be located within part of the existing car park of the Quay West office building. This stop would serve the areas around the Imperial War Museum North (IWMN), ITV studios on the southern bank of the Manchester Ship Canal as well as the Lowry and MediaCity:UK developments located on the northern bank of the Manchester Ship Canal, which are easily accessible via existing footbridges.

Engineering and Highway Works

4.4.11 This section of the proposed route would require demolition of several existing buildings to accommodate the tram infrastructure, including the Wharfside Business Centre units (1 – 9) and a factory building on the plot adjacent to the eastern boundary of the Quay West plot.

4.4.12 Access to the Quay West development from Trafford Wharf Road is proposed to be re-modelled to accommodate the Imperial War Museum stop.

Section 3 - Imperial War Museum to Village

4.4.13 From the Imperial War Museum stop, the proposed alignment continues westwards along the centre of Trafford Wharf Road with a traffic lane running either side. At the junction of Trafford Wharf Road/ Warren Bruce Road, the tramway would turn south to run segregated along the western side of the road. A turn back siding is anticipated in this location to allow additional trams to be entered into service, for example during events at Old Trafford football stadium, to maximise passenger carrying capacity.

4.4.14 From Warren Bruce Road, the proposed alignment crosses through the Village Circle roundabout and turns west onto Village Way (A5081), where a third stop (Village) is proposed to be located.

Village stop

4.4.15 The proposed Village stop would be located on the A5081 Village Way (east of Third Avenue) and would serve the industrial and commercial area known as Village and the surrounding environs of the Trafford Park Core Employment Area.

Engineering and Highway Works

4.4.16 A new signalised junction, controlling tram and traffic movements, is proposed to be provided to the west of the Imperial War Museum stop.

4.4.17 The existing accesses to the Rank Hovis site from Trafford Wharf Road would be retained (albeit modified) for left in, left out movements. Similarly the accesses to the IWMN are also proposed to be restricted to left in, left out movements only.

4.4.18 To mitigate the impact on egress from the IWMN development for westward movements it is proposed to provide a new junction on Wharfside Way with Waterside southbound movements only. This would also mitigate the impacts of the proposed modifications to the Wharfside Way / Sir Alex Ferguson Way junction for properties on Waterside and Trafford Wharf Road.

4.4.19 With the introduction of the new junction controlling tram and traffic conflicts to the west of the Imperial War Museum stop, Elevator Road at its junction with Trafford Wharf Road is proposed to be made left in / left out.

4.4.20 To accommodate the proposed turnback siding on Warren Bruce Road, the carriageway cross section is proposed to be reduced so that the existing informal on street parking is removed; however the existing single lane of traffic in each direction would be retained.

4.4.21 The existing cycle facility would be relocated to the eastern side of the road to align with broader plans being promoted separately by Transport for Greater Manchester for the provision of improved cycle facilities within the Trafford Park area.

4.4.22 The Warren Bruce Road and Village Way entrances and exits of the Village Circle roundabout are proposed to be remodelled to accommodate tram movements through the signalised roundabout.

Section 4 - Village to Parkway

4.4.23 From the proposed Village stop, the anticipated alignment continues westward to Parkway Circle within a segregated corridor to the north of Village Way, until just prior to the location of the existing Parkway Circle, where it crosses to the south of Village Way.

4.4.24 The existing layout at Parkway Circle roundabout is anticipated to be remodelled into a series of signalised junctions to alleviate existing traffic congestion, accommodate the tramway, and release highway land for the development of a park and ride facility.

Parkway stop

4.4.25 The Parkway stop is proposed to be located to the south of the new signalised traffic intersection, which would replace the existing Parkway Circle roundabout.

Park and Ride Site

4.4.26 A new Park and Ride site is proposed to the south of the Parkway stop.

4.4.27 This Park and Ride facility would allow car users to drive into Trafford Park, and travel onwards into Manchester city centre on the tram, thus potentially reducing vehicular congestion into and out of the city centre. Cycle stands and lockers are anticipated to be incorporated into the design of the Park and Ride facility to maximise travel choices for those opting to use active modes of travel for part of their journey.

4.4.28 Vehicular access to the Park and Ride site would be gained via a new junction off Westinghouse Road.

Engineering and Highway Works

4.4.29 Land acquisition and demolition (Subway franchise) would be required along Village Way.

4.4.30 Third Avenue is anticipated to be closed at the junction with Village Way to minimise conflicting movements with the tramway.

4.4.31 Remodelling of Village Way and its junctions with Fifth Avenue and Mosley Road, would be required to form the segregated tramway. A number of accesses to businesses along Village Way would also be remodelled.

4.4.32 Village Way would be realigned but retained as a dual carriageway, except for a short section where only a single eastbound lane is proposed. To minimise the overall land take required it is proposed to prohibit the right turn movements into Mosley Road and Fifth Avenue. To mitigate these movement prohibitions it is proposed to;

- Open the northern end of Mosley Road to two movements;
- Permit the left turn on to Mosley Road from Trafford Park Road; and
- Provide a new junction between Park Way and Westinghouse Road.

4.4.33 Parkway Circle is proposed to be reconfigured as a series of signalised junctions, as follows:

- Realigned Ashburton Road West/ Tenax Road junction;
- Village Way/ Park Way/ Tenax Road junction; and
- Realigned Westinghouse Road/ Park Way junction.

4.4.34 All movements currently possible at the roundabout would be retained with the exception of:

- Right turn and ahead movements from Westinghouse Road. These movements would be available from Mosley Road, Fifth Avenue or Europa Way; and
- U-turning traffic. Such movements would be possible using other roads in the Trafford Park area noting that Village Way, Westinghouse Road and Europa Way for a circular network around the central portion of the Trafford Park area.

Section 5 - Parkway to EventCity

4.4.35 From the Parkway stop, the proposed alignment continues in a south-westerly direction and crosses Park Way to run along its western side. It is anticipated that the tram would cross the Bridgewater Canal on a new single span bridge structure. At Barton Dock Road the proposed alignment turns right to run in the existing verge to the north of Barton Dock Road. A proposed fifth stop (EventCity) would be located in the vicinity of EventCity and Barton Square.

EventCity stop

4.4.36 The proposed EventCity stop would be located along the northern edge of Barton Dock Road, close to Phoenix Way. It would provide access to the Barton Square retail and leisure attractions as well as EventCity.

Engineering and Highway Works

4.4.37 To accommodate the Metrolink Trafford Park Line crossing at Mercury Way it would be necessary to signalise the junction of Barton Dock Road/ Mercury Way, which is currently a priority junction. A segregated left and right turn facility are proposed to be provided to:

- Appropriately direct drivers; and
- Allow tram and traffic movements to operate concurrently.

4.4.38 Peel Circle is proposed to be converted to a signal controlled junction comprising a cross roads of Barton Dock Road/ Phoenix Way/ Festival Way. The new junction would provide for the control of tram and traffic movements, enabling them to operate concurrently and release land for the provision of the EventCity stop. All traffic movements are proposed to be permitted, with the exception of the left turn into Phoenix Way, which is planned to be re-provided to the west of the Barton Square development via a new access (routed along the corridor previously promoted for the Metrolink Trafford Park Line in the 1990s).

4.4.39 The new junction is proposed to include pedestrian crossing facilities to cater for movements across Barton Dock Road and Phoenix Way.

4.4.40 In constructing the new access to the west of Barton Square, it is proposed to include a cycle lane, subject to the land owner's consent, which would connect into the recently upgraded path that flanks the Bridgewater Canal.

Section 6 - EventCity to Trafford Centre

4.4.41 From the EventCity stop, the proposed alignment crosses over to the southern side of Barton Dock Road to the Trafford Centre stop.

4.4.42 A trailing crossover is proposed to the east of the EventCity stop to allow trams to be turned back should there be an incident in the Trafford Centre area which would prevent a tram from reaching the terminus.

Trafford Centre stop

4.4.43 The Trafford Centre stop is proposed to be located within the existing limits in the vicinity of the Selfridges entrance and improvements to the pedestrian access between the stop location and intu Trafford Centre Mall entrance are proposed

4.4.44 The stop would be designed to sit within the landscape amenity areas, which may be required to be remodelled.

Engineering and Highway Works

4.4.45 The intu Trafford Centre car park access is anticipated to be remodelled. Existing count data indicates that the majority of the traffic entering the car park approaches from the east and a significant proportion exists to the west. Accordingly dedicated accesses for these movements are provided within the proposals from and to Barton Dock Road. It is proposed that all other movements would be provided from a new car park access road. This proposal would require the existing surface car park (adjacent to the decked car park) to be remodelled.

4.4.46 The existing footways and off carriageway cycleways are proposed to be retained/re-provided. Pedestrian access to the Selfridges entrance and the bus station is proposed to be improved.

4.5 Construction Works

4.5.1 Detailed construction methods would be determined by the appointed construction contractor following the detailed design of the scheme. The construction details presented within this ES are, therefore, based upon a series of assumptions regarding the civil engineering works and the construction programme, and have been defined using the professional experience of the project team in delivering similar Metrolink extensions and light rail projects in the UK.

4.5.2 The construction works would be effectively managed in order to reduce disruption and maintain access routes where possible. Construction activities would be managed by working closely with TMBC and other stakeholders prior to, and during, construction in order to plan the construction programme.

4.5.3 All works would be carried out in accordance with Transport for Greater Manchester's Code of Construction Practice (CoCP), submitted with the TWAO application (Ref. 4-4).

Works Areas

4.5.4 It is currently proposed that the scheme would be delivered under a single construction contract with the construction broken down across a number of individual work sites. The construction works may be undertaken concurrently in two or more works sites to reduce the length of the construction programme.

4.5.5 Temporary construction compounds, including storage areas, porta-cabins and welfare facilities would be required to be sited along the construction route. It is

currently anticipated that construction traffic would use the local highway network to access the construction compounds and works areas as necessary.

Utilities Diversion

4.5.6 Prior to the start of the main construction works, where required, statutory utilities (such as electricity, gas, water, waste water and telecommunications equipment) affected by the scheme, would be diverted or modified to prevent the need for diversion, as appropriate.

4.5.7 Such works would be undertaken by the appropriate utility companies in agreement with Transport for Greater Manchester. Appropriate approvals, such as opening notices and traffic management plans would be agreed with TMBC prior to the works commencing.

Site Clearance and Preparation

4.5.8 Trees and vegetation would need to be removed from the construction works areas prior to the start of the main construction programme.

4.5.9 Vegetation clearance and soil stripping would be carefully programmed to minimise, where practicable, the time period over which bare earth is exposed.

4.5.10 Following vegetation clearance, site preparation works (including demolition of buildings and structures, site clearance, excavations, ground preparation and earthworks) would be undertaken to prepare the works areas for the main civil construction works. Ducting and preparation of the drainage system within the subgrade would also be undertaken.

Main Construction Works

4.5.11 The main civil construction works would be undertaken following preparation of the ground in the works area as described above. The civils works are likely to comprise:

- Erection of site fencing and hoardings;
- Construction of new structures (e.g. the Pomona Ramp, Bridgewater Canal crossing and retaining walls);
- Highway works;
- Laying of the tramway track slab and surface drains;
- Laying of rails;
- Tram stop construction;
- Erection of OLE, lighting columns, CCTV and signage; and

- Laying of cabling for systems and communications.

Roads, Footpaths and Cycle Paths

4.5.12 Permanent road closures required for the Metrolink Trafford Park Line would be implemented during the construction phase of the scheme. In addition, temporary road closures and diversions of traffic, footpaths and cycle ways would be required and planned to coincide with the works programme. A Traffic Management Plan would be prepared in consultation with the highway authority (TMBC) and other stakeholders in advance of works commencing on site.

Working Hours

4.5.13 The majority of construction works are likely to take place between 08:00 and 18:00 hours, Monday to Saturday. Some works activities may be undertaken outside of these working hours, which would be subject to approval by TMBC. The works programme may also be influenced by leisure and sports events.

Construction Programme

4.5.14 It is anticipated that utilities diversion works, including site clearance, would commence in 2016. Remaining site clearance, preparation and civils works would follow.

4.5.15 It is expected that the Metrolink Trafford Park Line would be operational by 2020.

Environmental Management

4.5.16 A scheme-specific Construction Environmental Management Plan (CEMP) would be prepared by the appointed construction contractor. The CEMP would provide guidance on appropriate methods of working and would outline suitable impact avoidance measures and mitigation strategies. The CEMP would be aligned as applicable with Transport for Greater Manchester's CoCP (Ref. 4-4).

4.5.17 The appointed contractor would also be required to have, and maintain, an ISO14001 Environmental Management System (EMS).

4.6 Operation

4.6.1 The Metrolink Trafford Park Line is expected to be operational by 2020. To serve the expanded network, a total fleet of eight LRVs (with two spare) is anticipated to be in service along the Metrolink Trafford Park Line.

4.6.2 A service frequency of five trams per hour in each direction is anticipated on the Metrolink Trafford Park Line, offering a minimum hourly capacity of 1,000

passengers per direction (assuming normal loading). A greater service frequency may be used as demand required, such as at weekends for events

4.7 Transport Modelling and Assessment

4.7.1 This section of this ES chapter provides a brief summary of the proposed highway works, traffic modelling undertaken, and a summary of the key findings of the Transport Assessment (TA) prepared by Mott MacDonald (Ref. 4-1) and submitted as part of the TWAO application.

Traffic Modelling

4.7.2 Traffic modelling for the Metrolink Trafford Park Line was undertaken by SYSTRA to establish the overall traffic flows on the highway network in the vicinity of the Metrolink Trafford Park Line.

4.7.3 Changes to traffic flows were determined using the Greater Manchester strategic highway model which was built using the industry standard modelling software, 'SATURN' (Simulation and Assignment of Traffic in Urban Road Networks). The details of the modelling work and its findings are presented within the Transport Assessment (TA) (Ref. 4-1).

Transport Assessment

4.7.4 The purpose of the TA was to assess the permanent changes the Metrolink Trafford Park Line could have on the highway network, provide an understanding of how the scheme would function alongside other transport modes, and assess how the scheme might affect highway and public transport users.

4.7.5 The TA considers the impacts of the Metrolink Trafford Park Line on all modes of travel including (but not limited to) driving, walking, cycling and public transport and sets out the proposed mitigation measures to reduce or eliminate the identified impacts.

4.7.6 The scope and methodology of the TA was derived in liaison with the local highway authority (TMBC), whilst the assessment was prepared in accordance with the Department for Transport's (DfT) 2007 Guidance on Transport Assessment (GTA) (Ref. 4-5).

4.7.7 The key findings of the TA are summarised as follows:

- The Metrolink Trafford Park Line is embedded in planning policy to support economic growth with an accessible, sustainable, reliable public transport facility;
- Traffic modelling suggests that the Metrolink Trafford Park Line can be introduced with limited impact on the overall highway network;

- Currently, buses form the primary component of public transport in Trafford Park. As a result of the Metrolink Trafford Park Line, the routing of some bus services would be diverted to accommodate the proposed highway modifications. Mitigation measures have been proposed that enable each diverted bus service to continue to operate after the implementation of the Metrolink Trafford Park Line.
- The Metrolink Trafford Park Line is not expected to have a detrimental effect on the wider operation of the Metrolink network.
- The Metrolink Trafford Park Line would improve linkages between the Trafford Park area and the mainline railway network, offering an alternative to the use of private cars;
- Proposed changes to the existing footways and cycleways would result in benefits for pedestrians and cyclists;
- A number of informal on-street parking spaces would be displaced on Warren Bruce Road; however alternative parking locations already exist in close proximity. The scheme results in small impacts on the car parking associated with private developments but these impacts are not considered to have a detrimental effect.
- The proposed Park and Ride facility to the south of the Parkway stop would offer a new sustainable travel option for people travelling within Trafford Park;
- The existing taxi rank provision would be unaffected by the scheme. Taxis would be affected by the changes to the highway network but it is concluded there would be no material impact upon taxi services.
- The implementation of the Metrolink Trafford Park Line would alter some existing access routes requiring vehicles to re-route. Where the Metrolink Trafford Park Line has an impact upon existing access arrangements to individual properties, it has been demonstrated that where existing accesses cannot be retained, acceptable alternative access arrangements can be provided.
- The Metrolink Trafford Park Line would result in a positive impact upon highway safety along the scheme corridor;
- The proposals would enhance Trafford Park's ability to host events, public exhibitions and trade shows; and
- During the construction phase, traffic movement and access to local properties would be affected temporarily. Appropriate arrangements would

be required to facilitate vehicular, cycle and pedestrian access through the Trafford Park area during the works.

4.7.8 The TA concludes that the Metrolink Trafford Park Line scheme can be introduced without causing significant detriment to the existing highway, the wider public transport system and its users. Generally the scheme would result in positive benefits for the users of Trafford Park and the proposals and mitigation measures to offset impacts are wholly aligned with the vision of the TMBC and the Local Transport Plan.

4.8 References

Ref. 4-1 Transport for Greater Manchester (2014). 'Transport for Greater Manchester (Light Rapid Transit System) (Trafford Park Extension) Order' Transport Assessment.

Ref. 4-2 Office of Rail Regulation (2006). 'Guidance on Tramways – Publication 2'.

Ref. 4-3 Transport for Greater Manchester (2011). 'Wildlife Habitat and Tree Replacement Policy'.

Ref. 4-4 Transport for Greater Manchester (2014). 'Greater Manchester Metrolink Trafford Park Line – Code of Construction Practice'.

Ref. 4-5 Department for Transport (2007). 'Guidance on Transport Assessment'. HMSO, London.

Transport for Greater Manchester

Chapter 5:

Planning Policy Context

5 PLANNING POLICY CONTEXT

5.1 Introduction

5.1.1 This chapter of the Environmental Statement (ES) provides an overview of the planning policy of most relevance to the proposed Metrolink Trafford Park Line taking into account the defined scheme characteristics (as detailed in Chapter 4: Development Description) and the scheme objectives.

5.1.2 Extending the existing Metrolink network through to Trafford Park would provide a quality, efficient and reliable public transport alternative to the use of private cars. The Metrolink Trafford Park Line would improve public accessibility to the existing employment, leisure and tourism market within Trafford Park and could be a catalyst for future development in the local area. The main objectives of the Metrolink Trafford Park Line are thus:

- Stimulate regeneration and growth;
- Increase the potential employment catchment of Trafford Park by increasing its level of connectivity; and
- Provide viable alternatives to car travel.

5.1.3 Relevant planning policy has been considered at two levels:

- At a national level: the Government provides comprehensive policy and guidance on matters to be taken into account when considering planning applications and how environmental issues should be addressed when considering new development; and
- At a local level: policy is provided by a range of local documents.

5.1.4 In addition to the above, each technical chapter of the ES refers to the planning policies that are relevant to the assessment of the environmental effects reported within that chapter.

5.2 National Planning Policy

National Planning Policy Framework (2012)

5.2.1 National planning policy is set out in the National Planning Policy Framework (NPPF) (Ref. 5-1) which was published on 27th March 2012. The NPPF supersedes all previous planning policy statements, planning policy guidance and mineral planning guidance. It aims to make the planning system less complex and more accessible, as well as protecting the environment and promoting sustainable

growth. National policy guidance is also given in Circulars and White Papers and other Central Government publications. The NPPF is a material consideration in planning decisions.

5.2.2 A key theme enshrined within the NPPF is a presumption in favour of sustainable development. For decision-taking, this means that:

- Development proposals that accord with the development plan should be approved without delay; and
- Where the development plan is absent, silent or relevant policies are out-of-date, planning permission should be granted unless any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, and specific policies within the NPPF indicate development should be restricted.

5.2.3 The NPPF sets out twelve core planning principles that should underpin both plan-making and decision taking. As the Metrolink Trafford Park Line would provide new sustainable transport infrastructure to serve Trafford Park, the core planning principles that are of specific relevance are presented below:

- *"proactively drive and support economic development to deliver homes, business and industrial units, infrastructure and thriving local places that the country needs…;"*
- *"support the transition to a low carbon future in a changing climate…;"*
- *"contribute to conserving and enhancing the natural environment and reducing pollution…;"* and
- *"actively manage patterns of growth to make the fullest possible use of public transport, walking and cycling, and focus significant development in locations which are or can be made sustainable"* (Paragraph 17).

5.2.4 The NPPF is divided into a series of themes relating to delivering sustainable development - the themes that relate most to the Metrolink Trafford Park Line are set out below.

Promoting Sustainable Transport (paragraphs 29 - 41)

5.2.5 The NPPF sets out the need to deliver a transport system throughout the country that is balanced in favour of sustainable transport modes. The NPPF highlights the need to protect and exploit opportunities for the use of sustainable transport modes for the movement of people and encourages the delivery of transport solutions that support reductions in greenhouse gas emissions and reduce congestion.

5.2.6 The NPPF places a requirement on local authorities to work with neighbouring authorities and transport providers to develop strategies for the provision of viable infrastructure necessary to support sustainable development.

5.2.7 The Metrolink Trafford Park Line aims to provide a new sustainable mode of transport with the specific objectives as detailed in Section 5.1.

Building a Strong, Competitive Economy (paragraphs 18 – 22)

5.2.8 The NPPF highlights that the Government is committed to securing economic growth so that jobs and prosperity are created throughout the country. In order to achieve economic growth, local planning authorities are required to plan proactively to meet the development needs of business and support the development of the economy. This section of the NPPF is of relevance given the Metrolink Trafford Park Line objective to stimulate regeneration and growth.

5.2.9 In addition, as indicated in Chapter 13: Socio-economics, the Metrolink Trafford Park Line would deliver a number of beneficial effects in terms of employment opportunities and improved accessibility to employment opportunities.

Meeting the Challenge of Climate Change, Flooding and Coastal Change (paragraphs 93 – 108)

5.2.10 The NPPF identifies the need for planning to shape places that secure radical reductions in greenhouse gas emissions, minimise vulnerability and provide resilience to the impacts of climate change, and ensure inappropriate development in areas at risk of flooding is avoided.

5.2.11 A separate Flood Risk Assessment (FRA) has been prepared for the Metrolink Trafford Park Line (Technical Appendix F, Volume II of this ES) indicating that the scheme would have an effect of negligible significance on area flooding.

5.2.12 In addition, Chapter 14: Carbon Assessment indicates that the Metrolink Trafford Park Line presents a strong case for low carbon transport within Greater Manchester and would make a measurable contribution to the city's carbon reduction targets.

Conserving and Enhancing the Natural Environment (paragraphs 109 – 125)

5.2.13 The need to conserve and enhance the natural and local environment is set out within the NPPF, including protecting and enhancing valued landscapes, minimising the impacts on biodiversity and providing net gains on biodiversity where possible.

5.2.14 Chapter 9: Ecology and Nature Conservation highlights that there are no Special Areas of Conservation (SAC), Special Protection Areas (SPA) or Sites of Special Scientific Interest (SSSI) within 5 km of the Metrolink Trafford Park Line.

However, there are four non-statutory designated sites within 2 km of the Metrolink Trafford Park Line.

5.2.15 Taking into account the impact avoidance features included in the scheme design, and the recommended mitigation approach, Chapter 9: Ecology and Nature Conservation indicates that the Metrolink Trafford Park Line would have a negligible effect upon ecological habitats and associated protected species.

5.2.16 The NPPF highlights the importance of addressing adverse impacts relating to soil, air, water and noise pollution. The impacts of the Metrolink Trafford Park Line on noise and vibration, air quality, landscape and visual amenity, ground conditions and water resources are identified in Chapter 6: Noise and Vibration; Chapter 7: Air Quality; Chapter 8: Landscape and Visual; Chapter 10: Ground Conditions; and Chapter 11: Water Resources and Flood Risk of this ES respectively. Where appropriate, impact avoidance and mitigation measures are identified in each chapter to mitigate potentially adverse effects.

Conserving and Enhancing the Historic Environment (paragraphs 126 – 141)

5.2.17 The NPPF identifies the need to conserve and enhance the historic environment as part of delivering new development.

5.2.18 As highlighted in Chapter 12: Cultural Heritage, there are three designated listed buildings (Grade II) within 250 m of the Metrolink Trafford Park Line. Taking into account the impact avoidance features included in the scheme design, and the recommended mitigation approach, Chapter 12: Cultural Heritage indicates that the Metrolink Trafford Park Line would have effects on the historic environment that are of minor adverse significance during the construction phase and moderate beneficial effects during the operational phase.

National Planning Practice Guidance (2014)

5.2.19 On 6th March 2014 the Department for Communities and Local Government (DCLG) published its Planning Practice Guidance (Ref. 5-2), which consolidated and revised a large number of practice guidance documents. Relevant guidance categories from the Planning Practice Guidance, and where these are addressed in the ES, are set out in 0.

Table 5.1 National Planning Practice Guidance	
Guidance Category	**Relevant ES Chapter/ Other Document**
Air Quality	Chapter 7: Air Quality
Conserving and Enhancing the Historic Environment	Chapter 12: Cultural Heritage
Flood Risk and Coastal Change	Chapter 11: Water Resources and Flood Risk
Health and Wellbeing	Chapter 13: Socio-economics
Land Affected by Contamination	Chapter 10: Ground Conditions
Land Stability	
Light Pollution	Chapter 8: Landscape and Visual
Natural Environment	Chapter 9: Ecology and Nature Conservation
Noise	Chapter 6: Noise and Vibration
Travel Plans, Transport Assessments and Statements in Decision-taking	Transport Assessment submitted with the Transport and Works Act Order (TWAO) Application (Ref. 5-3)
Water Supply, Wastewater and Water Quality	Chapter 11: Water Resources and Flood Risk

5.3 Further National Policies and Strategies

Transport White Paper: The Future of Transport – A Network for 2030 (Department for Trade and Industry, 2004)

5.3.1 The Transport White Paper (Ref. 5-4) sets out factors that will shape transport in the UK over the next thirty years. The White Paper outlines the need to deliver coherent transport networks that deliver improvements in terms of transport management. The Transport White Paper is of relevance as the Metrolink Trafford Park Line would provide new sustainable transport infrastructure serving Trafford Park.

Eddington Transport Study – Transport's Role in Sustaining the UK's Productivity and Competitiveness (2006)

5.3.2 Sir Rod Eddington was jointly commissioned by the Chancellor of the Exchequer and the Secretary of State for Transport to examine the long-term links between transport and the UK's economic productivity, growth and stability, within the context of the Government's broader commitment to sustainable transport. The Eddington Transport Study (Ref. 5-5) emphasises the importance of having a

comprehensive and high-performing transport system that enables sustained economic prosperity. This study is of relevance given that the Metrolink Trafford Park Line would provide new sustainable transport infrastructure to serve Trafford Park. Furthermore, the scheme objectives are to improve public accessibility to the existing employment, leisure and tourism market within Trafford Park which could be a catalyst for future development in the local area.

Other Strategies

5.3.3 The following strategies all provide guidance in relation to responding to the impacts of climate change and reducing carbon emissions:

- The Energy White Paper (2007) (Ref. 5-6) sets out the Government's international and domestic energy strategy to respond to the growing evidence of the impact of climate change;
- The Climate Change Act 2008 (2008) (Ref. 5-7) enacts a new approach to managing and responding to climate change in the UK. At the heart of the Act is a legally binding target to reduce the UK's greenhouse gas emissions to at least 80 per cent below 1990 levels by 2050, to be achieved through action at home and abroad;
- The UK Low Carbon Transition Plan: National Strategy for Climate and Energy (2009) (Ref. 5-8) sets out the UK's first ever comprehensive low carbon transition plan to 2020. The plan aims to deliver emission cuts of 18% on 2008 levels by 2020 (and over a one third reduction on 1990 levels). More specifically, the plan aims to cut emissions from transport by 14%; and
- The Transport White Paper – Creating Growth, Cutting Carbon: Making Sustainable Transport (2011) (Ref. 5-9) sets out the government's vision for a sustainable local transport system that supports the economy and reduces carbon emissions. It explains how the government is placing localism at the heart of the transport agenda, taking measures to empower local authorities when it comes to tackling these issues in their areas.

5.3.4 These strategies are all of relevance to the Metrolink Trafford Park Line as the scheme aims to contribute towards tackling the impacts of climate change and reducing emissions through the provision of a sustainable mode of transport. An assessment of the carbon emissions as associated with the Metrolink Trafford Park Line is presented in Chapter 14: Carbon Assessment which illustrates that the scheme presents a strong case for low carbon transport within Greater Manchester and would make a measurable contribution to the city's carbon reduction targets.

5.4 Sub-Regional Policy

The Greater Manchester Strategy 2013-2020 (Stronger Together) (2013)

5.4.1 The Greater Manchester Strategy, Stronger Together (Ref. 5-10), is the Sustainable Community Strategy for the Greater Manchester city region. The Strategy makes reference to the availability of the Greater Manchester Transport Fund (GMTF) for funding new Metrolink lines (including the Metrolink Trafford Park Line). In addition to the GMTF, the Strategy highlights that the 'Earn Back' model provides scope to extend the spending power to enable the delivery of further transport priorities that offer significant Gross Value Added potential. The 'Earn Back' model would be used to further fund the Metrolink Trafford Park Line.

5.4.2 The Greater Manchester Strategy highlights the need to focus investment on the city region's strategic transport network to further enhance local, national and international connectivity. This will contribute towards strengthening and widening Greater Manchester's labour market, which is critical to future success and enables Greater Manchester businesses to reduce costs by moving people and goods more quickly, easily and reliably. Key objectives outlined within the Greater Manchester Strategy relating to the enhancement of transport provision include:

- *"Ensure businesses and residents can take advantage of improved transport connectivity to access education, training and employment opportunities across Greater Manchester… (Page 35); and*
- *Ensure that investment in [our] strategic transport network links people to jobs…" (Page 54).*

5.4.3 As indicated in Chapter 13: Socio-economics, the Metrolink Trafford Park Line would deliver a number of beneficial effects in terms of employment opportunities and improved accessibility to employment opportunities.

Greater Manchester's Third Local Transport Plan 2011/12 – 2015/16 (2011)

5.4.4 The Greater Manchester Third Local Transport Plan (LTP3) 2011/12 – 2015/16 (Ref. 5-11) contains the policies of the Integrated Transport Authority for the provision of safe, integrated, efficient and economic transport to, from and within the Greater Manchester Area. The importance of enhancing access to Trafford Park is identified throughout LTP3. More specifically, LTP3 identifies the Metrolink Trafford Park Line as a priority scheme that was awaiting further funding at the time of publication of the plan.

5.4.5 The Metrolink Trafford Park Line is also identified as a Greater Manchester Transport Fund Priority Scheme that would improve public transport access in the area and support the development of major current and future business and freight areas.

5.4.6 LTP3 also highlights that the Metrolink Trafford Park Line would provide improved public transport to the largest concentration of employment outside the Regional Centre.

5.4.7 These policies build on the overall direction of transport strategy set out in the previous Local Transport Plans (LTP1 2001-2006 and LTP2 2006-2011). The core objectives for Greater Manchester, as defined in LTP3 that are of specific relevance to the Metrolink Trafford Park Line, are as follows:

- *To ensure that carbon emissions from transport are reduced in line with UK Government targets in order to minimise the impact of climate change; and*
- *To ensure that the design and maintenance of the transport network and provision of services supports sustainable neighbourhoods and public spaces and provides equality of transport opportunities.*

5.5 Local Planning Policy[1]

5.5.1 The Metrolink Trafford Park Line falls within the Local Planning Authority of Trafford Metropolitan Borough Council (TMBC). The statutory Development Plan for TMBC includes the adopted Core Strategy Local Plan (2012) (Ref. 5-12) and the 'saved' policies within the Revised Trafford Unitary Development Plan (UDP) (2006) (Ref. 5-13) as discussed below.

Trafford Core Strategy Local Plan (2012)

5.5.2 The Trafford Core Strategy Local Plan (2012) provides the overarching planning policy framework for Trafford and sets the vision, spatial strategy and strategic policies for development in the Borough up to 2026. The Core Strategy was formally adopted in January 2012 and replaces in part a number of policies in the Revised Trafford UDP (2006). It forms Part One of the Local Plan. Emerging planning policy for TMBC includes Part 2 of the Local Plan, the Land Allocations Plan. The Metrolink Trafford Park Line needs to accord with the policies and objectives set out in the Trafford Core Strategy Local Plan (refer to the section below).

1 The current position of the Development Plan for TMBC was confirmed through a discussion with a senior planning officer at the Council in May 2014.

Strategic Objectives

5.5.3 The Trafford Core Strategy includes Strategic Objectives which are the overall spatial planning aims for Trafford. The following Strategic Objectives (SO) are of relevance to the Metrolink Trafford Park Line:

- SO2 (Regenerate), seeks to regenerate the physical, economic, environmental and social fabric of the most disadvantaged communities within the borough to reduce inequalities and improve prosperity;
- SO3 (Meet employment need), seeks to meet employment need and establish the right conditions to sustain employment sites for new and diverse investment;
- SO6 (Reduce the need to travel), seeks to reduce the need to travel and promote significant levels of development in the most sustainable locations in the Borough and make less sustainable locations accessible by improving transport links particularly public transport;
- SO7 (Secure sustainable development), seeks to secure sustainable development and promote the reuse of resources; and
- SO8 (Protect the historic built environment), seeks to protect the historic built environment, enhance and add value to the Borough's heritage.

Place Objectives

5.5.4 Alongside the Strategic Objectives, the Core Strategy outlines Place Objectives and specific objectives for Trafford Park. The Place Objectives of relevance to the Metrolink Trafford Park Line are outlined below;

- TPO3 and TPO15 seeks to ensure that Trafford Park as a whole is well served by public transport and in particular to improve access to the area from locations with low car ownership;
- TPO6 seeks to ensure that Trafford Park businesses have access to a workforce with the right skills to access jobs in growth sectors available locally;
- TPO8 seeks to provide the necessary conditions to meet the demands for growing key business sectors and the development of economic clusters, whilst protecting the established industrial base and related employment;
- TPO9 seeks to maximise potential of visitor attractions such as the Imperial War Museum North and the intu Trafford Centre, including the provision of supporting facilities such as hotels, bars, restaurants etc. to meet needs and retain visitor spend in the area;

- TPO14 seeks to secure improved sustainable transportation links to the Regional Centre, Trafford Park and other employment areas; and
- TPO17 seeks to ensure that all new development is constructed in accordance with the latest environmental standards.

Policies

5.5.5 The Core Strategy Local Plan policies that are of specific relevance to the Metrolink Trafford Park Line are detailed below.

5.5.6 The Core Strategy Local Plan seeks the development and maintenance of a sustainable integrated transport network that is accessible and offers a choice of modes of travel to all sectors of the local community and visitors to the Borough (Policy L4 – Sustainable Transport and Accessibility). This incorporates improvements and extensions of the Metrolink network within the Borough, which includes the Metrolink Trafford Park Line.

5.5.7 Policy SL4 (Trafford Centre Rectangle) outlines development requirements for the Trafford Centre Rectangle, which is identified in the Core Strategy Local Plan as a 'Strategic Location' for Trafford. The Metrolink Trafford Park Line is identified in the Core Strategy (page 72) as a priority project to help unlock development in this location. Overall, the policy identifies the need to deliver a major mixed-use development in this Strategic Location, providing a new residential neighbourhood, together with commercial, leisure and community facilities and substantial improvements to the public transport infrastructure.

5.5.8 Policy SL1 (Pomona Island) outlines development requirements for Pomona Island. The Metrolink Trafford Park Line would start at the existing Metrolink Pomona stop and provide a link from the Pomona Island area to Trafford Park and the intu Trafford Centre. The policy indicates that this location can deliver 10 hectares (ha) of employment activity, 800 residential units, new commercial leisure facilities including a hotel, small scale ancillary retail and bar/ restaurant uses, and appropriate new community facilities to support those people using the development.

5.5.9 The Metrolink Trafford Park Line would run through Trafford Wharfside and provide a sustainable mode of transport to the area. Policy SL2 (Trafford Wharfside) outlines development requirements for the area. TMBC considers the location to be able to deliver high quality mixed-use development for employment activity (10 ha of mainly B1 office and light industrial uses), leisure (including hotels) residential development (900 units) and an appropriate scale of supporting retail and community uses.

5.5.10 Other policies of relevance to the Metrolink Trafford Park Line are outlined below:

- Policy L3 (Regeneration and Reducing Inequalities) seeks improvements in accessibility (by a choice of transport modes) within Trafford's Regeneration Areas, and between the Regeneration Areas and employment areas, including Trafford Park. The development of the Metrolink Trafford Park Line would contribute towards delivering a choice of transport modes to access Trafford Park;
- Policy L5 (Climate Change) states new development should mitigate and reduce its impact on climate change factors, such as pollution and flooding and maximise its sustainability through improved environmental performance of buildings, lower carbon emissions and renewable or decentralised energy generation. The Metrolink Trafford Park Line aims to contribute towards tackling the impacts of climate change and reducing emissions through sustainable transport provision and would be undertaken in a manner that minimises potential environmental impacts through impact avoidance and impact mitigation;
- The Core Strategy Local Plan encourages the development of clusters of economic activity. Policy W1 (Economy) sets out the need to focus on employment uses in Trafford Wharfside, Trafford Park Core, Trafford Centre Rectangle and Pomona Island which are located in close proximity to the Metrolink Trafford Park Line. The potential socio-economic impacts of the Metrolink Trafford Park Line are considered in Chapter 13: Socio-economics which illustrates that the scheme would deliver beneficial effects in terms of employment opportunities and improved accessibility to employment opportunities;
- A requirement to protect, maintain and enhance the significant character and appearance of the heritage assets in Trafford is set out in Policy R1 (Historic Environment). The impacts of the Metrolink Trafford Park Line on the historic environment are identified in Chapter 12: Cultural Heritage which indicates that the Metrolink Trafford Park Line would have effects on the historic environment that are of minor adverse significance during the construction phase and moderate beneficial effects during the operational phase; and
- The need to protect and enhance the natural environment of the Borough is set out in Policy R2 (Natural Environment). Chapter 9: Ecology and Nature Conservation indicates that the Metrolink Trafford Park Line would have a negligible effect upon ecological habitats and associated protected species.

Revised Trafford Unitary Development Plan (2006)

5.5.11 TMBC formally adopted the Revised Trafford UDP in June 2006. The UDP includes a number of saved policies and proposals which remain relevant to the Metrolink Trafford Park Line. The following policies from the UDP are of particular relevance as they relate to designations within or adjacent to the Metrolink Trafford Park Line.

5.5.12 The principal of the Metrolink Trafford Park Line is established in Proposal T11 (High Quality Public Transport Network Improvement), which states that TMBC will, in its decisions on land use matters, actively encourage and seek support for the improvement and development of the Metrolink. This policy will be superseded by emerging policy TR2.1 (Metrolink) of the Land Allocations Plan, which identifies a proposed route and stops for the Metrolink Trafford Park Line.

5.5.13 The proposed route of the Metrolink Trafford Park Line is located in close proximity to the Bridgewater Canal Wildlife Corridor and the Manchester Ship Canal Wildlife Corridor. Policy ENV10 (Wildlife Corridors) seeks to consolidate and strengthen the effectiveness of the wildlife corridors. The impacts of the Metrolink Trafford Park Line on ecology are identified further in Chapter 9: Ecology and Nature Conservation which indicates that the scheme would have a negligible impact upon both the Bridgewater Canal and the Manchester Ship Canal.

5.5.14 The Metrolink Trafford Park Line would run through one of Trafford's main industrial areas, which is covered by Policy E7 (Main Industrial Areas). This policy seeks to permit and encourage development (providing it is in accordance with other policies) for business, industry, storage/ distribution (B1, B2 & B8 Use Classes) and similar appropriate uses (e.g. sui generis proposals). This is more specifically outlined in Proposal TP1 (the Trafford Park Core Industrial Area) within which the Metrolink Trafford Park Line falls. TP1 states that TMBC will permit development for business, industry, storage and distribution (B1, B2 and B8) and similar appropriate uses in accordance with Proposal E7.

5.5.15 The Metrolink Trafford Park Line would run close by the Wharfside Strategic Area (Proposal TP5) and the existing Village Business Park (Proposal TP6 – Village Business Park and Centre). The UDP policy highlights that development proposals that may prejudice the provisions of the Metrolink extension, or the provision of new stops to serve the area, will not be approved.

5.5.16 Located at the start of the Metrolink Trafford Park Line is the Pomona Strategic Development Area. Proposal TP2 (Pomona Strategic Area) permits new and replacement development for office accommodation, leisure and tourism and

housing. TP2 also requires development in the area to be adequately served by a sustainable integrated transport network accessible by all sectors of the community, which the Metrolink Trafford Park Line aims to provide.

5.5.17 The Metrolink Trafford Park Line would run across the existing Trafford Park Rail Corridor. Proposal TP11 (Trafford Park Rail Corridors) sets out the need to safeguard the rail routes within Trafford Park.

Trafford Local Plan (Part 2): Land Allocations (Draft) (estimated adoption date 2016)

5.5.18 To deliver the Core Strategy vision, objectives and core policies, other planning policy documents will set out the detailed proposals, including for development sites and areas protected against development. The Land Allocations Plan (Ref. 5-14) will be the principal means by which the objectives defined in the Core Strategy will be translated onto the ground in Trafford.

5.5.19 The Land Allocations Plan was consulted on in early 2014. This represented the Regulation 18 consultation stage under The Town and Country Planning (Local Planning) (England) Regulations 2012 (Ref. 5-15). At the time of writing, TMBC is addressing consultation responses and expect a revised Land Allocations document to be published for a further stage of consultation in autumn 2014, with the aim of Plan adoption in early 2016.

5.5.20 Given that TMBC is at an advanced stage in preparing the Land Allocations Plan, and that the Plan is required to be consistent with policies outlined within the Core Strategy, it is considered that weight can be placed on the content of the draft document and the allocations that are proposed therein.

5.5.21 Within the Draft Land Allocations document there is an alignment shown on the Policies Map for the Metrolink Trafford Park Line. The plan includes the Metrolink Trafford Park Line stops in the vicinity of Wharfside, Imperial War Museum North, Village, Parkway Circle, EventCity and the intu Trafford Centre.

5.5.22 The emerging policies of note to the Metrolink Trafford Park Line are set out below:

- Policy TR2.1 (Metrolink) states there will be encouragement and promotion of the improvement and extension of the Metrolink network within the Borough;
- Policy WHA1 (Wharfside Strategic Location) states that there will be support for the provision of the Metrolink Trafford Park Line through Wharfside including the provision of new Metrolink stops; and

- Policy TCR1 (Trafford Centre Rectangle Strategic Location) states that there will be support for the provision of the Metrolink Trafford Park Line through the Trafford Centre Rectangle, including the provision of new Metrolink stops.

5.6 Conclusions

5.6.1 The sections above provide an overview of the planning policy of most relevance to the Metrolink Trafford Park Line. Planning policy has been considered at both a national and local level. The various planning policies as highlighted above have been taken into account when defining the Metrolink Trafford Park Line objectives, whilst the technical chapters presented within this ES also refer to the various planning policies that are of relevance to each discipline.

5.7 References

Ref. 5-1 Department for Communities and Local Government (DCLG) (2012). 'The National Planning Policy Framework (NPPF)'. DCLG, London.

Ref. 5-2 DCLG (2014). 'National Planning Practice Guidance'. DCLG, London.

Ref. 5-3 Transport for Greater Manchester (2014). 'Transport for Greater Manchester (Light Rapid Transit System) (Trafford Park Extension) Order: Transport Assessment'.

Ref. 5-4 Development for Trade and Industry (2004). 'Transport White Paper: The Future of Transport – A Network for 2030'. Department for Transport, London.

Ref. 5-5 Department for Transport (2006). 'Eddington Transport Study – Transport's Role in Sustaining the UK's Productivity and Competitiveness'. HM Treasury on behalf of the Controller of Her Majesty's Stationery Office, Norwich.

Ref. 5-6 Department for Trade and Industry (2007). 'Energy White Paper: Meeting the Energy Challenge'. Department of Trade and Industry, Norwich.

Ref. 5-7 HM Government (2008). 'Climate Change Act'. Department for Energy and Climate Change, London.

Ref. 5-8 Department for Energy and Climate Change (2009). 'UK Low Carbon Transition Plan: National Strategy for Climate and Energy'. The Stationery Office (TSO), London.

Ref. 5-9 Department for Transport (2011). 'Transport White Paper – Creating Growth, Cutting Carbon: Making Sustainable Transport'. TSO, London.

Ref. 5-10 Association of Greater Manchester Authorities (AGMA) (2013). 'The Greater Manchester Strategy 2013-2020 (Stronger Together)'. AGMA, Manchester.

Ref. 5-11 Transport for Greater Manchester (2011). 'Greater Manchester's Third Local Transport Plan 2011/12 – 2015/16'. Transport for Greater Manchester, Manchester.

Ref. 5-12 Trafford Metropolitan Borough Council (TMBC) (2012). 'Core Strategy Development Plan Document'. TMBC, Trafford.

Ref. 5-13 TMBC (2006). 'Unitary Development Plan'. TMBC, Trafford.

Ref. 5-14 TMBC (2014). 'Land Allocations – Consultation Draft'. TMBC, Trafford.

Ref. 5-15 DCLG (2012). 'The Town and Country Planning (Local Planning) (England) Regulations'. TSO, London.

Transport for Greater Manchester

Chapter 6:

Noise and Vibration

6 NOISE AND VIBRATION

6.1 Introduction

6.1.1 This chapter of the Environmental Statement (ES) reports the findings of an assessment of potential impacts on noise and vibration as a result of the construction and operation of the proposed Metrolink Trafford Park Line, Greater Manchester.

6.1.2 The chapter is supported by Technical Appendix B (Volume II of this ES) and Figures 6.1 and 6.2 (Volume III of this ES).

6.1.3 Described within this chapter are:

- The methods used to assess the noise and vibration effects associated with the Metrolink Trafford Park Line;
- The baseline noise and vibration conditions currently existing along the Metrolink Trafford Park Line;
- The magnitude of impact and resulting significance of effects arising from the Metrolink Trafford Park Line;
- The mitigation measures required to prevent, reduce or offset any adverse noise and vibration effects; and
- The likely residual effects after mitigation measures have been adopted.

6.1.4 Impacts and effects are considered during the construction phase and during the operational phase of the Metrolink Trafford Park Line. In particular, the chapter considers potential impacts on identified receptors, in terms of:

- Noise and vibration levels from the construction works;
- Noise and vibration levels due to the operation of the new line and associated infrastructure; and
- Noise levels due to changes in road traffic flows during construction and operational phases.

6.2 Noise and Vibration Terminology

6.2.1 Throughout this chapter, the terminology and abbreviations as indicated in Table 6.1 have been used.

Table 6.1 Noise and Vibration Terminology	
Term	**Definition**
dB	The unit of noise measurement that expresses the loudness in terms of decibels (dB).
Hz	Hertz (unit of frequency).
Fast/slow time weighting	A sound level meter can be set to log noise levels on a 'fast' or 'slow' time weighting. A 'fast' time weighting corresponds to a response time of 125 milliseconds whereas a 'slow' time weighting corresponds to a response time of 1 second. A 'slow' time weighting damps the variation in noise levels logged whereas a 'fast' time weighting is more sensitive to variations in noise.
Free-field/ façade noise	Noise measurements are typically carried out under free-field or façade conditions. Free-field noise is measured at least 3.5 m away from a vertical reflecting surface whereas façade noise includes a contribution from façade reflections and is measured at a distance of 1 m from a reflecting façade.
L_{A1}, L_{A5}, L_{A10}, L_{A50}, L_{A90}, L_{A99}	A-weighted sound pressure level exceeded for 1, 5, 10, 50, 90 and 99% of the measured time respectively.
L_{Aeq}	Equivalent continuous A-weighted sound pressure level over a given period of time.
L_{Amax}	The maximum A-weighted sound pressure level over a given period of time.
PPV	Peak Particle Velocity in millimetres per second (mms^{-1}). The measurement parameter that is usually used to describe vibration in relation to sudden impulse events.
VDV	Vibration Dose Value is the fourth root of the time integral of the fourth power of the acceleration after it has been frequency weighted. A frequency weighting is applied to mirror the non-linear response of the human body to vibration amplitudes at different frequencies.
L_w	Sound Power Level. Sound power is the rate per unit time at which airborne sound energy is radiated by a source. L_w values are preferred for noise prediction purposes as their value is independent of distance or environment.

6.2.2 Where a noise indicator (e.g. L_{eq}) includes the suffix A (e.g. L_{Aeq}), the reported noise level is weighted based upon a weighting factor for human sensitivity to sound (A weighting curve).

6.2.3 Table 6.2 details the typical noise levels (sound pressure level in dB(A)) as associated with a range of common situations.

Table 6.2 Noise Levels for Common Situations	
Typical noise level, dB(A)	**Example**
0	Threshold of hearing
30	Rural area at night, still air
40	Public library, refrigerator humming at 2 m
50	Quiet office, no machinery
60	Normal conversation
70	Telephone ringing at 2 m
80	General factory noise level
90	Heavy goods vehicle from pavement
100	Pneumatic drill at 5 m
120	Discotheque – 1 m in front of loud speaker
140	Threshold of pain

6.3 Legislation and Planning Policy Context

Legislative Background

Environmental Protection Act 1990

6.3.1 Under the Environmental Protection Act (EPA) 1990 (Ref. 6-1), local authorities have a duty to investigate noise and vibration complaints. If they consider a source of noise or vibration to amount to a statutory nuisance, then a notice must be served on the person/ organisation responsible. In addition, individuals can also pursue private action under the EPA. The EPA covers construction noise and vibration, noise from premises and fixed plant, but does not cover noise and vibration from road traffic or tramways.

Control of Pollution Act 1974

6.3.2 Under Section 60 of the Control of Pollution Act (CoPA) 1974 (Ref. 6-2) a local authority can serve a notice on a contractor in order to control construction works. Under Section 61 of the CoPA, a contractor can apply for 'prior consent' to carry out construction works in order to agree with the local authority the details of the works and the methods to be employed to minimise noise and vibration.

The Noise Insulation Regulations 1996

6.3.3 The Noise Insulation (Railways and Other Guided Transport Systems) (Amendment) Regulations 1996 (Ref. 6-3) apply to the operation of new or altered tramways. The Regulations impose a duty on the authority responsible for constructing a tramway (or adding to an existing system) to provide residential buildings, which meet various criteria, with insulation against noise or to pay a grant for insulation work to be carried out to such buildings.

Planning Policy Context

National Planning Policy

National Planning Policy Framework, 2012

6.3.4 The National Planning Policy Framework (NPPF) (Ref. 6-4) was published in March 2012 (see Chapter 5: Planning Policy Context). The NPPF replaces the following noise related policy and guidance:

- Planning Policy Statement (PPS) 23: Planning and Pollution Control (Ref. 6-5); and
- Planning Policy Guidance 24: Planning and Noise (PPG24) (Ref. 6-6).

6.3.5 The NPPF provides for the production of distinctive local and neighbourhood plans by local authorities, in consultation with local people, which should be developed to reflect the needs and priorities of their communities. The paragraphs from the NPPF relating to noise are set out below:

- Paragraph 109: The planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.
- Paragraph 123: Planning policies and decisions should aim to:
    - Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
    - Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
    - Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and

- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

6.3.6 Applications for planning permission must be determined in accordance with the Development Plan (which includes any local plan or neighbourhood plans adopted for the area), unless material considerations indicate otherwise. The NPPF must be taken into account in the preparation of local and neighbourhood plans, and is a material consideration in the determination of planning applications. Planning policies and decision must reflect and, where appropriate, promote relevant European Union (EU) obligations and statutory requirements.

Noise Policy Statement for England, 2010

6.3.7 The Noise Policy Statement for England (NPSE) (Ref. 6-7) sets out the long term vision of the Government's noise policy, to "*promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development*". It seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise and applies to all forms of noise, including: environmental noise, neighbour noise and neighbourhood noise.

6.3.8 The NPSE adopts established concepts from toxicology that are currently being applied to noise impacts and uses these to classify the effect of an exposure to noise on health and quality of life into three categories:

- No Observed Effect Level (NOEL) - the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established.
- Lowest Observable Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected.
- Significant Observed Adverse Effect Level (SOAEL) - the level above which significant adverse effects on health and quality of life occur.

6.3.9 It is recognised that SOAEL does not have a single objective noise-based level that can be applied to all sources of noise in all situations. The SOAEL is therefore variable and dependent upon the individual noise source(s), receptor(s), and time of day.

6.3.10 The first aim of the NPSE is to avoid significant adverse impacts on health and quality of life, taking into account the guiding principles of sustainable development. The second aim of the NPSE is to consider situations where impacts are established between the LOAEL and SOAEL. In such circumstances,

all reasonable steps should be taken to mitigate and minimise the impacts; however, this does not mean that adverse impacts cannot occur. The third aim of the NPSE is to improve health and quality of life, where possible, through the pro-active management of noise, whilst also taking account of the guiding principles of sustainable development.

6.3.11 The Department for Environment, Food and Rural Affairs (DEFRA) has led a research contract to identify the SOAEL and LOAEL for a limited range of noise sources; however, no guidance from this research has been issued at this time. Therefore, no national guidance currently exists outlining the SOAEL or LOAEL for any noise sources, and developments going through the planning process must identify suitable levels on an individual basis.

Planning Practice Guidance, 2014

6.3.12 In March 2014, the Department for Communities and Local Government (DCLG) released its Planning Practice Guidance (PPG) web-based resource (Ref. 6-8) to support the NPPF. The guidance advises that local planning authorities' should consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur; and
- Whether or not a good standard of amenity can be achieved.

6.3.13 This guidance introduced the additional concepts of NOAEL (No Observed Adverse Effect Level), and UAEL (Unacceptable Adverse Effect Level). Details of the PPG are provided in Table 6.3.

Table 6.3 Planning Practice Guidance (Ref. 6-8)

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required

Table 6.3 Planning Practice Guidance (Ref. 6-8)			
Perception	**Examples of Outcomes**	**Increasing Effect Level**	**Action**
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

6.3.14 Factors to be considered in determining if noise is a concern are identified including the absolute noise level of the source, the existing ambient noise

climate, time of day, frequency of occurrence, duration, character of the noise and cumulative impacts.

Local Policy

Trafford Core Strategy Local Plan (adopted January 2012).

6.3.15 The Trafford Core Strategy Local Plan (2012) (Ref. 6-10) provides the overarching planning policy framework for Trafford and sets the vision, spatial strategy and strategic policies for development in the Borough up to 2026. The Core Strategy replaces in part a number of policies in the Revised Trafford UDP (2006).

6.3.16 The Core Strategy contains one policy specifically relating to noise:

"L5.13 Development that has potential to cause adverse pollution (of air, light, water, ground), noise or vibration will not be permitted unless it can be demonstrated that adequate mitigation measures can be put in place."

Trafford Unitary Development Plan (UDP) (adopted 2006)

6.3.17 The Trafford UDP (Ref. 6-9) contains two saved policies relating to noise, as follows:

- Part II Proposal ENV30 – Control of Pollution:

"The Council will seek to ensure that forms of development likely to cause significant levels of pollution (of air, water or ground), or of noise and/or vibration are not sited within areas where the predominant land uses would be incompatible with such sources of nuisance."

- Proposal D1 – All New Development:

"The Council will seek to ensure that all new developments are of a high standard of design and layout and will grant planning permission for development proposals that do not conflict with other Policies or Proposals of this Plan, and:

Are compatible with the character of the surrounding area and do not prejudice the amenity of the occupiers of adjacent property by reason of overshadowing, overlooking, visual intrusion, noise and disturbance, odour or in any other way."

Trafford Local Plan (Part 2): Land Allocations (Draft)

6.3.18 The Land Allocations Plan (Ref. 6-11) will be the principal means by which the objectives defined in the Core Strategy will be actioned in Trafford. The Plan is currently in an advanced draft stage and is expected to be adopted in early 2016.

Other Relevant Policy, Standards and Guidance

6.3.19 Within this chapter, reference will also be made to (but not be limited to) the following relevant guidance:

- BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites' Part 1: Noise (Ref. 6-14);
- BS 5228-2:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites' Part 2: Vibration (Ref. 6-18);
- BS 7385-2: 1993 'Evaluation and measurement for vibration in buildings'(Ref. 6-22);
- BS 6472: 2008 'Guide to evaluation of human exposure to vibration in buildings'(Ref. 6-17);
- 'Calculation of Railway Noise', 1995 (Ref. 6-21);
- Design Manual for Roads and Bridges Volume 11 Section 3 Part 7 – 'Traffic Noise and Vibration' 2011 (Ref. 6-19);
- 'Calculation of Road Traffic Noise' (CRTN), 1988 (Ref. 6-20);
- BS 4142: 1997 – 'Method for rating industrial noise affecting mixed residential and industrial areas' (Ref. 6-23); and
- BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' (Ref. 6-15).

6.4 Assessment Methodology and Effect Significance Criteria

6.4.1 The following information is presented within this section:

- Identification of the information sources consulted to prepare this noise and vibration impact assessment;
- Details of impact assessment guidance used to define the methodology applied;
- Details of the consultation activities undertaken with respect to noise and vibration;
- The methodology used to assess the potential noise and vibration effects, including the criteria used to determine receptor sensitivity and impact magnitudes.

6.4.2 The scope and proposed methodologies presented in this section are based on those employed for transportation schemes similar to the Metrolink Trafford Park Line.

Information Sources

6.4.3 The following sources of information that define the Metrolink Trafford Park Line were reviewed and form the basis of the impact assessment:

- Baseline noise survey;
- Illustrative Technical Development Scheme Plans which have been submitted with the TWAO Application;
- Traffic data provided by the scheme traffic engineers (SYSTRA); and
- Ground height data purchased from a mapping supplier.

Study Area

6.4.4 The Study Area for the assessment of effects at noise and vibration sensitive receptors was agreed with Trafford Metropolitan Borough Council (TMBC) to extend to 300 metres (m) from the Metrolink Trafford Park Line and proposed construction works.

6.4.5 For changes in road traffic during Metrolink Trafford Park Line operation, the Study Area comprises all links subject to potentially significant changes in traffic flow following the opening of the scheme. A change in the Basic Traffic Noise Level (BNL) of 1 dB has been used to identify such roads.

Methods for Determining Baseline Conditions and Sensitive Receptors

Desk Study

6.4.6 A desk study, comprising a review of available mapping and aerial photography, identified that the noise climate along the Metrolink Trafford Park Line is dominated by road traffic noise. The Metrolink Trafford Park Line route passes through predominantly commercial areas and therefore there may be fixed plant and other sources associated with commercial premises which also contribute to the local noise climate.

6.4.7 The desk study did not identify any existing residential areas in close proximity to the Metrolink Trafford Park Line. However, residential properties are located in Merchants Quay, on the Salford side of the Manchester Ship Canal, which are located over 100 m to the north of the route – these receptors have been added as a receptor.

6.4.8 A small number of commercial receptors of potentially high sensitivity were identified as being in the vicinity of the Metrolink Trafford Park Line. These comprise the ITV Studios, the Premier Inn Hotel and Imperial War Museum North on Trafford Wharf Road, the Trafford Park Hotel on Village Way and the

EventCity conference centre on Barton Dock Road. The hotels are of comparable sensitivity to residential properties, whilst ITV Studios, the Imperial War Museum North and EventCity may require the application of specific noise and vibration criteria.

Field Surveys

6.4.9 Seven noise monitoring locations were selected to represent the most noise and vibration sensitive locations along the Metrolink Trafford Park Line, as identified above, and also to cover the areas between these sensitive locations. The selected measurement locations were agreed with TMBC.

6.4.10 Long-term unattended baseline monitoring in close proximity to representative sensitive receptors was not possible due to a lack of secure sites. Therefore, shortened manned monitoring was undertaken at each of the monitoring locations. The monitoring locations are illustrated in Figure 6.1 (ES Volume III) and detailed in Table 6.4.

Table 6.4 Baseline Noise Monitoring Locations

Reference	Survey Location	Survey Dates/ Start Times	Details
N1	EventCity, Barton Dock Road	17/07/14 10:00	3.5 m from the façade of EventCity (Jupiter Building) and approximately 30 m to edge of carriageway.
N2	Offices, Barton Dock Road	17/07/14 10:02	Noise meter positioned at furthest extent of pavement from the carriageway edge - approx. 3.8 m due to shrubbery. Representative of office building opposite the junction with Mercury Way adjacent to shipping container area.
N3	Offices, Village Way (Ashburton Road East)	17/07/14 10:21	1 m from offices façade.
N4	Trafford Park Hotel Village Way (Ashburton Road East)	17/07/14 10:40	1 m from façade and 1.2 m from carriageway edge due to limited publicly accessible land.

Table 6.4 Baseline Noise Monitoring Locations			
Reference	**Survey Location**	**Survey Dates/ Start Times**	**Details**
N5	ITV Studios, Trafford Wharf Road	21/07/14 12:35	4 m from edge of carriageway and perimeter wall of Rank Hovis site.
N6	Offices, Trafford Wharf Road	17/07/14 14:07	>3.0 m from nearest façade and 3.8 m from carriageway.
N7	Premier Inn Hotel, Trafford Wharf Road	17/07/14 14:07	3.5 m from nearest façade and edge of carriageway.

6.4.11 All noise surveys were undertaken by URS. Details of the instrumentation used are presented in Technical Appendix B (ES Volume II). Calibration certificates for all noise survey instrumentation are available upon request.

Meteorological Conditions

6.4.12 Weather conditions were monitored and recorded throughout the duration of the survey periods by direct observation while on site.

6.4.13 In general weather conditions during the baseline surveys was dry, sunny and warm between 21 to 25° Celsius with wind speeds below 2.0 ms^{-1}. Further details are provided in Technical Appendix B (ES Volume II).

6.4.14 No unacceptable weather conditions were identified during the measurements (i.e. periods of heavy rain or wind speeds in excess of 5 ms^{-1}).

Measurement Protocol

6.4.15 The baseline noise surveys were undertaken in accordance with BS 7445-1:2003 Description and Measurement of Environmental Noise (Ref. 6-13). Details of the noise monitoring equipment deployed for measuring baseline noise are provided in Technical Appendix B (ES Volume II).

6.4.16 The calibration level of all noise instrumentation was checked both prior to and immediately following each survey period. No significant drift (>+/- 0.1dB) was noted.

6.4.17 Measured parameters including the L_{Aeq}, L_{A90}, L_{A10} and L_{AFmax} were logged in 1-hour intervals.

6.4.18 The microphone of each set of noise monitoring equipment used during the noise measurement survey was fitted with the appropriate windshield.

6.4.19 The attended noise measurements were undertaken at 1.2 - 1.5 m above ground level.

Modelling

6.4.20 A 'Do Minimum' road traffic noise model was produced as part of the operational road traffic noise modelling. This model was used to predict the road traffic noise levels at the noise monitoring locations using the Do Minimum traffic data in 2020 and 2035. Further details of the road traffic noise modelling are presented in the following section of this chapter.

Assessment Methodology

6.4.21 The following sections outline the methods employed to undertake the noise and vibration assessment for the Metrolink Trafford Park Line.

6.4.22 The approach to the calculation and assessment of construction noise levels together with the representative receptor locations and their associated sensitivities was discussed with TMBC Environmental Health Department prior to the start of the assessment.

Sensitivity/ Importance of the Receptor

6.4.23 Sensitive commercial premises such as television studios, museums and conference facilities are considered to be of potentially 'high' sensitivity. However, it is noted that the majority of the EventCity conference facility building consists of solid metal cladding with no windows. The Imperial War Museum North also contains few windows with some facades consisting of solid cladding.

6.4.24 Residential premises, including hotels, are considered to be of medium sensitivity.

6.4.25 Offices and retail premises are considered to be of low sensitivity.

6.4.26 Warehouses and industrial units that do not contain any of the aforementioned uses are considered to be of negligible sensitivity.

Construction Noise

6.4.27 The noise levels generated by construction activities and experienced by nearby sensitive receptors depend upon a number of variables, the most significant of which are:

- The noise generated by plant or equipment used on-site, or on-site activities, generally expressed as sound power levels (L_W);
- The periods of operation of the plant on the site, known as its 'on-time';
- The distance between the noise source and the receptor; and
- The attenuation provided by ground absorption and any intervening barriers.

6.4.28 Construction noise predictions were undertaken using a spreadsheet implementation of the methodology outlined in BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1: Noise (Ref. 6-13). BS 5228 predicts noise as an equivalent continuous noise level averaged over a period such as 10 hour working day ($L_{Aeq,10h}$).

6.4.29 BS 5228 contains a database of the noise emission from individual items of equipment and activities, and includes routines to predict noise from demolition and construction activities at identified receptors. The prediction method provides guidance on the effects of different types of ground conditions, barrier attenuation and how to assess the impact of fixed and mobile plant.

6.4.30 The details pertaining to the likely construction schedule and a plant roster for employment in the assessment were provided by the scheme engineers for the major phases of the work. This allowed the prediction of the expected construction noise levels during these phases of the construction works.

6.4.31 The assessment of construction noise effects at residential properties and hotels was undertaken based on 'example method 1 – the ABC method' as defined in BS 5228-1:2009+A1:2014. Table 6.5 provides guidance in terms of appropriate threshold values for residential receptors, based upon existing ambient noise levels. For the purposes of this assessment, the ABC threshold values are defined as the SOAEL for residential receptors.

Table 6.5 Construction Noise Level Thresholds - Residential			
Assessment Category and Threshold Value Period	**Threshold Value $L_{Aeq,T}$ dB(A) façade**		
	Category A (a)	**Category B (b)**	**Category C (c)**
Night-time (23:00 – 07:00)	45	50	55
Evenings and Weekends (d)	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75
NOTE 1: A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level. NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise. NOTE 3: Applies to residential receptors only.			
(a) Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. (b) Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values. (c) Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than Category A values. (d) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays, 07:00 – 23:00 Sundays.			

6.4.32 For residential properties where construction noise levels are predicted to exceed the ABC thresholds (thresholds considered by this assessment to represent the SOAEL), the assessment of the significance of the effect is based on professional judgement, taking into account a range of other factors including:

- The layout and orientation of the property relative to the works; and
- The duration/ frequency or likelihood of the effect.

6.4.33 In accordance with the NPPF and NPSE, it is also important to identify receptors that exceed the LOAEL and ensure adverse effects are mitigated and minimised.

6.4.34 For residential receptors, the LOAEL for construction noise is defined for this assessment as 55, 50 and 40 dB, $L_{Aeq,T(façade)}$ for the daytime, evening/ weekend and night time periods respectively.

6.4.35 As the ABC assessment method is only applicable to residential receptors. A different approach to defining the onset of potentially significant effects is required for non-residential receptors. There are three defined non-residential

noise sensitive receptors within the Study Area. These are the Imperial War Museum North, EventCity and ITV Studios.

6.4.36 Guidance for the Imperial War Museum North was taken from BS 8233:2014, which recommends a design range of 40 - 50 dB for indoor ambient noise levels. Assuming a conservative sound insulation provided by the fabric of the building of 25 dB, this gives an onset of potentially significant effects of 75 dB $L_{Aeq,T(façade)}$ during the day.

6.4.37 Guidance for EventCity was based on the design range within BS 8233:2014, which gives a design range of 30 - 35 dB L_{Aeq} for areas which require good listening conditions. Since EventCity has no windows on the façade closest to the proposed construction works, the sound insulation for a lined steel cladding of 35 dB was assumed, this gives an onset of potentially significant effects of 70 dB $L_{Aeq,T(façade)}$.

6.4.38 For ITV Studios, guidance is not provided within BS 8233:2014 for this specific type of receptor. In the absence of specific guidance, an onset of potentially significant effects of 70 dB $L_{Aeq,T(façade)}$ was assumed (the same as for EventCity).

6.4.39 For low and negligible sensitivity commercial/ industrial receptors, a significance threshold of 75 dB, $L_{Aeq,T(façade)}$ for daytime works is applied, based on the guidance in AL72 for office use (Ref. 6-12).

6.4.40 Further consideration of whether an effect is significant was undertaken using professional judgement, taking account of the duration and frequency of the effect, as well as the time of day that the effect would be experienced.

Construction Vibration

6.4.41 The prediction of vibration was limited to the works associated with the proposed pile installations. Piling is a potential source of groundborne vibration and as such has the potential to disturb occupants of buildings close to the location of the piling works.

6.4.42 Piling works are expected for the construction of the elevated structures at Pomona and the Bridgewater Canal Bridge, and for the piling works required along the edge of the Manchester Ship Canal. Piling may also be needed in certain locations for the installation of Overhead Line Equipment (OLE) poles. The exact locations of the OLE poles are expected to be confirmed during the detailed design stage and therefore, to ensure a worst-case approach to the assessment, the impact of piling was assessed at all of the selected construction receptors.

6.4.43 The assessment assumes that all piling works are carried out using rotary bored piling techniques.

6.4.44 There are no accepted formulae for the prediction of the passage of vibration through ground due to the non-uniform effects of different ground conditions, although some empirical formulae have been proposed for known ground conditions based on previously measured data.

6.4.45 The vibration peak particle velocity (PPV) due to piling of foundations was calculated at sensitive receptors using example measured source data and the propagation relationship taken from the BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 2: Vibration (Ref. 6-18).

6.4.46 Guidance on the annoyance effects of construction vibration is provided in BS 5228-2:2009+A1:2014, adapted below as indicated in Table 6.6.

Table 6.6 Guidance on Effects of Construction Vibration Levels - Annoyance

Vibration Level ppv mms^{-1}	Description of Effect	Effect
<0.3	Vibration is unlikely to be perceptible in even the most sensitive situations for most vibration frequencies associated with construction.	Negligible
0.3 to 1	Increasing likelihood of perceptible vibration in residential environments.	Minor
1 to 10	Increasing likelihood of complaint in residential environments, but can be tolerated at the lower end of the scale if prior warning and explanation has been given to residents.	Moderate
>10	Vibration is likely to be intolerable for any more than a very brief exposure to a level of 10 mms^{-1}.	Major

6.4.47 The estimated PPV values due to construction works on-site were compared to the levels specified in Table 6.6 to determine the significance of the vibration effects in terms of annoyance. The onset of potentially significant effects, the SOAEL, is classified as 1 mms^{-1} PPV at the level at which construction vibration can be tolerated with prior warning. The LOAEL is set for this assessment at 0.3 mms^{-1} PPV, at the point at which construction vibration is likely to become perceptible.

6.4.48 The criteria above relate to occupants of buildings and therefore the same criteria are used for all receptors. At receptors above the SOAEL, further

consideration of whether an effect is significant is undertaken using professional judgement, taking account of the duration and frequency of the effect, as well as the time of day that the effect would be experienced.

6.4.49 BS 7385-2:1993 Evaluation and measurement for vibration in buildings – Part 2: Guide to Damage Levels from Groundborne Vibration (Ref. 6-22) provides guidance on vibration levels likely to result in cosmetic damage, and is referenced in BS 5228-2. Guide values for transient vibration, above which cosmetic damage could occur, are given in Table 6.7.

Table 6.7 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	15 Hz and above
Reinforced or framed structures	50 mms^{-1} at 4 Hz and above	
Industrial and heavy commercial buildings	15 mms^{-1} at 4Hz increasing to 20 mms^{-1} at 15Hz	20 mms^{-1} at 15Hz increasing to 50 mms^{-1} at 40Hz and above

Note 1: Values referred to are at the base of the building.

Note 2: For un-reinforced or light framed structures and residential or light commercial buildings, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.

6.4.50 BS 7385-2 states that the probability of building damage tends to zero for transient vibration levels up to 12.5 mms^{-1} PPV. For continuous vibration the threshold is considerably less at around half this value.

6.4.51 It is also noted that these values refer to the likelihood of cosmetic damage. ISO 4866:2010 (Ref. 6-25) defines three different categories of building damage:

- Cosmetic – formation of hairline cracks in plaster or drywall surfaces and in mortar joints of brick/concrete block constructions;
- Minor – formation of large cracks or loosening and falling of plaster or drywall surfaces or cracks through brick/block; and
- Major – damage to structural elements, cracks in support columns, loosening of joints, splaying of masonry cracks.

6.4.52 BS 7385-2 defines that minor damage occurs at a vibration level twice that of cosmetic damage and major damage occurs at a vibration twice that of minor damage. Therefore, this guidance can be used to define the significance of the effect in terms of building damage identified in Table 6.8.

Table 6.8 Significance of Effect for Building Vibration		
Continuous Vibration Level, PPV mms^{-1}	**Damage Risk**	**Significance of Effect**
6	Tends to zero	Negligible
7.5	Cosmetic	Minor
15	Minor	Moderate
30	Major	Major

6.4.53 It should also be noted that these guideline values refer to buildings and above ground structures. The effects of vibration on buried services is defined in section B4.4 of BS 5228-2 and recommends that a limit value of 15 mms^{-1} PPV should be applied to buried services for continuous vibration in the absence of specific criteria from the undertakers.

Construction Traffic Noise

6.4.54 The construction works have the potential to influence traffic flows on existing roads in the area along the Metrolink Trafford Park Line. The assessment focuses on the impact at existing sensitive receptors located on the most affected roads.

Given that details of construction traffic levels are expected to be defined during the detailed design stage, a qualitative assessment of the effects of construction traffic has been undertaken herein.

Operational Tram Noise

6.4.55 Light Rail Vehicles (LRVs) are powered by electricity supplied by the Overhead Line Equipment (OLE) and are therefore relatively quiet when compared to that of a similar power output internal combustion engine. The main noise source from LRVs is the interaction of the wheels with the rails. Other operational noise sources may include noise from auxiliary equipment fitted to the tram vehicles.

6.4.56 The noise produced from the interaction of wheel and rail can take the form of flange squeal, which is the piercing resonant response of wheels as they negotiate sharp curves, or noise from irregularities in the wheel or track surfaces, such as flat spots on the wheels and joints in the rails. Further augmentation of rolling noise levels can occur when trains pass over different types of track or structures such as bridges.

6.4.57 The Department for Transport (DfT) technical memorandum 'Calculation of Railway Noise' (CRN) (Ref. 6-21) sets out the method to be used for calculating noise from railways and other guided transport systems.

6.4.58 The method of predicting consists of six stages, as follows:

- Calculate the contribution of noise from each segment of track by dividing the railway into one or more segments;
- Obtain the 'sound exposure level' (SEL) from the table contained in CRN or by direct measurement;
- Correct the SEL for distance, ground and air absorption, the effect of any screening barriers, and the angle of view;
- Correct for any reflection effect at the reception point;
- Convert to the value obtained to that of L_{Aeq} taking into account the time period required and the number of trains; and
- Combine the noise from each segment to obtain the total day and night L_{Aeq} for Metrolink.

6.4.59 The prediction of tram noise levels was undertaken using SoundPLAN (v 7.3) noise modelling software, which implements the CRN procedure. The modelling has assumed that the new tram line operates five trams per hour in each direction between the hours of 05:30 and 01:30. Modelling has assumed that all LRVs operate at a constant 30 mph speed as a worst-case.

6.4.60 For the purpose of this assessment it was assumed that the tram tracks are directly fixed to a concrete slab as is proposed for the majority of the Metrolink Trafford Park Line. Therefore, in the CRN predictions the correction for 'slab track' was used.

6.4.61 It has also been assumed that the two proposed elevated structures are steel bridges and the correction for this structure type was applied to the noise predictions.

6.4.62 The magnitude of the impact of the LRVs was determined by comparing the Do Minimum traffic noise levels in the year of opening with the predicted cumulative operational noise levels (LRV noise levels and do something traffic noise levels) as detailed in Table 6.9.

Table 6.9 Criteria for Assessment of Changes in Existing Ambient Noise Levels due to the Operation of the Trams	
Change in Noise Level dB(A)	**Magnitude of Impact**
0	No Change
≤ 1	Negligible
>1 - ≤3	Low
>3 - ≤5	Medium
> 5	High

6.4.63 The significance of the effect of the addition of tram noise to existing ambient noise levels is based on the magnitude of the impact and the sensitivity of the receptor, as shown in Table 6.10.

Table 6.10 Significance of Effect Matrix

Sensitivity of Receptor		Magnitude of Impact			
		Negligible	**Low**	**Medium**	**High**
	High	Minor	Moderate	Major	Major
	Medium	Negligible	Minor	Moderate	Major
	Low	Negligible	Negligible	Minor	Moderate
	Negligible	Negligible	Negligible	Negligible	Minor

Operational Tram Vibration

6.4.64 The level of vibration generated by LRVs depends on the surface irregularities of the wheels and rails, and on the mass and speed of the vehicle. The level of vibration transmitted into the ground depends on the form of construction used for the rail and track bed isolation. The rail is connected to the track foundation in a bed of elastomer and cork that is primarily provided for electrical isolation, but also helps to reduce vibration transmission into the ground.

6.4.65 The prediction of vibration through the soil at distances removed from the track is difficult, as the soil/ subsoil structure can vary from one site to another. The transmission of vibration waves through soils and rock is mathematically very complex to calculate as, when boundaries are present, such as layers of soil or rock or building foundations, waves can be attenuated or enhanced by refraction and interference. Such phenomena are impossible to foresee. It is, therefore,

normal practice to assess vibration propagation characteristics by on site measurements of similar track structures.

6.4.66 When vibration reaches the foundation of a building, the proportion of energy entering the building depends on the nature of the foundations. For slab floors, there is little attenuation as the slab is in close contact with the surrounding soil so that the vibration of such floor slabs are virtually the same as that which would exist without the slab. At buildings with spread or piled foundations, vibration levels can be reduced by a factor of two to four when compared to the predicted ground vibration.

6.4.67 Vibration is propagated within a building structure through walls and floors and is usually attenuated at upper floor levels. However, at buildings with timber floors, vibration can be amplified, especially if the natural floor resonance frequency coincides with peaks in the ground borne vibration spectrum. Increases by factors of two to three are possible when compared to the foundation vibration level (Ref. 6-16).

6.4.68 The vibration level in ground adjacent to buildings is, therefore, a good indication as to the likely levels on the upper floor, since the attenuation of vibration through the foundation is of similar magnitude to the amplification through the structure.

6.4.69 The methodology applied to this assessment has considered the vibration produced by the LRVs operating on the existing Metrolink system. Measurements of the ground borne vibration produced by the existing system were carried out on the existing Metrolink line between Piccadilly and Piccadilly Gardens. These measurements were used to define the source level and propagation characteristics for the operation of LRVs in an urban area.

6.4.70 The effects of vibration on occupants of buildings are outlined in BS 6472:2008. Part 1 (Ref. 6-17) of BS 6472:2008 which covers sources other than blasting and is applicable to the assessment of vibration from rail vehicles. BS 6472:2008 assesses human exposure to vibration in terms of the Vibration Dose Value (VDV).

6.4.71 The significance of LRV vibration effects is derived from BS 6472-1:2008, which rates vibration in terms of varying degrees of adverse comment, ranging from ‘adverse comment not expected’ to ‘adverse comment very likely’. This range of varying degrees of adverse comment has been translated into the significance criteria presented in Table 6.11.

Table 6.11 Significance of Effect for Operational Vibration from LRVs			
Vibration level (VDV ms-1.75)		BS 6472 Rating	Significance of effect
Day (07:00 – 23:00)	Night (23:00 – 07:00)		
< 0.2	< 0.1	Adverse comment is not expected	Negligible
0.2 - 0.4	0.1 - 0.2	Low probability of adverse comment	Minor
0.4 - 0.8	0.2 - 0.4	Adverse comment possible	Moderate
> 0.8	> 0.4	Adverse comment probable	Major

6.4.72 The values shown in Table 6.11 relate to residential accommodation and are also used for hotels. Where the assessment concerns the effect on commercial premises (including the ITV studios, Imperial War Museum North and EventCity), the values shown in Table 6.11 were doubled.

6.4.73 Further consideration of whether an effect is significant was undertaken using professional judgement, taking account of the duration and frequency of the effect, as well as the time of day that the effect would be experienced.

Operational Road Traffic Noise

6.4.74 The implementation of the Metrolink Trafford Park Line is anticipated to require changes to road system and thus changes in traffic flows have the potential to change noise levels at locations away from the route corridor.

6.4.75 Noise from a flow of road traffic is generated by both vehicles' engines and the interaction of tyres with the road surface. The traffic noise level at a receptor, such as an observer at the roadside or residents within a property, is influenced by a number of factors including: traffic flow, speed, composition (% heavy good vehicles (HGV)), gradient, type of road surface, distance from the road and the presence of any obstructions between the road and the receptor.

6.4.76 Noise from a stream of traffic is not constant and therefore, to assess the noise impact, a single figure estimate of the overall noise level is necessary. The index adopted by the Government in 'Calculation of Road Traffic Noise' (CRTN) (Ref. 6-20) to assess traffic noise is $L_{A10,18h}$. This value is determined by taking the highest 10% of noise readings in each of the 18 one hour periods between 06:00 and 24:00, and then calculating the arithmetic mean. As detailed in the Design

Manual for Roads and Bridges (DMRB) (Ref. 6-19), a reasonably good correlation has been shown to exist between this index and residents' perception of traffic noise over a wide range of exposures.

6.4.77 CRTN provides the standard methodology for predicting the $L_{A10,18h}$ road traffic noise level. Noise levels are predicted at a point 1 m measured horizontally externally from the façade of the building.

6.4.78 Road traffic noise levels were predicted for the following scenarios:

- Year of opening without the scheme (2020 Do Minimum);
- Year of opening with the scheme (2020 Do Something);
- Assessment year without the scheme (2035 Do Minimum); and
- Assessment year with the scheme (2035 Do Something).

6.4.79 The Do Minimum and Do Something data were compared to identify any surrounding roads which undergo a potentially significant change in two-way traffic flows. This is defined as a change in the 18-hour flow which produces a change in traffic noise level in excess of 1 dB $L_{A10,18h}$. The selected receptors include consideration of such surrounding roads.

6.4.80 Roads with very low flows (an 18-hour flow of less than 1,000 in one or more scenarios) fall outside the CRTN prediction methodology. However, they have been included within the assessment for completeness, though such low flows do not contribute significantly to the predicted traffic noise levels.

6.4.81 The calculations were carried out using the SoundPLAN v7.3 noise modelling software. This has allowed the modelling of road traffic noise from all roads in the Study Area for which traffic data was provided. The noise levels were calculated for all scenarios at the selected noise sensitive receptors.

6.4.82 Criteria for assessing the magnitude of the impact of road traffic noise are provided in the DMRB Volume 11, Section 3, Part 7 (Ref. 6-19). The DMRB criteria have been adapted to produce the criteria presented in Table 6.12, and were used in this assessment.

Table 6.12 Criteria for Assessment of Changes in Existing Ambient Traffic Noise Levels due to Tram Operation	
Change in Noise Level dB(A)	**Magnitude of Impact**
0	No Change
≤ 1	Negligible
>1 - ≤3	Low
>3 - ≤5	Medium
> 5	High

6.4.83 The predicted road traffic noise levels were also combined with the predicted LRV noise levels to determine the cumulative impact from the combination of the tram and changes to road traffic noise.

6.4.84 The criteria in Table 6.12 were also used to assess the magnitude of the impact of operational LRV noise. The significance of the effect of the addition of LRV noise to existing ambient noise levels is based on the magnitude of the impact and the sensitivity of the receptor, as shown in Table 6.13.

Table 6.13 Significance of Effect Matrix					
Sensitivity of Receptor		**Magnitude of Impact**			
		Negligible	**Low**	**Medium**	**High**
	High	Minor	Moderate	Major	Major
	Medium	Negligible	Minor	Moderate	Major
	Low	Negligible	Negligible	Minor	Moderate
	Negligible	Negligible	Negligible	Negligible	Minor

Assumptions and Limitations

6.4.85 At this stage of the assessment process, only limited information is available on the construction works for the Metrolink Trafford Park Line. More specific information will not be available until a construction contractor is appointed. The assessment of construction noise and vibration, therefore, includes a series of assumptions about the plant and working methods required for construction purposes. As such, the construction noise and vibration assessment is considered to be representative of the expected final construction noise and vibration levels.

6.4.86 Limited information is available regarding the 3D alignment of the Metrolink Trafford Park Line. However, a long section for the centreline of the Metrolink Trafford Park Line has been used to assign a height to the tram track route. Given that no ground height information is available regarding the revised route alignment north of Trafford Wharf Road along the southern bank of the Manchester Ship Canal (refer to Section 3.5, Chapter 3: Alternatives and Design Evolution), this section of the route has been assumed to sit at existing ground levels.

6.4.87 The assessment of noise impacts resulting from traffic has been undertaken as based upon supplied traffic data. The supplied traffic modelling data does not take account of the amended tram route along the southern bank of the Manchester Ship Canal which may alter modelled traffic flows along Trafford Wharf Road.

6.4.88 The new roads associated with the Western Gateway Infrastructure Scheme (WGIS) are included in the assessment; however, detailed plans and 3D ground height information for this scheme are not available. Therefore, the position and height of these roads have been estimated. As the WGIS scheme is fairly remote from the selected receptors used in the assessment, this is not considered to be a significant limitation.

6.4.89 The assessment of vibration from the operation of the Trafford Park line considers the effects on people and buildings. It does not consider the effect on sensitive equipment, which requires the determination of specific thresholds in conjunction with the equipment manufacturers.

6.5 Baseline Description

Summary of Ambient Noise Measurements

6.5.1 Table 6.14 provides a summary of the noise measurements at each of the seven noise monitoring locations (see Figure 6.1, ES Volume III) selected to determine ambient noise levels on which to base the construction and operational noise assessments. Further details, including time histories, are provided in Technical Appendix B (ES Volume II).

Table 6.14 Ambient Noise Monitoring Summary					
Reference	**Location**	**Time Period**	**$L_{Aeq,T}$ dB**	**$L_{A90,T}$ dB**	**L_{Amax} dB**
N1	EventCity, Barton Dock Road	17/07/14 10:00 to 13:00	61	57	92
N2	Offices, Barton Dock Road	17/07/14 10:02 to 13:02	71	62	89
N3	Offices, Village Way (Ashburton Road East)	17/07/14 10:21 to 13:21	77	64	99
N4	Trafford Park Hotel Village Way (Ashburton Road East)	17/07/14 10:40 – 13:40	78	62	110
N5	ITV Studios, Trafford Wharf Road	21/07/14 12:35 to 15:35	70	56	92
N6	Offices, Trafford Wharf Road	17/07/14 14:07 to 17:07	70	54	89
N7	Premier Inn Hotel, Trafford Wharf Road	17/07/14 14:07 to 17:07	69	52	94

6.5.2 As would be expected for an urban area, existing ambient noise levels are fairly high. Road traffic noise was noted as the dominant noise source at all locations. Industrial noise sources were also noted as audible at N1, N2, N4 and N5, whilst regular aircraft overhead were audible.

6.6 Impacts Avoidance Measures

Construction

6.6.1 All construction activities would be carried out in accordance with Transport for Greater Manchester's Code of Construction Practice (CoCP). In addition, the selected construction contractor would prepare and implement a Construction Environmental Management Plan (CEMP). These plans provide guidance on appropriate methods of working and outline suitable noise and vibration impact

avoidance measures and mitigation strategies. The selected construction contractor is expected to produce a Noise and Vibration Management Plan as part of the CEMP documentation.

6.6.2 It is assumed that the selected construction contractor would follow best practicable means to minimise the noise impact upon the local community. Best practicable means includes the following:

- All construction plant and equipment should comply with European Union (EU) noise emission limits;
- Proper use of plant with respect to minimising noise emissions and regular maintenance. All vehicles and mechanical plant used for the purpose of the works should be fitted with effective exhaust silencers and be maintained in good efficient working order;
- Selection of inherently quiet plant where appropriate. All major compressors 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 all ancillary pneumatic percussive tools should be fitted with mufflers or silencers of the type recommended by the manufacturers;
- Machines in intermittent use should be shut down in the intervening periods between work or throttled down to a minimum;
- Plant and equipment such as flatbed lorries, skips and chutes should be lined with noise attenuating materials. Materials should be handled with care and be placed, not dropped. Materials should be delivered during normal working hours;
- All ancillary plant such as generators, compressors and pumps should be positioned so as to cause minimum noise disturbance, i.e. furthest from receptors or behind close boarded noise barriers. If necessary, acoustic enclosures should be provided and/or acoustic shielding;
- Construction contractors would be obliged to adhere to the codes of practice for construction working and piling given in BS 5228 and the guidance given therein minimising noise emissions from the site.

Operation

6.6.3 The modelling of the noise and vibration from the operation of the Metrolink Trafford Park Line has assumed that the following noise and vibration considerations are implemented in the design:

- Continuously welded rail is used wherever practical;
- Any track embedded within the road surface would use a rail embedment material that provides a certain degree of resilience to the track structure;
- Direct fix track would use a fixing method (i.e. baseplate) with a suitable resilient pad;
- The design of insulated and expansion joints would be such that impact noise is minimised; and
- The vehicles using the Metrolink Trafford Park Line do not feature cast-iron tread brakes.

6.7 Assessment of Impacts and Effects

6.7.1 The following selected receptor locations were used for the prediction of noise and vibration impacts as associated with the Metrolink Trafford Park Line. These receptor locations are:

- R1 – 16 Exchange Quay;
- R2 – Telephone Exchange, Trafford Wharf Road;
- R3 – Hilti Office, Trafford Wharf Road;
- R4 – 113 Merchants Quay, Salford (residential);
- R5 – Premier Inn Hotel, Trafford Wharf Road (residential);
- R6 – Kratos Analytical Building, Trafford Wharf Road;
- R7 – Data Centre, Trafford Wharf Road;
- R8 – Quay West Offices, Trafford Wharf Road;
- R9 – Imperial War Museum North;
- R10 – ITV Studios;
- R11 – Warren Bruce Court offices, Warren Bruce Road;
- R12 – Offices on corner of Village Way and Trafford Park Road;
- R13 – Trafford Park Hotel (residential);
- R14 – Offices/Industrial corner of Village Way and Mosley Road;

- R15 – Speedy Hire building, Ashbridge;
- R16 – Offices/Industrial on corner of Warren Road and Westinghouse Road;
- R17 – Industrial unit, Fourways;
- R18 – Industrial unit, east side of Park Way;
- R19 – Industrial unit, south end of Longbridge Road;
- R20 – former Kratos site, Barton Dock Road;
- R21 – Roadway Container Logistics offices, Barton Dock Road;
- R22 – EventCity;
- R23 – Barton Square; and
- R24 – Trafford Centre.

6.7.2 The receptor locations are illustrated in Figure 6.2 (ES Volume III).

Construction

Construction Noise

6.7.3 The prediction of expected noise levels from the Metrolink Trafford Park Line construction works was undertaken for the following major phases of the construction works:

- A1 – demolition and site clearance;
- A2 – piling for bridge foundations;
- A3 – bridge pier construction;
- A4 – bridge beams and deck construction;
- A5 – remove existing road surface and excavate;
- A6 – install track bed;
- A7 – install track;
- A8 – construct new tram stop;
- A9 – road surface finishing;
- A10 – install OLE; and
- A11 – tram stop fit out (cabling, furniture etc.).

6.7.4 Technical Appendix B (ES Volume II) contains information relating to the data sources, inputs and assumptions employed in the construction noise predictions. This includes the plant items and the anticipated percentage 'on-time' for a 10-

hour working day for each activity. The predictions were carried out assuming that plant operates at the centre of the construction corridor and that mobile plant operates over a 25 m traverse distance during the course of a 10-hour working day.

6.7.5 Construction noise levels were calculated for a 10-hour working day. The calculations relate to the section of the Metrolink Trafford Park Line works adjacent to each receptor and that there would be direct line of sight between the works and the receptor. The assessment has assumed that all works are carried out during core working hours of 08:00 to 18:00 Monday to Saturday. Some works activities may be undertaken outside of these working hours, which would be subject to approval by TMBC.

6.7.6 Table 6.15 summarises predicted construction noise levels at defined receptors. The corresponding criteria for the onset of potentially significant effects is also provided, exceedances of the criteria are highlighted in bold.

6.7.7 At R4 (113 Merchants Quay), no ambient noise monitoring data are available as this receptor was added to the assessment following the amendment to the tram route (as detailed in Section 3.5, Chapter 3: Alternatives and Design Evolution). As a conservative approach, the lowest daytime criteria for residential properties of 65 dB $L_{Aeq,10h(façade)}$ has been applied. At the two hotels (R5 and R13), the criteria are based on the measured daytime ambient levels from N7 and N4 respectively. At the remaining non-residential receptors the criterion is generally 75 dB $L_{Aeq,10h(façade)}$, with the exception of R10 (the ITV Studios), and R22 (EventCity) for which a criterion of 70 dB $L_{Aeq,10h(façade)}$ was applied.

Table 6.15 Predicted Maximum Construction Noise Levels (Daytime)

Receptor Location	Predicted Façade Noise Levels, dB $L_{Aeq,10h}$											Criteria
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	
R1	73	69	66	65	63	69	65	-	61	65	-	75
R2	79	-	-	-	79	76	71	-	76	71	-	75
R3	76	-	-	-	76	72	67	68	74	67	60	75
R4	66	-	-	-	66	63	58	57	63	58	49	65
R5	77	-	-	-	77	74	69	70	74	69	62	75
R6	75	-	-	-	75	70	65	60	72	65	52	75
R7	85	-	-	-	70	82	77	58	67	77	50	75
R8	80	-	-	-	77	77	72	73	75	72	65	75

Table 6.15 Predicted Maximum Construction Noise Levels (Daytime)												
Receptor Location	Predicted Façade Noise Levels, dB $L_{Aeq,10h}$											Criteria
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	
R9	80	-	-	-	80	77	72	65	77	72	57	75
R10	77	-	-	-	77	74	69	-	75	69	-	70
R11	78	-	-	-	78	75	70	-	75	70	-	75
R12	81	-	-	-	81	78	73	62	79	73	54	75
R13	82	-	-	-	82	75	70	71	80	70	63	78
R14	86	-	-	-	80	85	78	-	78	78	-	75
R15	78	-	-	-	78	70	65	62	76	65	54	75
R16	79	-	-	-	79	67	62	63	76	62	55	75
R17	75	-	-	-	75	69	64	58	72	64	50	75
R18	75	-	-	-	75	71	67	57	72	67	49	75
R19	74	70	67	66	74	71	66	-	71	66	-	75
R20	78	-	-	-	72	75	70	-	70	70	-	75
R21	79	-	-	-	79	71	67	-	76	67	-	75
R22	82	-	-	-	80	80	74	66	78	74	58	70
R23	77	-	-	-	73	74	69	70	71	69	62	75
R24	74	-	-	-	71	71	66	65	69	66	57	75

6.7.8 At the majority of the selected receptors, one or more activities exceed the identified threshold. Demolition and site clearance works, plus road surface removal, are generally the source of the highest predicted levels. However, these are worst-case noise levels, with construction activities assumed to be carried out on the section of the Metrolink Trafford Park Line adjacent to the receptor. For the majority of the site works, noise levels are anticipated to be significantly less than those stated in Table 6.15, as plant and equipment used in the works are likely to be further away from the receptor location. The period of time for which significant construction noise effects are predicted to occur are likely to account for a small proportion of the total construction period.

Construction Vibration

6.7.9 There is no method for predicting vibration generated by rotary boring piling techniques within BS 5228-2:2009+A1:2014. However, there is case history data that can be drawn upon to give an indication of the likely levels of vibration from

this type of work. The case history data shows that peak particle velocity levels at 5m from the piling rarely exceed 1 mms^{-1}. Vibration levels of this magnitude are considered to be minor adverse in terms of human response and negligible in terms of building damage. As such, construction vibration is not considered to be significant at all receptors.

Construction Traffic Noise

6.7.10 Whilst the levels of construction traffic associated with the Metrolink Trafford Park Line are currently uncertain; the relatively high levels of traffic on the main roads within the Study Area are such that construction traffic is not expected to cause a significant increase in road traffic noise. As such, it is expected that construction traffic noise should not result in potentially significant adverse effects upon defined receptors.

Operation

Operational LRV Noise

6.7.11 The prediction of the operational noise levels produced by the Metrolink Trafford Park Line was carried out at all the selected receptors. Since baseline noise levels were not able to be measured at all locations, the predicted tram noise levels were compared to the predicted 2020 Do Minimum road traffic noise levels. This represents a worst-case assessment since road traffic noise levels are predicted to increase from 2020 to 2035.

6.7.12 The predicted noise levels are presented in Table 6.16, rounded to the nearest whole decibel. The reported results are for the façade which experiences the greatest difference in noise levels due to the tram i.e. the highest difference between LRV noise levels and corresponding 2020 do minimum traffic noise levels. Other facades may experience higher absolute noise levels due to the operation of the tram, however, the difference between the LRV noise levels and the corresponding do minimum traffic noise levels are smaller.

Table 6.16 Predicted LRV Noise Levels

Receptor	Predicted Façade LRV Noise Levels, dB $L_{Aeq,16hr}$	Predicted Do Minimum 2020 Façade Road Traffic Noise Levels $L_{Aeq,16hr}$ dB	Difference dB
R1	56	61	-5
R2	36	45	-10
R3	51	59	-8
R4	46	47	-2

Table 6.16 Predicted LRV Noise Levels			
Receptor	**Predicted Façade LRV Noise Levels, dB $L_{Aeq,16hr}$**	**Predicted Do Minimum 2020 Façade Road Traffic Noise Levels $L_{Aeq,16hr}$ dB**	**Difference dB**
R5	50	55	-5
R6	53	60	-7
R7	63	44	+20
R8	48	42	+6
R9	56	59	-3
R10	58	61	-4
R11	59	58	+1
R12	62	64	-3
R13	53	61	-8
R14	62	68	-6
R15	53	64	-11
R16	52	67	-15
R17	52	64	-12
R18	51	64	-13
R19	55	61	-6
R20	64	67	-3
R21	56	67	-10
R22	62	65	-4
R23	58	64	-5
R24	56	60	-5

6.7.13 These results in Table 6.16 are presented for the daytime only. At the majority of receptors daytime LRV noise levels are below the existing 2020 Do Minimum traffic noise levels. However, at R7 (data centre), R8 (offices) and R11 (offices) the daytime LRV noise levels are higher than the 2020 Do Minimum traffic noise levels. At R7 the tram route is located along the northern façade of the building facing the canal, whereas road traffic is located on the southern façade on Trafford Wharf Road, resulting in a 20 dB difference in noise levels on the northern facade. At R8, a difference of +6 dB is predicted (between LRV noise and 2020 Do Minimum traffic noise) on the eastern façade, as road traffic is

located to the south on Trafford Wharf Road. The eastern façade is shielded by an existing commercial premises which would be demolished as part of the Metrolink Trafford Park Line; however, absolute LRV noise levels on the eastern façade are low at less than 50 dB $L_{Aeq,T}$.

6.7.14 There are three receptors identified as being sensitive during the night, namely R4 (113 Merchants Quay), R5 (Premier Inn Hotel) and R13 (Trafford Park Hotel). At these locations, the predicted LRV noise levels are 48 dB, 47 dB and 50 dB $L_{Aeq,8hr}$ at the façade which experiences the largest difference from 2020 Do Minimum traffic noise levels. At R4 the tram noise levels at night are a maximum of 2 dB above the do minimum traffic noise levels, at R5 the difference is 0 dB and at R13 the difference is -3 dB.

Operational LRV Vibration

6.7.15 The operational LRV vibration levels, in terms of annoyance to occupiers, were predicted at the selected receptor locations. The results of the predictions are presented in Table 6.17.

Table 6.17 Predicted Operational LRV Vibration Levels

Receptor	Daytime Vibration Dose Value ($ms^{-1.75}$)	Night-time Vibration Dose Value ($ms^{-1.75}$)
R1	<0.001	<0.001
R2	0.003	0.002
R3	0.001	0.001
R4	<0.001	<0.001
R5	0.001	0.001
R6	<0.001	<0.001
R7	0.018	0.013
R8	0.004	0.003
R9	0.004	0.003
R10	0.002	0.001
R11	0.002	0.001
R12	0.006	0.004
R13	0.002	0.001
R14	0.049	0.035
R15	<0.001	<0.001
R16	<0.001	<0.001

Table 6.17 Predicted Operational LRV Vibration Levels		
Receptor	**Daytime Vibration Dose Value ($ms^{-1.75}$)**	**Night-time Vibration Dose Value ($ms^{-1.75}$)**
R17	<0.001	<0.001
R18	0.001	0.001
R19	0.001	<0.001
R20	0.002	0.001
R21	0.001	0.001
R22	0.009	0.006
R23	0.002	0.001
R24	0.001	<0.001

6.7.16 The predicted operational vibration levels fall into the 'adverse comment is not expected' category in BS 6472-1:2008. Therefore, the significance of the effect of operational LRV vibration is classed as negligible in terms of annoyance to occupiers of nearby buildings.

Operational Road Traffic

6.7.17 The operational road traffic noise levels were predicted at all chosen receptor locations for all scenarios. The road traffic noise impacts were predicted in terms of a change in the $L_{A10,18h}$. This comparison was done for the change in traffic noise levels due to the Metrolink Trafford Park Line in both 2020 and 2035. The results of the assessment are shown in Table 6.18, rounded to the nearest whole decibel. The reported results are for the façade which experiences the worst case change due to the Metrolink Trafford Park Line.

Table 6.18 Predicted Change in Road Traffic Noise Levels		
Receptor	**2020DS – 2020DM $L_{A10,18h}$ dB**	**2035DS – 2035DM $L_{A10,18h}$ dB**
R1	-1	-1
R2	0	+1
R3	+4	+3
R4	+3	+2
R5	+5	+5
R6	+1	+1

Table 6.18 Predicted Change in Road Traffic Noise Levels		
Receptor	**2020DS – 2020DM $L_{A10,18h}$ dB**	**2035DS – 2035DM $L_{A10,18h}$ dB**
R7	+5	+5
R8	+6	+6
R9	+1	0
R10	0	0
R11	+2	+1
R12	+3	+3
R13	+1	+1
R14	+2	+3
R15	+3	+3
R16	-1	-1
R17	+1	+1
R18	+2	+2
R19	0	0
R20	+1	+1
R21	+3	+3
R22	+2	+3
R23	+2	+2
R24	0	0

6.7.18 For the majority of the selected receptors, the magnitude of the worst case change in predicted traffic noise levels due to the Metrolink Trafford Park Line is low or negligible. At three receptors (R3, R5 and R7) a medium increase in traffic noise levels is predicted at the worst affected façade, and at one receptor (R8) a high increase is predicted.

6.7.19 At R3 (offices) and R5 (Premier Inn hotel) a medium increase in traffic noise levels occurs on the southern façade of the buildings facing towards Victoria Place. This is currently a no-through road at the western end and there is no connection onto Sir Alex Ferguson Way; therefore the Do Minimum traffic flow is zero.

6.7.20 In the Do Something scenario, Trafford Wharf Road to the north of the hotel and offices is closed and traffic flows are therefore zero. The traffic flow is

transferred onto Victoria Place (to the south of the buildings) which connects onto Sir Alex Ferguson Way.

6.7.21 The Do Minimum and Do Something traffic flows are very similar; however, the traffic is relocated from the north of the buildings to the south. The magnitude of the reduction in traffic noise levels on the northern facades is high. In the Do Something scenario, absolute traffic noise levels on the southern façade of the hotel are lower than the Do Minimum traffic noise levels on the northern façade, due to the close proximity of the northern façade to Trafford Wharf Road. Based on the sensitivity of these receptors, the significance of the effect at R3 (offices) ranges from minor adverse at the southern façade to moderate beneficial on the northern façade.

6.7.22 At R5 (Premier Inn hotel), the significance of the effect ranges from moderate adverse (at the southern façade) to major beneficial (on the northern façade). Taking account of the absolute traffic noise levels and the layout of the hotel, the overall significance of the effect at R5 is classed as minor beneficial.

6.7.23 At R7 (data centre) the significance of the adverse effect of the Metrolink Trafford Park Line is minor adverse based on the low sensitivity of the receptor. At R8 (offices) a small section of the eastern façade at ground/ first floor level experiences an increase in traffic noise levels of just over 5 dB. This is due to the loss of the screening provided in the Do Minimum scenario by the adjacent commercial premises, which would be demolished as part of the Metrolink Trafford Park Line. Absolute Do Something traffic noise levels in this location are relatively low, although parts of the building experience higher Do Minimum traffic noise levels. On this basis the overall significance of the effect on R8 is classed as minor adverse.

Operational Noise – Combined Road Traffic and LRV Noise

6.7.24 A combined traffic and LRV noise assessment was carried out to provide a worst-case assessment of the impact of the Metrolink Trafford Park Line. The assessment was carried out by combining the LRV noise levels with the Do Something road traffic noise levels. The combined noise level was then compared to the associated Do Minimum traffic noise levels.

6.7.25 To enable the noise levels to be combined, the road traffic noise levels were carried out in terms of L_{Aeq} levels. The combined assessment was done for both the 2020 and 2035 traffic scenarios.

6.7.26 The results of the combined assessment (rounded to the nearest whole decibel) are presented in Table 6.19. The reported results are for the façade which experiences the worst case change due to the Metrolink Trafford Park Line.

Table 6.19 Predicted Combined Operational Noise Impact		
Receptor	**Combined 2020 Noise Level – 2020DM Road Traffic Noise**	**Combined 2035 Noise Level – 2035DM Road Traffic Noise**
R1	0	0
R2	0	+1
R3	+3	+3
R4	+4	+3
R5	+5	+5
R6	+1	+1
R7	+20	+21
R8	+9	+8
R9	+2	+2
R10	+1	+1
R11	+4	+3
R12	+4	+4
R13	+2	+1
R14	+2	+2
R15	+3	+3
R16	-1	-1
R17	+1	+1
R18	+2	+2
R19	+1	+1
R20	+2	+2
R21	+3	+3
R22	+3	+3
R23	+3	+3
R24	+1	+1

6.7.27 For the majority of the selected receptors the magnitude of the worst case change in daytime predicted traffic noise levels in the Do Something scenario is low or negligible. At four receptors (R4, R5, R11 and R12), a medium increase in daytime traffic noise levels is predicted at the worst affected façade. At two receptors (R7 and R8) a high increase is predicted.

6.7.28 At R9 (Imperial War Museum North) the eastern side of the building is predicted to experience a maximum combined increase in daytime LRV and road traffic noise of just under 2 dB. This is a low magnitude increase, but based on the high sensitivity of the receptor, the significance of the effect is potentially moderate adverse. At all other facades the magnitude of the increase is negligible. The absolute combined LRV and traffic noise levels on the closest approach of the eastern side of the building to the Metrolink Trafford Park Line are just over 60 dB $L_{Aeq,16h}$. The front (south west) side of the building experiences Do Minimum road traffic noise levels in excess of 60 dB $L_{Aeq,16h}$. Based on the absolute combined noise levels and the absence of windows on the eastern side of the building, the significance of the effect is classed as minor adverse.

6.7.29 At R22 (EventCity), the southern side of the building is predicted to experience a maximum combined increase in daytime LRV and road traffic noise of just under 3 dB. This is a low magnitude increase, but based on the high sensitivity of the receptor, the significance of the effect is potentially moderate adverse. At all other facades a negligible increase or negligible/ low decrease is predicted. Based on the absence of windows on the southern side of the building, the significance of the effect is classed as minor adverse.

6.7.30 At R4 (113 Merchants Quay, Salford), the worst case daytime increase in the Do Something scenario is just under 4 dB; at night, the worst case increase is just under 5 dB. Based on the medium sensitivity of this residential receptor, this results in a moderate adverse significant effect at this location. The demolition of various commercial units and the Samuel Platts public house on Trafford Wharf Road increases the contribution from road traffic at the receptor. This, combined with a slight contribution from the LRV running along the canal, is the source of the medium magnitude increase; although it is noted that absolute predicted combined noise levels are low at this receptor (in the low to mid 50 dB $L_{Aeq,16h}$ dB range during the day and the high 40 to low 50 dB $L_{Aeq,8h}$ dB range at night).

6.7.31 At R5 (Premier Inn hotel), the worst case increase in both daytime and night time noise levels is of medium magnitude, when considering the combined impact of road traffic noise and LRV noise. As discussed in the assessment of operational road traffic noise, this worst case impact occurs on the southern façade due to the transfer of traffic from Trafford Wharf Road (north of the building) to Victoria Place (south of the building). The introduction of the Metrolink Trafford Park Line to the north of the building partially offsets the reduction in traffic noise levels on Trafford Wharf Road; however, the magnitude of the overall reduction in noise levels is medium to high. Therefore, the overall significance of the effect at R5 is classed as negligible.

6.7.32 At R11 (offices) and R12 (offices), the predicted effect of the Metrolink Trafford Park Line is minor adverse based on the low sensitivity of the receptor. At R7 (data centre) and R8 (offices) the magnitude of the impact is high, therefore the significance of the effect is potentially moderate adverse.

6.7.33 At R7 an increase in overall noise levels on the north façade of the data centre of up to 21 dB is predicted. This is due to the introduction of the Metrolink Trafford Park Line in close proximity to the northern façade of the building, which is currently shielded from road traffic noise originating to the south. At the south side of the building the increase in overall noise levels is negligible. The absolute overall noise levels on the northern side of the building are in the low 60 dB $L_{Aeq,16h}$ range. This is comparable to the Do Minimum traffic noise levels on the southern side of the building. On this basis the overall significance of the effect on R7 is classed as minor adverse.

6.7.34 At R8 a small section of the north east corner of the building experiences an increase in overall noise levels of up to almost 9 dB. This is due to a combination of the loss of the screening provided in the Do Minimum scenario by the adjacent commercial premises, which would be demolished, and the introduction of the Metrolink Trafford Park Line to the east of the building. Absolute overall noise levels in this location are relatively low, other parts of the building experience higher Do Minimum traffic noise levels. On this basis the overall significance of the effect on R8 is classed as minor adverse.

6.8 Additional Mitigation

Construction

6.8.1 The construction noise assessment described in Table 6.15 and the accompanying text predicts a potentially significant noise effects at some of the identified receptors. It is recommended that consideration is given to the use of localised acoustic screens when works are being carried out in close proximity to particularly noise sensitive receptors, such as the hotels.

Operation

6.8.2 No specific mitigation measures for the operation of the LRVs on the Metrolink Trafford Park Line are currently proposed, other than those included in the design of the scheme (refer to Section 6.6).

6.8.3 Based on this initial identification of a potentially moderate adverse effect at residential properties on the northern side of the Manchester Ship Canal, further consideration of the noise impacts and any mitigation requirements for these properties will be made as the detailed design progresses.

6.8.4 The results of the traffic noise assessment as presented herein indicate that noise mitigation measures are not necessary.

6.9 Residual Effects and Conclusions

6.9.1 A summary of residual noise and vibration effects arising from the construction and operation of the Metrolink Trafford Park Line is set out in Table 6.20.

Table 6.20 Summary of Noise and Vibration Residual Effects

Stage of Development	Description of Effect	Residual Effect Significance	Nature of Effect (see footnote)	Geographic Scale
Construction noise	Noise produced by the construction activities on receptors along the Metrolink Trafford Park Line	Significant adverse	St, R	Local
Construction vibration	Vibration produced by the construction works affecting buildings and occupiers of buildings along the Metrolink Trafford Park Line	Negligible	St, R	Local
Operational LRV vibration	Vibration affecting occupiers of buildings along the Metrolink Trafford Park Line	Negligible	Lt, P, IR	Local
Operational road traffic noise	Noise from changes to road traffic affecting all receptors in the Study Area	Minor adverse	Lt, P, IR	Local
Combined road and LRV operational noise	Combination of road and tram noise affecting all receptors in the Study Area	Negligible to Moderate adverse	Lt, P, IR	Local

St = short term, Mt = medium term, Lt = long term, P = permanent, D = direct, InD = indirect, R = reversible, IR = irreversible, N/A = not applicable

6.10 References

Ref. 6-1 Environmental Protection Act 1990.

Ref. 6-2 Control of Pollution Act 1974.

Ref. 6-3 The Noise Insulation (Railways and Other Guided Transport Systems) (Amendment) Regulations 1996.

Ref. 6-4 Department for Communities and Local Government (DCLG) (2012); National Planning Policy Framework.

Ref. 6-5 Office of the Deputy Prime Minister (2004) Planning Policy Statement (PPS) 23: Planning and Pollution Control.

Ref. 6-6 Department of the Environment/Welsh Office, (1994); Planning Policy Guidance 24 – Planning and Noise, TSO, London.

Ref. 6-7 Department for Environment, Food and Rural Affairs (2010); Noise Policy Statement for England.

Ref. 6-8 http://planningguidance.planningportal.gov.uk/blog/guidance/noise/noise-guidance/ (2014).

Ref. 6-9 Trafford Unitary Development Plan (UDP) (adopted 2006).

Ref. 6-10 Trafford Local Plan: Core Strategy (adopted January 2012).

Ref. 6-11 Trafford Local Development Framework: Land Allocations (August 2012).

Ref. 6-12 Department of the Environment (1976), Advisory Leaflet (AL) 72 (1976), Noise control on Building Sites, HMSO, first published 1968, Third edition 1976.

Ref. 6-13 British Standards Institute, 1991. BS 7445 - Description and Measurement of Environmental Noise, London.

Ref. 6-14 British Standards Institute, 2014. BS 5228-1:2009 + A1 2014:Code of Practice for noise and vibration control on construction and open sites: Part 1: Noise.

Ref. 6-15 British Standards Institute, 2014. BS 8233:2014 Guidance on sound insulation and noise reduction for buildings.

Ref. 6-16 Association of noise Consultants, 2012.Measuremetn and Assessment of Groundborne Noise and Vibration.

Ref. 6-17 British Standards Institute, 2008. BS 6472:2008 - Guide to Evaluation of Human Exposure to Vibration in Buildings.

Ref. 6-18 British Standards Institute, 2014. BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 2: Vibration.

Ref. 6-19 Highways Agency, 2011. Design Manual for Roads and Bridges Volume 11 Section 3 Part 7-Traffic Noise and Vibration (DMRB).

Ref. 6-20 Department of Transport/Welsh Office, 1988. The Calculation of Road Traffic Noise (CRTN).

Ref. 6-21 Department for Transport, 1995. The Calculation of Railway Noise.

Ref. 6-22 British Standards Institute, 1993. BS7 385-2:1993 Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration.

Ref. 6-23 British Standards Institute, 1997. BS 4142:1997 - Method for rating industrial noise affecting mixed residential and industrial areas.

Ref. 6-24 World Health Organisation, 2010. Night Noise Guidelines for Europe.

Ref. 6-25 ISO 4866:2010 Mechanical vibration and shock -- Vibration of fixed structures -- Guidelines for the measurement of vibrations and evaluation of their effects on structures.

Transport for Greater Manchester

Chapter 7:

Air Quality

7 AIR QUALITY

7.1 Introduction

7.1.1 This chapter of the Environmental Statement (ES) reports the findings of an assessment of potential impacts on air quality as a result of the proposed Metrolink Trafford Park Line, Greater Manchester. This assessment focuses on the potential effects that the construction and operational phases of the Metrolink Trafford Park Line would have on air quality sensitive receptors. Where appropriate, mitigation measures have been recommended to minimise the potential for adverse residual effects from being experienced.

7.1.2 The chapter is supported by Figure 7.1 which is provided in Volume III of this ES.

7.1.3 A review of published ambient air quality data forms the basis for the current and future baseline conditions against which the magnitude of predicted impacts due to the Metrolink Trafford Park Line are assessed. Greater Manchester has declared an Air Quality Management Area (AQMA) in an area covering Manchester city centre, the area around Manchester Airport and the main arterial traffic routes in the city. The AQMA was declared due to exceedances of the annual mean nitrogen dioxide (NO_2) objective. The Metrolink Trafford Park Line is located within this AQMA (see Figure 7.1, Volume III of this ES).

7.1.4 During the construction and operational phases, changes in vehicle movements have the potential to change long term and short term mean concentrations of particulate matter (PM_{10} and $PM_{2.5}$[1]) and nitrogen dioxide (NO_2) as a result of predicted changes in road traffic movements on the local road network.

7.1.5 The air quality assessment has utilised the predicted traffic flows for the Metrolink Trafford Park Line as prepared by the scheme traffic consultants (Systra). Based on the traffic model scenario years, air quality impacts have been considered specifically for:

- 2013 Current Baseline Scenario (for the purpose of calibrating the dispersion model);
- 2020 Do Minimum Scenario (opening year without the scheme); and
- 2020 Do Something Scenario (opening year with the scheme).

[1] PM_{10} and $PM_{2.5}$ refer to particulate matter that have aerodynamic diameters of less than 10 and 2.5 micrometres (μm), respectively.

7.2 Legislation and Planning Policy Context

Legislative Background

7.2.1 The Clean Air for Europe (CAFÉ) programme revisited the management of Air Quality within the European Union (EU) and replaced the EU Framework Directive 96/62/EC (Ref. 7-1) its associated Daughter Directives 1999/30/EC (Ref. 7-2), 2000/69/EC (Ref. 7-3), 2002/3/EC (Ref. 7-4), and the Council Decision 97/101/EC (Ref. 7-5), with a single act, the Ambient Air Quality and Cleaner Air for Europe Directive 2008/50/EC (Ref. 7-6).

7.2.2 Directive 2008/50/EC is currently transcribed into UK legislation by the Air Quality Standards Regulations 2010 (Ref. 7-7), which came into force on 11th June 2010. These limit values are binding to the UK and have been set with the aim of avoiding, preventing or reducing harmful effects on human health and on the environment as a whole.

National Planning Policy

National Planning Policy Framework

7.2.3 The National Planning Policy Framework (NPPF), published in March 2012 (Ref. 7-8), states that:

"The planning system should contribute to and enhance the national and local environment by:

Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels or soil, air, water or noise pollution or land instability…" (paragraph 109)

7.2.4 Annex 2 of the NPPF defines 'Pollution' as:

"Anything that affects the quality of land, air, water or soils, which might lead to an adverse impact on human health, the natural environment or general amenity. Pollution can arise from a range of emissions, including smoke, fumes, gases, dust, steam, odour, noise and light".

7.2.5 There are both national and local policies for the control of air pollution and for the management of local air quality within the Trafford Metropolitan Borough Council (TMBC), Salford City Council (SCC) and Manchester City Council (MCC) administrative areas. The effect of the Metrolink Trafford Park Line on the achievement of such policies and plans are matters that may be a material consideration by planning authorities, when making decisions for individual planning applications. Paragraph 124 of the NPPF states that:

"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan".

7.2.6 The National Planning Practice Guidance (NPPG) (Ref. 7-9) provides a summary of the air quality issues set out in the NPPF and goes on to note that the assessment should include the following information:

- The existing air quality in the Air Quality Study Area (existing baseline);
- The future air quality without the development in place (future baseline); and
- The future air quality with the development in place (with mitigation).

7.2.7 The guidance then advises that applications should proceed to decision with appropriate planning conditions or planning obligation, if the development (including mitigation) would not lead to an unacceptable risk from air pollution, prevent sustained compliance with EU limit values or fail to comply with the requirements of the Habitats Regulations (Ref. 7-10).

National Air Quality Strategy

7.2.8 The UK National Air Quality Strategy (Ref. 7-7) was initially published in 2000 under the requirements of the Environment Act 1995 (Ref. 7-11). The most recent version of the strategy (Ref. 7-12) sets out objective values for key pollutants as a tool to help local authorities manage local air quality improvements in accordance with the EU Air Quality Framework Directive. Some of these objectives values have subsequently been laid out within the Air Quality (England) Regulations 2000 (Ref. 7-13) and later amendments (Ref. 7-14).

7.2.9 The air quality objective values referred to above have been set down in regulation solely for the purposes of local air quality management. Under the local air quality management regime, TMBC and SCC have a duty to carry out regular assessments of air quality against the objective values. Where these will not be met in the given timescale; they must designate an AQMA and prepare an Air Quality Action Plan (AQAP) with the aim of achieving the objective value. The boundary of an AQMA is set by the governing local authority to define the geographical area that is to be subject to the management measures set out in the AQAP. Consequently, it is not unusual for the boundary of an AQMA to

include within it, relevant locations where air quality is not at risk of exceeding an air quality objective.

7.2.10 The UK's national air quality objectives values for the pollutants of relevance to this assessment are provided in Table 7.1.

Table 7.1 Air Quality Values for England

Pollutant	Averaging Period	Value (µg/m^3)	Maximum Permitted Exceedances	Target Date
Nitrogen Dioxide (NO_2)	Annual Mean	40	None	31/12/05
	Hourly Mean	200	18 times per year	31/02/05
Particulate Matter (PM_{10})	Annual Mean	40	None	31/12/04
	24-hour	50	35 times per year	31/12/04
Fine Particulate Matter ($PM_{2.5}$)	Annual Mean	25	None	2020

Local Policy

Local Air Quality Management

7.2.11 Under the requirements of Part IV of the Environment Act (1995) (Ref. 7-11) TMBC, SCC and MCC have carried out a phased review and assessment of local air quality within their administrative area since 2000. Details are provided in the sections below.

Trafford Metropolitan Borough Council (TMBC)

7.2.12 TMBC declared the original AQMA for likely exceedances of the NO_2 annual average objective in June 2001. Following the Detailed Assessment undertaken in 2004, TMBC complied with its duties to consult the statutory bodies and then declared the redefined AQMA. This redefined AQMA (Figure 7.1, Volume III of this ES) took account of the areas of NO_2 annual average exceedance identified along the A56, A560 and A6144 and areas around central Altrincham and Sale; including Stamford New Road, Timperley Road and Marsland Road (Ref. 7-15).

7.2.13 TMBC undertakes extensive automatic and diffusion tube air quality monitoring throughout its area. Concentrations outside of the AQMA in 2008 were all below the objectives at relevant locations, therefore, confirming that these locations do not need to be included within the AQMA.

7.2.14 TMBC has prepared guidance on development in their area within the Trafford Local Plan Core Strategy (Ref. 7-16). A policy regarding transport is outlined below:

"SO6: Reduce the need to travel – promote significant levels of development in the most sustainable locations in the borough and make less sustainable locations accessible by improving transport links, particularly public transport."

7.2.15 Within Policy SO6 is a section aimed at air quality, this is outlined below:

"ST016: To address poor air quality in the area, particularly along the A56'.

7.2.16 There is also a policy concerning air pollution in relation to climate change as follows:

"Policy L5: 'Climate Change' … L5_15 within the Borough's Air Quality Management Zones developers will be required to adopt measures identified in the Greater Manchester Air Quality Plan, to ensure that their development would not have an adverse impact on the air quality."

Salford City Council (SCC)

7.2.17 SCC declared an AQMA in 2005 due to the exceedance of annual mean NO_2 objective. The AQMA (Figure 7.1, Volume III of this ES) covers an area encompassing the motorways and some of the main roads passing through the city of Salford.

7.2.18 In the most recent published Air Quality Progress Report (2011) (Ref. 7-17), no new exceedances were identified for NO_2 and PM_{10} and no further investigations were required beyond those previously identified. Monitoring data showed exceedances of the annual mean NO_2 objective at road side locations and exceedances of the hourly NO_2 objective by the M60 which is already in an AQMA. There were also no exceedances of PM_{10} at either the Eccles or M60 monitoring stations. NO_2 monitoring of the Manchester to Wigan rail line confirmed annual mean concentrations below the objective, and no further assessment was required.

7.2.19 SCC withdrew its Core Strategy in November 2012 (Ref. 7-18) and is currently preparing a draft Local Plan anticipated to be published for consultation in summer 2015.

Manchester City Council (MCC)

7.2.20 MCC declared the original AQMA in July 2001 for likely exceedances of the NO_2 annual average and 24 hour PM_{10} objective values along major roads, the city centre and an area around Manchester Airport. Following the Detailed

Assessment undertaken in 2004, MCC found that only annual mean concentrations of NO_2 were likely to exceed the air quality objective value. The boundaries of the AQMA were reviewed and amended by a variation order in 2007. This redefined AQMA (Figure 7.1, Volume III of this ES) covers the city centre, the arterial traffic routes around the city and those to the south of the city and also the area associated with Manchester Airport.

7.2.21 MCC undertakes extensive automatic (3 locations) and diffusion tube (32 locations) air quality monitoring throughout its area.

7.2.22 The latest progress report submitted in 2011 (Ref. 7-19) did not identify any new areas of exceedance outside the AQMA and within the MCC administrative area. Two monitoring locations within the AQMA reported NO_2 concentrations below the objective value, although all NO_2 concentrations were lower in 2009 than for previous years. Two city centre roadside locations reported annual mean NO_2 concentrations in excess of 60 $\mu g/m^3$. Concentrations of this magnitude could indicate exceedances of the hourly NO_2 objective value at these locations. There were no exceedances of PM_{10}.

7.2.23 MCC has prepared guidance on development in their area within the Core Strategy Development Plan Document (Ref. 7-20). A policy regarding transport is outlined below:

"CC 5: Proposals will be supported that improve pedestrian safety, improve air quality and increase the scope for accessible public realm improvements."

7.2.24 Policy EN 16 is a section aimed at air quality and states:

"EN16: The Council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas, located along Manchester's principal traffic routes and at Manchester Airport."

Manchester Air Quality Action Plan (AQAP)

7.2.25 An AQAP (Ref. 7-21) was prepared as part of the second Local Transport Plan (LTP) (Ref. 7-22) for all the local authorities in Greater Manchester due to the declaration of a regional AQMA. This includes a number of areas for action to improve air quality within the region with specific focus on vehicle emissions, alternative modes of transport, travel plans, traffic management, buildings and land use planning, industrial emissions, domestic emissions and raising awareness. The AQAP and measures within it are constantly reviewed, and updated as part of the review process for the Local Transport Plan.

7.2.26 The primary source of NO_2 and most of the other key pollutants in the conurbation is road transport. Therefore, following the publication of the

Greater Manchester AQAP, the plan has been integrated into Greater Manchester's LTP (Ref. 7-22). The third Greater Manchester LTP includes measures to improve air quality in the area (Ref. 7-23). The approach to improving air quality will be based on:

- "Reducing acute pollution incidents from traffic;
- Improving vehicle efficiency including vehicle and fuel technology and efficient driving techniques;
- Reducing the trips by motor vehicles; and
- Improving network efficiency."

7.2.27 In the short term, options under consideration to reduce acute pollution incidents from traffic and to improve vehicle efficiency are:

- "An annual programme of vehicle emissions testing on major transport corridors;
- Extending the enforcement of idling vehicle, which is already carried out in the Regional Centre, to town and district centres;
- Targeted renewal of buses on routes into the Regional Centre and in adjacent areas where permitted levels of pollutants are exceeded;
- Support/ lobby central government for a national HGV scrappage scheme and work with the government on complementary regulation measures; and
- Co-ordinate the uptake of Safe and Fuel Efficient Driving (SAFED) training for smaller freight and bus operators and promote continued updates to driving skills through a best practice scheme."

7.3 Assessment Methodology and Effect Significance Criteria

7.3.1 This section presents the following:

- Identification of the information sources that have been consulted to prepare this air quality impact assessment;
- Details of the consultation activities undertaken with respect to air quality;
- Details of the impact assessment guidance used to define the methodology applied; and
- Details of the methodology used to assess the potential air quality effects, including the criteria used to determine receptor sensitivity and impact magnitudes.

7.3.2 There is currently no statutory guidance on the method by which an air quality impact assessment should be undertaken. Several non-statutory bodies have published their own guidance relating to air quality and development control (Ref. 7-24) or to the assessment of the significance of air quality effects (Ref. 7-25).

7.3.3 This section explains the methods used to assess the significance of the:

- Impact of fugitive emissions of particulate matter from construction phase activities; and
- Impact of road traffic exhaust emissions associated with changes brought about by the Metrolink Trafford Park Line.

7.3.4 Potentially affected air quality sensitive receptors have been identified for each element of the assessment and the magnitude of the change in air quality statistics at each receptor has been considered. The methods used to determine the significance of the effect associated with air quality impacts are described in the sections below.

7.3.5 When assessing the impact of the construction and operational phases of the Metrolink Trafford Park Line, sensitive receptors closest to the route and predicted works areas were selected. These receptors are considered to be worst-case locations compared with other receptors more distant from the works/ operational tramway. Receptors for the construction and operational phase assessments are described in more detail in Paragraphs 7.3.29 and 7.3.32, respectively.

Construction Phase Emissions of Particulate Matter

7.3.6 Fugitive emissions of airborne particulate matter are readily produced through the action of abrasive forces on materials and therefore a wide range of site preparation and construction activities have the potential to generate this type of emission, including:

- Demolition work;
- Earthworks (including the handling, working and storage of materials);
- Construction activities; and
- The transfer of dust making materials from the site onto the local road network.

7.3.7 Particulate matter in air is made up of particulates of a variety of sizes, and the concept of a ‘size fraction’ is used to describe particulates with sizes in a defined range. These definitions are based on the collection efficiency of specific

sampling methods and each size fraction is especially associated with different types of impacts. In this assessment the term 'dust' is used to mean particulate matter in the size fraction 1 µm – 75 µm in diameter, as defined in British Standard (BS) 6069:1994 (Ref. 7-26). Dust impacts are considered in terms of the change in airborne concentration and the change in the rate of deposition of dust onto surfaces.

7.3.8 The size fraction called 'PM_{10}' is composed of material with an aerodynamic diameter of less than 10 µm in diameter and overlaps with the size fraction for dust. Air quality objectives (Ref. 7-7) for PM_{10} have been set for the protection of human health and the term PM_{10} is only used in this assessment when referring to the potential impact of emissions of particulate matter from demolition and construction activities on human health receptors. The short-term, 24-hour mean objective for airborne concentrations of PM_{10} is the appropriate air quality objective for assessing the potential impact on health of short term fugitive emissions from demolition and construction sites.

7.3.9 The Institute of Air Quality Management (IAQM) (Ref. 7-27) adopts a broad definition of dust that includes the potential for changes in airborne concentration, changes in deposition rates and the risk to human health and public amenity, when considering the significance of effects from emissions of fugitive particulate matter. In this assessment, specific reference is made to the impacts associated with specific size fractions (dust, PM_{10}) within the assessment narrative, before considering the overall effect on receptors using an approach that is consistent with the IAQM's guidance.

7.3.10 The nature of the impact requiring assessment varies between different types of receptor. In general, receptors associated with higher baseline dust deposition rates (such as farms, light and heavy industry or outdoor storage facilities) are less sensitive to impacts. In comparison, some hi-technology industries or food processing plants operate under clean air conditions and increased airborne particulate matter concentrations may have an increased economic cost associated with the extraction of more material by the plant's air filtration units.

7.3.11 Table 7.2 below provides some generic examples of the type of impacts that may result from fugitive emissions of particulate matter. The varying sensitivity of distinct receptor types to specified impacts is also listed in Table 7.2. For example, residential buildings are considered to be more sensitive to the impact of material becoming soiled by depositing material, than agricultural land.

Table 7.2 Types of Impacts from Emissions of Particulate Matter		
Nature of Impact	**Receptor Types Affected**	**Relative Sensitivity**
Change in 24 hour mean PM_{10} concentrations	Residential properties	Receptor sensitivity was considered when Air Quality Objective Value was set
	Schools	
	Hospitals and clinics	
Change in the rate at which air filtration units require maintenance	Hospitals and clinics	High
	Hi-tech industries	High
	Food processing industries	High
Change in the rate at which material accumulates on glossy surfaces, such as glass or paint work	Painting and furnishing operations	High
	Residential properties	Medium
	Schools	Medium
	Food retailers	Medium
	Offices	Medium
	Museums and Galleries	Medium
	Glasshouses	Medium
Change in the rate at which property or products becomes soiled by deposited material	Food processing industries	High
	Painting and furnishing operations	High
	Museums and Galleries	High
	Residential properties	High
	Food retailers	Medium
	Offices	Medium
Change in the rate at which mineral material is deposited onto vegetation	Ecological sites	Medium - Low
Change in the chemical composition of mineral material deposited	Ecological sites	Medium - Low
	Outdoor Storage	Medium - Low

7.3.12 This construction assessment is consistent with the overarching approach to the assessment of the impacts of construction as set out in current guidance from the IAQM (Ref. 7-27). The method adopted for this assessment follows the

IAQM's guidance in taking a conservative, site specific approach to assigning the significance of potential effects. The assessment considers the significance of potential effects without mitigation in place, and recommends mitigation measures appropriate to the identified risks to receptors, to minimise the significance of any impacts.

7.3.13 At present, there are no statutory UK or EU standards relating to the assessment or control of nuisance dust. The emphasis of the regulation and control of demolition and construction dust should therefore be the adoption of good working practices on site. Good design practice is a process that is informed by impact assessments and is able to avoid the potential for significant adverse environmental effects at the design stage. This approach assumes that mitigation measures, beyond those inherent in the proposed design, that are identified as being necessary in the impact assessment, would be applied during works (as secured by planning conditions for the Metrolink Trafford Park Line) to ensure potential significant adverse effects do not occur.

7.3.14 Examples of accepted good site practice include guidelines published by the Building Research Establishment (Ref. 7-28), the Greater London Authority (Ref. 7-29) and considerate constructor schemes.

7.3.15 A qualitative assessment has been undertaken to assess the significance of any construction effects on receptors. The steps in the assessment process are to consider potential sources of emissions on the basis of the main activity groupings of demolition, earthworks, construction and track-out. For each activity group, the same steps are applied with respect to the potential impacts at receptors before coming to an overall conclusion about the significance of the effects predicted. The steps are:

- Identify the nature, duration and the location of activities being carried out;
- Establish the risk of significant effects occurring as a result of these activities;
- Review the proposed or embedded mitigation against good site practice;
- Identify additional mitigation measures, if necessary, to reduce the risk of a significant adverse effect occurring at receptors; and
- Summarise the overall effect of the works with respect to fugitive emissions of particulate matter and then report the significance of the effects.

Construction Phase Road Traffic Emissions

7.3.16 The construction phase of the proposals is likely to lead to a small increase in the number of vehicles on the local highway network for the duration of the

construction works. Environmental Protection UK (EPUK) (Ref. 7-24) set out criteria to establish the need for an air quality assessment for the construction phase of a development as being:

"Large, long-term construction sites that would generate large HGV flows (>200 per day) over a period of a year or more."

7.3.17 The nature and duration of specific aspects of the construction works are, as yet, unconfirmed. In the absence of detailed construction information, for the purposes of this ES, it has been assumed, based on the moderate size of the site and phasing to be undertaken during the construction works, that there would be less than 200 construction vehicle movements per day.

7.3.18 The additional number of vehicle movements is not considered to be high enough to have the potential to cause a significant adverse air quality effect at any receptors. Construction phase road traffic emissions are thus not considered further as it can be concluded that the air quality effect on receptors would be not significant.

Operational Road Traffic Emissions

7.3.19 The incomplete combustion of fuel in vehicle engines results in the presence of hydrocarbons (HC) such as benzene and 1,3-butadiene, and sulphur dioxide (SO_2), carbon monoxide (CO), PM_{10} and $PM_{2.5}$ in exhaust emissions. In addition, at the high temperatures and pressures found within vehicle engines, some of the nitrogen in the air and the fuel is oxidised to form NO_X, mainly in the form of nitric oxide (NO), which is then converted to NO_2 in the atmosphere. NO_2 is associated with adverse effects on human health. Better emission control technology and fuel specifications are expected to reduce emissions per vehicle in the long term.

7.3.20 Although SO_2, CO, benzene and 1,3-butadiene are also present in motor vehicle exhaust emissions, detailed consideration of the associated impacts on local air quality is not considered relevant in the context of this proposal. This is because road traffic emissions of these substances have been reviewed by the local authority and nowhere within the TMBC or SCC administrative area is at risk of exceeding these objectives. The Metrolink Trafford Park Line would not be capable of compromising the achievement of the relevant air quality objectives for the protection of human health. Emissions of SO_2, CO, benzene and 1,3-butadiene from road traffic are therefore not considered further within this assessment.

7.3.21 During operation, the Metrolink Trafford Park Line has the potential to change vehicle movements on the surrounding road network. An increase in vehicle emissions can increase the exposure of receptors to concentrations of NO_2 and particulate matter (PM_{10} and $PM_{2.5}$). This assessment quantifies the concentration of the pollutants most commonly associated with vehicle emissions at selected receptor locations. Concentrations for both the 'baseline' scenarios and the 'Do Something' scenario have been predicted using applicable modelling techniques. The magnitude of change as a result of the change in vehicle movements due to the Metrolink Trafford Park Line has been used to identify the potential for road traffic emissions to cause a significant air quality effect at selected receptors.

7.3.22 To undertake the assessment of road traffic emissions during the operational phase, the latest version of dispersion model software 'ADMS-Roads' (V3.2.4) has been used to quantify pollution levels at receptors. ADMS-Roads is a modern dispersion model that has an extensive published track record of use in the UK for the assessment of local air quality impacts, including model validation and verification studies (Ref. 7-30).

Use of Measurement Data

7.3.23 It is standard practice in air quality assessments to verify the performance of air quality models (used to assess the air quality implications of development projects) against real measured data from within an air quality study area to account for model bias.

7.3.24 The model predictions presented in this air quality impact assessment have been verified against monitoring data gathered by the local authorities and additional site specific data collected by URS. The verification factor for the closest monitoring data point was applied to each of the receptor predictions.

7.3.25 The background concentration data used in this assessment has been sourced from Defra 2011-based background maps for 2013 for the Air Quality Study Area. 2013 backgrounds were used for the 2013 baseline scenario, as well as for the 2020 Do Minimum and 2020 Do Something scenarios to ensure a conservative approach.

Information Sources

7.3.26 The following sources of information, which define the Metrolink Trafford Park Line, have been reviewed and form the basis of the impact assessment:

- Traffic data for baseline (2013), Do Minimum (2020) and Do Something (2020) scenarios from the Metrolink Trafford Park Line traffic model;

- The illustrative Technical Development Scheme Plans (submitted as part of the TWAO application).
- A technical note on potential outline construction methods (Mott MacDonald, 2014);
- OS mapping;
- Local authority air quality monitoring data; and
- Defra background pollutant concentration maps (Ref. 7-31).

Methods for Determining Baseline Conditions and Sensitive Receptors

Receptors Potentially Affected by Emissions from Construction Phase Works

7.3.27 When assessing the impact of dust emissions generated during demolition and construction works, receptors are defined as the nearest potentially sensitive receptor to the boundary of the site in each direction. These receptors have the potential to experience impacts of greater magnitude (from emissions of particulate matter generated by the works) when compared with other more distant receptors or less sensitive receptors.

7.3.28 When assessing the impact of dust emissions generated during construction works, an assessment is required where there is:

- A human receptor within 350 metres (m) of the site boundary;
- An internationally designated ecological receptor within 50 m of the site boundary; or
- A human or internationally designated ecological receptor within 50 m of the route used by construction vehicles on the public highway (over a distance of 500 m from the site entrance).

7.3.29 There are a number of receptors that are sensitive to dust within and in the immediate vicinity of the Metrolink Trafford Park Line. These receptors include:

- Residential properties: Exchange Quay, Clippers Quay and Merchants Quay, Salford;
- Food processing industries: Kellogg's (Barton Dock Road), Soreen (Marshall Stevens Way) and Rank Hovis (Trafford Wharf Road);
- Schools: The Village Nursery (Third Avenue) and Barton Clough Primary School (Stretford Audley Avenue);
- Offices: located on Trafford Wharf Road, Exchange Quay, Clippers Quay and Merchants Quay;

- Car parks: intu Trafford Centre, Old Trafford football stadium, Evans Halshaw commercial vehicle park (Village Way/ Mosley Road), Volkswagen Van Centre (Village Way/ Fifth Avenue); and
- Museums and galleries: The Lowry (Salford Quays) and Imperial War Museum North (Trafford Wharf Road).

Receptors Potentially Affected by Operational Emissions

7.3.30 The concentration of road traffic emitted pollutants at the roadside or at receptors is influenced by a number of factors. These include background pollution levels and the volume of traffic emissions (which is dictated by traffic flow rates, composition and speed).

7.3.31 The air quality objective values for pollutants associated with road traffic have been set by the Expert Panel of Air Quality Standards at a level below the lowest concentration at which the more sensitive members of society have been observed to be adversely affected by exposure to each pollutant. All receptors that represent exposure of the public are therefore assessed as having equal sensitivity.

7.3.32 Impacts from road traffic have been quantified at 17 sensitive receptors (residential properties) (R1-R17) within the air quality Study Area along the road network close to the Metrolink Trafford Park Line. Each of the receptors chosen represents the maximum level of exposure that would be experienced at other receptors in their vicinity. The receptors are listed in Table 7.3 and their location is indicated on Figure 7.1 (Volume III of this ES). All receptors have been modelled at a height of 1.5 m.

Table 7.3 Air Quality Receptors

Receptor	Description	Grid Reference X	Grid Reference Y
R1	Grange Road West	374907	399268
R2	Grange Road East	374942	399527
R3	Iona Way	377166	396107
R4	Chester Road North	382513	397034
R5	Ordsall Lane	381375	396848
R6	Merchants Quay	380944	396852

Table 7.3 Air Quality Receptors			
Receptor	**Description**	**Grid Reference X**	**Grid Reference Y**
R7	Chester Road S	380408	395523
R8	Chester Road/ Thomas Street	380201	395237
R9	Davyhulme Road	379100	395151
R10	Park Road	379130	395027
R11	Barton Road	378511	395311
R12	Lostock Road	377498	395638
R13	Canterbury Gardens	378377	398674
R14	White Street	380399	398444
R15	Worsley Road	376309	398160
R16	Enfield Close	376517	397952
R17	Stroma Gardens	376453	396391

Field Surveys

7.3.33 In order to establish baseline conditions, a three month diffusion tube survey was undertaken by URS to supplement monitoring carried out by TMBC (see Section 7.4). The location of the diffusion tubes are described in Table 7.4 and shown on Figure 7.1 (Volume III of this ES).

Table 7.4 URS Air Quality Monitoring Survey Information						
Site Name	**Site Description**	**Distance from Metrolink Trafford Park Line**	**Grid Reference**		**2013 Annual Mean NO_2 ($\mu g/m^3$)**	**Period Data Capture (%)**
			X	**Y**		
TP 1	Old Hall Road	680 m south of the Metrolink Trafford Park Line	378039	395726	33.0	78
TP 2	518 Barton Road	880 m south of the Metrolink Trafford Park Line	378027	395476	40.8	100
TP 3	Park Road A5181	1.4 km south of the Metrolink Trafford Park Line	379032	395365	45.4	100
TP 4	852 Chester Road	1.3 km south of the Metrolink Trafford Park Line	380338	395458	53.8	100
TP 5	Trafford House, Chester Road	610 m south of the Metrolink Trafford Park Line	380842	396011	57.5	100
TP 6	34 Barton Road	1.4 km north of the Metrolink Trafford Park Line	376387	398071	40.6	100
TP 7	A57 Eccles New Road	1.8 km north of the Metrolink Trafford Park Line	378632	398645	43.3	89

Modelling

7.3.34 Detailed modelling of the impacts of changes in road traffic emissions during the Metrolink Trafford Park Line operational phase has been modelled using the latest version of dispersion model software 'ADMS-Roads' (V3.2.4).

7.3.35 The general model conditions used in the assessment of road traffic emissions are summarised in Table 7.5. Other more detailed aspects needed to model the dispersion of emissions are considered within the paragraphs below.

Table 7.5 General ADMS Roads Model Conditions	
Variables	**Model Input**
Surface roughness at source	1.0
Minimum Monin-Obukhov length for stable conditions	30 m
Terrain Types	Flat
Receptor Location	x,y coordinates determined by GIS z height of 1.5 m for receptors
Emissions	NO_X, PM_{10}, $PM_{2.5}$
Emission Factors	EFT V6.0.1 emission factor dataset
Meteorological data	1 year 2013 hourly sequential data from Manchester Airport meteorology station
Emission profiles	No emission profile used
Receptors	Sensitive receptors only (see Table 7.3)
Model output	Long-term annual mean NO_X concentrations
	Long-term annual mean PM_{10} concentrations
	Long-term annual mean $PM_{2.5}$ concentrations

Traffic Data

7.3.36 The traffic data used within this assessment for the baseline year and the 2020 Do Minimum and 2020 Do Something opening year has been provided by the scheme traffic consultants (Systra) for the Metrolink Trafford Park Line.

Meteorological Data

7.3.37 Meteorological data from Manchester Airport for 2013 has been used to inform the assessment. This meteorological site is located approximately 9 km from the air quality Study Area boundary. Conditions at this meteorological site are considered to be representative of the Metrolink Trafford Park Line air quality Study Area.

Background Data

7.3.38 As discussed in Paragraph 7.3.25, background data have been sourced from Defra 2011-based background maps for 2013 for the air quality Study Area. Annual mean background data for 2013 is presented in Table 7.6 for each selected receptor in the air quality Study Area.

Table 7.6 Annual Mean Background Concentration Data for Baseline (2013) and Opening Years (2020)*			
Receptor	**NO_2 (µg/m^3)**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**
R1	13.6	17.2	11.3
R2	13.6	17.2	11.3
R3	19.6	18.2	12.0
R4	21.1	18.1	12.3
R5	21.0	17.7	12.1
R6	21.8	17.3	11.8
R7	20.5	17.0	11.7
R8	20.5	17.0	11.7
R9	19.6	16.6	11.3
R10	19.6	16.6	11.3
R11	17.8	16.8	11.2
R12	17.7	17.9	11.9
R13	20.4	19.0	12.5
R14	23.0	18.9	12.7
R15	19.5	16.9	11.5
R16	18.9	16.2	11.0
R17	25.4	18.2	12.1

* Data from the 2013 Defra background map has been applied to both baseline and opening year scenarios to ensure a conservative approach.

Bias Adjustment of Road Contribution Pollutant Concentrations

7.3.39 Local authority and URS monitoring data within the air quality Study Area were used for model bias adjustment for NO_X and particulates. A local verification factor was applied to each of the selected receptors derived from the closest monitoring location.

7.3.40 Verification factors applied to NO_X and particulate modelled output results are summarised in Table 7.7.

Table 7.7 Bias Adjustment Factors of Road Contribution Pollutant Concentrations	
Receptors	**Verification Factor**
R1 - 3, R12, R17	2.00
R4 - 8, R14	3.58
R9, R10	2.22
R11	4.01
R13	3.67
R15, R16	3.37

NO_X to NO_2 Conversion

7.3.41 To accompany the publication of the guidance document LAQM TG(09) (Ref. 7-32), a NO_X to NO_2 converter was made available as a tool to calculate the road NO_2 contribution from modelled road NO_X contributions. The tool comes in the form of an MS Excel spreadsheet and uses local authority specific data to calculate annual mean concentrations of NO_2 from dispersion model output values of annual mean concentrations of NO_X. This tool was used to calculate the total NO_2 concentrations at selected receptors from the modelled road NO_X contribution and associated background concentration. For the purposes of this assessment, the 'all other urban traffic' settings were selected for all of the identified receptors.

Predicting the Number of Days in which the PM_{10} 24-hour Mean Objective is Exceeded

7.3.42 The guidance document LAQM TG(03) sets out the method to calculate the number of days in which the PM_{10} 24-hr mean objective is exceeded (Ref. 7-33). The calculation is based on a relationship with the predicted PM_{10} annual mean concentration. The formula used within this assessment is:

$$\text{No. of } Exceedances = 0.0014 * C^3 + \frac{206}{C} - 18.5$$

7.3.43 Where C is the annual mean concentration of PM_{10}.

Predicting the Number of Days in which the NO_2 Hourly Mean Objective is Exceeded

7.3.44 Research projects completed on behalf of Defra and the Devolved Administrations (Ref. 7-34) and (Ref. 7-35) have concluded that the hourly mean

NO_2 objective is unlikely to be exceeded if annual mean concentrations are predicted to be less than 60 µg/m^3.

7.3.45 In 2003, Laxen and Marner (Ref. 7-34) concluded:

"… local authorities could reliably base decisions on likely exceedances of the 1-hour objective for nitrogen dioxide alongside busy streets using an annual mean of 60 µg/m^3 and above."

7.3.46 Their findings are further supported by AEA-Technology (Ref. 7-35) who revisited the investigation to complete an updated analysis including new monitoring results and additional monitoring sites. The recommendations of the AEAT report are:

"Local authorities should continue to use the threshold of 60 µg/m^3 NO_2 as the trigger for considering a likely exceedance of the hourly mean nitrogen dioxide objective."

7.3.47 This assessment will therefore evaluate the likelihood of exceeding the hourly mean NO_2 objective by comparing predicted annual mean NO_2 concentrations at all selected receptors to an annual mean equivalent threshold of 60 µg/m^3 NO_2. Where predicted concentrations are below this value, it can be concluded with confidence that the hourly mean NO_2 objective (200 µg/m^3 NO_2 not more than 18 times per year) would be achieved.

Assessment Methodology

Magnitude of Impact

Operational Phase

7.3.48 With regard to road traffic, the change in pollutant concentrations for the 2020 Do Something scenario (as compared to the 2020 Do Minimum concentrations) have been quantified at selected receptors (Table 7.3) within the air quality Study Area. These receptors are representative of exposure of other receptors in their vicinity. The absolute magnitudes of pollutant concentrations in the baseline and 2020 Do Minimum scenarios have also been quantified and these have been used to consider the risk of the air quality limit values being exceeded in each scenario.

7.3.49 For a change of a given magnitude, the IAQM have published recommendations for describing the magnitude of impacts at individual receptors (Table 7.8) and describing the significance (Table 7.10) of such impacts. For example, a change in predicted annual mean concentrations of NO_2 or PM_{10} of less than 0.4 µg/m^3 is considered (Ref. 7-27) to be so small as to be imperceptible. A change (impact)

that is imperceptible, given normal bounds of variation, would not be capable of having a direct effect on local air quality that could be considered to be significant. The magnitude of change is divided into four classes, as defined in Table 7.8.

Table 7.8 Magnitude of Changes in Ambient Pollutant Concentrations

Magnitude of Change	Annual Mean Concentrations of NO_2 ($\mu g/m^3$)	Annual Mean Concentrations of PM_{10} ($\mu g/m^3$)	Annual Mean Concentrations of $PM_{2.5}$ ($\mu g/m^3$)	Exceedances of the 24-hour mean objective for PM_{10} (days)
Large	Increase/ decrease > 4	Increase/ decrease > 4	Increase/ decrease > 2.5	Increase/ decrease > 4
Medium	Increase/ decrease 2 – 4	Increase/ decrease 2 - 4	Increase/ decrease 1.25 – 2.5	Increase/ decrease 2 to 4
Small	Increase/ decrease 0.4 - 2	Increase/ decrease 0.4 - 2	Increase/ decrease 0.25 – 1.25	Increase/ decrease 1 – 2
Imperceptible	Increase/ decrease < 0.4	Increase/ decrease < 0.4	Increase/ decrease < 0.25	Increase/ decrease < 1

7.3.50 The magnitude of the change in the predicted number of exceedances of the 24-hour objective is directly derived from the predicted annual mean value using the relationship defined in LAQM.TG(03). The magnitude descriptors for 24-hour mean PM_{10} in Table 7.8 are as set out by Environmental Protection UK (Ref. 7-24).

Significance of Effect

Construction Phase

7.3.51 For amenity effects (including that of dust), the aim of a developer is to bring forward a scheme, including mitigation measures if necessary, that does not introduce the potential for additional complaints to be generated as a result of the proposed development.

7.3.52 Experience in the UK (Ref. 7-25) is that good site practice is capable of mitigating the impact of fugitive emissions of particulate matter effectively so that, in all but the most exceptional circumstances, effects at receptors can be controlled to ensure effects are of negligible or minor significance at worse (see Table 7.9). This process can be managed through the preparation and implementation of a Construction Environmental Management Plan (CEMP).

7.3.53 The scale of the risk of adverse effects occurring due to each group of activities, with mitigation in place, is described using the terms high, medium and low risk. The basis for the choice of descriptor is set out for each section herein.

Table 7.9 Descriptors Applied to the Predicted Adverse Effects of Fugitive Emissions of Particulate Matter

Significance of Effect at a Single Receptor	Description
Major	A significant effect that is likely to be a material consideration in its own right.
Moderate	A significant effect that may be a material consideration in combination with other significant effects, but is unlikely to be a material consideration in its own right
Minor	An effect that is not significant but that may be of local concern
Negligible	An effect that is not significant change

Operational Phase

7.3.54 Relevant receptors have been selected to represent locations where people are likely to be present. The air quality objective values have been set at concentrations that provide protection to all members of society, including more vulnerable groups such as the very young, elderly or unwell. As such, the sensitivity of receptors was considered in the definition of the air quality objective values and no additional subdivision of human health receptors on the basis of building or location type is necessary.

7.3.55 For receptors that are predicted to experience a perceptible change, the effect of the change on local air quality and the risk of exceeding the air quality objective value is summarised in Table 7.10 for annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$.

Table 7.10 Air Quality Impact Descriptors for Changes to Annual Mean NO_2, PM_{10} and $PM_{2.5}$ Concentrations at a Receptor			
Absolute Concentration in Relation to Objective/Limit Value	**Change in Concentration**		
	Small	**Medium**	**Large**
Increase with Scheme			
Above Objective Limit Value With Scheme	Minor Adverse	Moderate Adverse	Major Adverse
Just Below Objective/ Limit Value With Scheme (90 - 100%)	Minor Adverse	Moderate Adverse	Moderate Adverse
Below Objective/ Limit Value With Scheme (90 - 75 %)	Negligible	Minor Adverse	Minor Adverse
Well Below Objective/ Limit Value With Scheme (<75%)	Negligible	Negligible	Minor Adverse
Decrease with Scheme			
Above Objective Limit Value Without Scheme	Minor Beneficial	Moderate Beneficial	Major Beneficial
Just Below Objective/ Limit Value Without Scheme (90 - 100%)	Minor Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/ Limit Value Without Scheme (90 - 75 %)	Negligible	Minor Beneficial	Minor Beneficial
Well Below Objective/ Limit Value Without Scheme (<75%)	Negligible	Negligible	Minor Beneficial

7.3.56 A small increase in annual mean concentrations of NO_2 and PM_{10}, at receptors exposed to baseline concentrations that are just below the objective value (36 $\mu g/m^3$ to 40 $\mu g/m^3$) is considered to have a minor adverse effect, as there is a slight increase in the risk of exceeding the objective value. However, a small increase in annual mean concentration of NO_2 and PM_{10} at receptors exposed to baseline concentrations that are below or well below (< 36 $\mu g/m^3$) is not likely to affect the achievement of the objective value and therefore has a negligible effect.

7.3.57 The equivalent values for just below the annual mean $PM_{2.5}$ objective value, where a small increase would cause a minor adverse effect on air quality, is 22.5 $\mu g/m^3$ to 25 $\mu g/m^3$. Where baseline annual mean $PM_{2.5}$ concentrations at a receptor are well below the objective (<18.75 $\mu g/m^3$), a small increase would have a negligible effect on air quality.

Assessment of Significance

7.3.58 The significance of all of the reported impacts has then been considered for the development in overall terms. The potential for the scheme to interfere with the successful implementation of policies and strategies for the management of local air quality are considered if relevant, but the principle focus is any change to the likelihood of future achievement of the air quality objectives as set out in Table 7.1 for the following pollutants.

- Annual mean nitrogen dioxide (NO_2) concentration of 40 µg/m^3;
- Annual mean particulate matter (PM_{10}) concentration of 40 µg/m^3;
- Annual mean fine particulate matter ($PM_{2.5}$) concentrations of 25 µg/m^3;
- 24-hour mean PM_{10} concentration of 50 µg/m^3 not to be exceeded on more than 35 days per year; and
- 1-hour mean NO_2 concentration of 200 µg/m^3 not to be exceeded more than 18 times per year.

7.3.59 The achievement of local authority goals for local air quality management are directly linked to the achievement of the air quality objective values described above, and as such this assessment focuses on the likelihood of future achievement of the air quality objective values.

7.3.60 In terms of the significance of the consequences of any adverse impacts, an effect is reported as being either 'not significant' or as being 'significant'. If the overall effect of the development on local air quality or on amenity is found to be 'moderate' or 'major' this is deemed to be 'significant'. Effects found to be 'minor' are considered to be 'not significant', although they may be a matter of local concern. 'Negligible' effects are considered to be 'not significant'.

Consultation

7.3.61 Consultations carried out as part of this air quality impact assessment (including those carried out at the EIA Scoping stage), are summarised in Table 7.11.

Table 7.11 Consultation Summary

Consultee	Date	Method	Summary of Response
Richard Pollitt (TMBC)	9th May 2014	Email/ phone	Monitoring locations agreed
Nasreen Ali (TMBC)	1st May 2014	Email	Monitoring locations and methodology agreed
Mike Webb (Bridgewater Canal Company Limited)	15th July 2014	Email	No comments relevant to air quality
Peter Green (Sustrans)	15th July 2014	Email	No comments relevant to air quality
Martin Woods (Department for Transport)	25th June 2014	Email	No comments relevant to air quality
Linden Francis (Department for Transport)	25th June 2014	Email	Referred to scoping responses from consultees (Environment Agency, English Heritage, Natural England, and Trafford Metropolitan Borough Council). No scoping response was received from TMBC
Alice Ullathorne (English Heritage)	5th June 2014	Letter	No comments relevant to air quality
Hannah Telfer (Environment Agency)	18th June 2014	Letter	No comments relevant to air quality
Joanne Widgery (Natural England)	2nd June 2014	Email	Highlighted the need for an assessment to take account of the risks of air pollution and how these can be managed or reduced

Assumptions and Limitations

7.3.62 Assumptions made during this air quality assessment include the following:

- Air quality modelling of traffic emissions has been based upon the traffic model datasets as provided by scheme traffic consultants (Systra) for the Metrolink Trafford Park Line. The supplied traffic modelling data does not take account of the amended tram route along the southern bank of the Manchester Ship Canal which may alter modelled traffic flows along Trafford Wharf Road. It is unlikely the revised route would affect the overall conclusions of this assessment as the elements of the route which have been revised are distant from relevant sensitive receptors and any changes in traffic are considered unlikely to significantly affect the predictions presented herein for the previous design;
- The latest Defra NO_X to NO_2 conversion factors have been used;
- 2013 background pollutant concentrations have been assumed to provide conservative estimates for all years of the assessment; and
- Worst-case receptors have been assumed, which represent the location of maximum exposure to air pollutants within the area.

7.3.63 This approach has aimed to minimise the assumptions and limitations of the assessment as far as practicable such that the assessment is considered proportionate and robust on this basis.

7.4 Baseline Description

7.4.1 Local air quality is a combination of background air quality, which is representative of the general levels of pollution in the area away from busy roads and industrial activity (in parks and quiet residential areas, for example), and added emissions from local emission sources.

Monitoring and Measurement Data

Trafford Metropolitan Borough Council (TMBC)

7.4.2 TMBC undertakes measurement and monitoring of NO_2 concentrations in their administrative area as part of the review and assessment of local air quality management.

7.4.3 TMBC have two automatic monitoring sites located in the vicinity of the Metrolink Trafford Park Line. These automatic monitors are located at Moss Park School and the A56 Chester Road (Ref. 7-15). Measurement data for NO_2 from these automatic monitors between 2006 and 2008 are set out in Table 7.12.

These sites are considered to be located too far from the Metrolink Trafford Park Line to be representative of local or background pollutant concentrations.

Table 7.12 Results of NO_2 Automatic Monitoring (TMBC)

Automatic Monitoring Site	Distance from Metrolink Trafford Park Line	Grid Reference (X,Y)	Automatic Monitoring Site Type	Annual Mean NO_2 Concentration ($\mu g/m^3$)*		
				2006	2007	2008
Moss Park School	2.1 km south of the Metrolink Trafford Park Line	378787, 394725	Urban Background	30	33	32
A56 Chester Road	2.7 km south of the Metrolink Trafford Park Line	379422, 394024	Roadside	**43**	**42**	**46**

*numbers **in bold** denote an exceedance of the annual mean NO_2 objective

7.4.4 There are four TMBC diffusion tube measurement locations in the vicinity of the Metrolink Trafford Park Line (Ref. 7-15). The measurement data for the period between 2006 and 2008 are set out in Table 7.13, and give a general indication of air concentrations in the local area within this time period.

Table 7.13 TMBC Diffusion Tube Monitoring Data

Site Name	Distance from Metrolink Trafford Park Line	Grid Reference (X,Y)	Location Type	Annual Mean NO_2 Concentration ($\mu g/m^3$)*		
				2006	2007	2008
A56 White City	40 m south of the Metrolink Trafford Park Line	381221, 396441	Kerbside	**48**	**42**	**40**
Cleansing Depot	360 m south of the Metrolink Trafford Park Line	379619, 396371	Industrial	-	-	30
M60 Junction Park Way	640 m south of the Metrolink Trafford Park Line	377447, 395749	Kerbside	**44**	35	32

* numbers **in bold** denote an exceedance of the annual mean NO_2 objective.

7.4.5 The results from the measurements undertaken by TMBC shown above indicate that the A56 White City diffusion tube was above the annual mean NO_2 objective between 2006 and 2008. The cleansing depot and M60 junction Park Way diffusion tubes were both below the annual mean NO_2 objective in 2008.

Salford City Council (SCC)

7.4.6 SCC undertakes measurement and monitoring of NO_2 concentrations in their administrative area as part of the review and assessment of local air quality management.

7.4.7 SCC has an automatic monitoring site located in the vicinity of the Metrolink Trafford Park Line. This automatic monitor is located at AQM 2 Eccles and monitors PM_{10} concentrations (Ref. 7-17). Measurement data from this site (from 2008 to 2010) are set out in Table 7.14. The results indicate that PM_{10} concentrations were around half of the PM_{10} annual average air quality objective.

Table 7.14 Results for PM_{10} Automatic Monitoring (SCC)

Automatic Monitoring Site	Distance from Metrolink Trafford Park Line	Grid Reference (X,Y)	Automatic Monitoring Site Type	Annual Mean PM_{10} Concentration ($\mu g/m^3$)		
				2008	2009	2010
AQM 2 Eccles	1.8 km north of the Metrolink Trafford Park Line	377925, 398729	Kerbside	20	17	19

7.4.8 There are three SCC diffusion tube measurement locations in the vicinity of the Metrolink Trafford Park Line (Ref. 7-17). The measurement data for the period between 2008 and 2010 are set out in Table 7.15, and give a general indication of concentrations in the local area within this time period.

Table 7.15 SCC Diffusion Tube Monitoring Data

Site Name	Distance from Metrolink Trafford Park Line	Grid Reference (X,Y)	Location Type	Annual Mean NO_2 Concentration ($\mu g/m^3$)*		
				2008	2009	2010
SA23/SA28/SA22 AURN Eccles	1.8 km north of the Metrolink Trafford Park Line	377925, 398729	Urban Background	38.4	38.2	**41.5**
SA25 16 Wyn Gardens	1.5 km north of the Metrolink Trafford Park Line	381297, 398032	Roadside	34.8	37.2	36.2

Table 7.15 SCC Diffusion Tube Monitoring Data						
Site Name	**Distance from Metrolink Trafford Park Line**	**Grid Reference (X,Y)**	**Location Type**	**Annual Mean NO_2 Concentration ($\mu g/m^3$)***		
				2008	**2009**	**2010**
SA36 2 Pembroke Street	1.5 km north of the Metrolink Trafford Park Line	380401, 398442	Roadside	28.5	-	-

* numbers **in bold** denote an exceedance of the annual mean NO_2 objective

7.4.9 The results from the Automatic Urban and Rural Network (AURN) co-located Eccles diffusion tube was above the annual mean NO_2 objective in 2010. The diffusion tubes located on Wyn Gardens and Pembroke Street were both below the annual mean NO_2 objective in 2010.

Manchester City Council (MCC)

7.4.10 MCC undertakes measurement and monitoring of NO_2 concentrations in their administrative area as part of the review and assessment of local air quality management.

7.4.11 MCC has three automatic monitoring sites located in the vicinity of the Metrolink Trafford Park Line. These automatic monitors are located at Piccadilly Gardens, Manchester South (located off Styal Road) and Oxford Road. Measurement data for NO_2 from these automatic monitors for the period 2008 to 2010 are set out in Table 7.16.

Table 7.16 Results of NO_2 Automatic Monitoring (MCC)						
Automatic Monitoring Site	**Distance from Metrolink Trafford Park Line**	**Grid Reference (X,Y)**	**Automatic Monitoring Site Type**	**Annual Mean NO_2 Concentration (µg/m3)***		
				2008	**2009**	**2010**
Piccadilly Gardens	2.8 km northeast of the Metrolink Trafford Park Line	384310, 398337	Urban Background	**43**	**42**	**45**
Manchester South	10.5 km south of the Metrolink Trafford Park Line	383904, 385818	Suburban	24	24	28
Oxford Road	2.7 km east of the Metrolink Trafford Park Line	384233, 397287	Kerbside	-	-	**64**

*numbers **in bold** denote an exceedance of the annual mean NO_2 objective.

7.4.12 There are two MCC diffusion tube measurement locations in the vicinity of the Metrolink Trafford Park Line (Ref. 7-19). The measurement data for the period between 2008 and 2010 are set out in Table 7.17, and give a general indication of concentrations in the local area within this time period.

Table 7.17 MCC Diffusion Tube Monitoring Data

Site Name	Distance from Metrolink Trafford Park Line	Grid Reference (X,Y)	Location Type	Annual Mean NO_2 Concentration ($\mu g/m^3$)*		
				2008	2009	2010
Liverpool Road	2.0 km northeast of the Metrolink Trafford Park Line	383218, 397770	Urban Centre	**51**	**48**	**52**
Hewitt Street	2.2 km northeast of the Metrolink Trafford Park Line	383602, 397488	Urban Centre	-	**43**	**49**

* numbers **in bold** denote an exceedance of the annual mean NO_2 objective.

7.4.13 The results from the measurements undertaken by MCC shown above indicate that both diffusion tubes were above the annual mean NO_2 objective in 2008 - 2010.

Study Area

7.4.14 The operational local air quality Study Area considers the route of the Metrolink Trafford Park Line and those routes considered to be affected by the scheme, as identified by comparing modelled traffic data for the 2020 Do Minimum and 2020 Do Something scenarios against the local air quality screening criteria presented within the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 1 'Air Quality' (HA207/07) (Ref. 7-36). These criteria are outlined below:

- Road alignment will change by 5 m or more; or
- Daily traffic flows will change by 1,000 annual average daily traffic (AADT) flow or more; or
- Heavy Duty Vehicles (HDV) flows will change 200 AADT or more; or
- Daily average speeds will change by 10 km/hr or more; or
- Peak hour speed will change by 20 km/hr or more.

7.4.15 Air quality monitoring data and receptors that are within 200 m of the scheme or affected road network are considered in this air quality impact assessment. Receptors beyond 200 m have not been considered in detail as beyond 200 m, pollutant concentrations are anticipated to be indistinguishable from background concentrations.

7.4.16 Selected additional links have also been included in the local operational air quality modelling. Additional links have been included where the additional emissions from these links are required to adequately describe pollutant concentrations at receptors located along with the scheme or affected routes (i.e. those routes which meet the criteria listed in paragraph 7.4.14).

Predicted Baseline Pollutant Concentrations

7.4.17 Predicted annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$, and the number of exceedances of the 24-hour 50 µg/m^3 PM_{10} air quality objective at the selected receptors during the baseline scenario, are listed in Table 7.18.

Table 7.18 Air Quality Statistics Predicted for Baseline Scenario in 2013

Receptors	Annual Mean Concentration (µg/m^3)			No. Days PM_{10} > 50 µg/m^3
	Annual Mean NO_2 (µg/m^3)	Annual Mean PM_{10} (µg/m^3)	Annual Mean $PM_{2.5}$ (µg/m^3)	
R1	33.1	19.3	12.8	3
R2	**51.7**	22.1	14.8	7
R3	**59.7**	21.7	14.5	6
R4	38.0	25.6	17.0	14
R5	**54.4**	19.6	13.4	3
R6	36.8	18.1	12.3	2
R7	**46.4**	20.8	14.1	5
R8	35.0	21.8	14.8	7
R9	27.6	19.4	13.1	3
R10	**42.2**	18.2	12.4	2
R11	37.5	19.0	12.6	3
R12	30.4	19.7	13.1	3
R13	17.8	21.3	14.0	6
R14	32.2	23.4	16.0	9
R15	21.8	19.0	12.8	3

Table 7.18 Air Quality Statistics Predicted for Baseline Scenario in 2013				
Receptors	**Annual Mean Concentration ($\mu g/m^3$)**			**No. Days PM_{10} > 50 $\mu g/m^3$**
	Annual Mean NO_2 ($\mu g/m^3$)	**Annual Mean PM_{10} ($\mu g/m^3$)**	**Annual Mean $PM_{2.5}$ ($\mu g/m^3$)**	
R16	33.9	18.0	12.2	2
R17	**49.8**	21.3	14.3	6

* numbers **in bold** denote an exceedance of the annual mean objective.

7.4.18 In the 2013 baseline scenario, predicted annual mean concentrations of NO_2 for six receptors are above the air quality mean objective across the air quality Study Area. There are eleven receptors which are below the objective value, of which: five receptors are just below, three receptors are below, and three receptors are well below the annual mean objective. All NO_2 concentrations are below the annual mean equivalent value (60 $\mu g/m^3$) for the hourly mean NO_2 objective.

7.4.19 In the 2013 baseline scenario, annual mean concentrations of PM_{10} and $PM_{2.5}$ are predicted to be well below the air quality objective for that pollutant at all locations within the air quality Study Area. The number of exceedances of the 24-hour PM_{10} objective is well below the relevant air quality objective.

7.4.20 Predicted annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$, and the number of exceedances of the 24-hour 50 $\mu g/m^3$ PM_{10} air quality objective, at the selected receptors during the 2020 Do Minimum scenario, are listed in Table 7.19.

Table 7.19 Air Quality Statistics Predicted for the 2020 Do Minimum Scenario				
Receptors	**Annual Mean Concentration ($\mu g/m^3$)**			**No. Days PM_{10} > 50 $\mu g/m^3$**
	Annual Mean NO_2 ($\mu g/m^3$)	**Annual Mean PM_{10} ($\mu g/m^3$)**	**Annual Mean $PM_{2.5}$ ($\mu g/m^3$)**	
R1	24.1	18.9	12.3	3
R2	35.2	21.1	13.7	5
R3	**46.4**	21.0	13.7	5
R4	31.0	24.6	15.9	12
R5	**43.3**	19.5	13.2	3
R6	28.6	18.0	12.2	2
R7	37.4	20.4	13.6	4
R8	30.5	21.3	14.1	6

Table 7.19 Air Quality Statistics Predicted for the 2020 Do Minimum Scenario				
Receptors	**Annual Mean Concentration (μg/m^3)**			**No. Days PM_{10} > 50 μg/m^3**
	Annual Mean NO_2 (μg/m^3)	**Annual Mean PM_{10} (μg/m^3)**	**Annual Mean $PM_{2.5}$ (μg/m^3)**	
R9	25.4	19.2	12.8	3
R10	34.9	18.1	12.2	2
R11	31.3	18.7	12.3	2
R12	26.5	19.3	12.8	3
R13	17.8	21.1	13.7	5
R14	27.4	18.4	12.1	
R15	21.8	18.6	12.4	2
R16	26.7	17.7	11.9	2
R17	**43.5**	20.9	13.8	5

* numbers **in bold** denote an exceedance of the annual mean objective.

7.4.21 In the 2020 Do Minimum scenario, predicted annual mean concentrations of NO_2 for three receptors (R3, R5 and R17) are above the air quality mean objective across the air quality Study Area. There are fourteen receptors which are below the objective value, of which: one receptor is just below, five receptors are below, and eight receptors are well below the annual mean objective. All NO_2 concentrations are well below the annual mean equivalent value (60 μg/m^3) for the hourly mean NO_2 objective. In the 2020 Do Minimum scenario, annual mean concentrations of PM_{10} and $PM_{2.5}$ are predicted to be well below the air quality objective for that pollutant at all receptors within the air quality Study Area. The number of exceedances of the 24-hour PM_{10} objective is also well below the relevant air quality objective.

Baseline Dust Climate

7.4.22 A background level of dust exists in all urban and rural locations in the UK. Dust can be generated on a local scale from vehicle movements and from the action of wind on exposed soils and surfaces. Dust levels can be affected by long range transport of dust from distant sources into the local vicinity.

7.4.23 Residents currently experience dust deposition at a rate that is determined by the contributions of local and distant sources. This baseline rate of soiling is considered normal and varies depending on prevailing climatic conditions. The

tolerance of individuals to deposited dust is therefore shaped by their experience of baseline conditions.

7.4.24 Existing local sources of particulate matter in the vicinity of the Metrolink Trafford Park Line includes wind-blown dust, exhaust emissions from energy plant and road vehicles, brake and tyre wear from road vehicles and the long range transport of material from outside the air quality Study Area.

7.5 Impacts Avoidance Measures

7.5.1 All construction activities would be carried out in accordance with Transport for Greater Manchester's Code of Construction Practice (CoCP) (refer to Section 4.5 in Chapter 4: Development Description). In addition, the selected construction contractor would prepare and implement a CEMP. These plans would provide guidance on appropriate methods of working and outline suitable dust and air quality impact avoidance measures and mitigation strategies.

7.5.2 Mitigation measures which should be include in the CEMP and implemented during demolition, earthworks, construction activities and trackout include the following:

7.5.3 Measures specific to demolition activities include:

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);
- Ensure effective water suppression is used during demolition operations;
- Avoid explosive blasting, using appropriate manual or mechanical alternatives; and
- Bag and remove any biological debris or damp down such material before demolition.

7.5.4 Measures specific to earthworks include:

- Re-vegetate earthworks and exposed areas/ soil stockpiles to stabilise surfaces as soon as practicable;
- Use hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and
- Only remove the cover in small areas during work and not all at once.

7.5.5 Measures specific to construction activities include:

- Avoid scabbling (roughening of concrete surfaces);

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- For smaller supplies of fine powder materials ensure bags are sealed after use and stored to prevent dust.

7.5.6 Measures specific to trackout activities include:

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site compounds;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving site compounds are covered to prevent escape of materials during transport;
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes from site compounds and any subsequent action in a site log book;
- Install hard surfaced haul routes from site compounds, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving site compounds where reasonably practicable);
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- Access gates to be located at least 10 m from receptors where possible.

7.5.7 If effective mitigation measures are in place, as outlined above, significant dust effects on receptors are likely to be prevented, resulting in a residual effect that is not significant.

7.6 Assessment of Impacts and Effects

Construction Dust Emissions

7.6.1 The nature and duration of specific aspects of the construction works are, as yet, unknown. In the absence of detailed construction information, the assessment of construction dust effects has made several assumptions on the likely activities and phasing to be undertaken during the construction phase.

7.6.2 As with the majority of construction projects of this type, the early phases of the works are likely to involve: site clearance, demolition, excavations and earthworks, and temporary stockpiling of potentially dusty materials. These activities are likely to be the principal sources of dust during the early construction phases.

7.6.3 During the main construction work phase, when the Metrolink Trafford Park Line route is being constructed, the principal sources of dust are likely to be from the cutting and grinding of materials and the movement of construction related road vehicles.

7.6.4 The latter phases of work, when the majority of the infrastructure is complete, would involve landscaping and finishing works. During these phases, the principal sources of dust would be associated with the storage, handling and movement of materials generated during earthworks.

7.6.5 The receptors located close enough to the Metrolink Trafford Park Line to potentially be adversely affected by the works are listed in paragraph 7.3.29.

7.6.6 Based on IAQM guidance (Ref. 7-27), the potential impacts considered at the selected receptors are:

- Effects on amenity and property including changes to the rate of deposition of particulate matter onto glossy surfaces and other property;
- Changes in 24 hour mean concentrations that might increase the risk of exposure to PM_{10} at levels that could exceed the 24-hour air quality objective; and
- Effects of dust deposition on internationally designated ecologically sensitive habitats and plant communities.

7.6.7 As there are human receptors within 350 m of the site boundary, an assessment is required as set out in IAQM guidance (Ref. 7-27).

7.6.8 There are no internationally designated ecologically sensitive receptors located within 2 km of the Metrolink Trafford Park Line (see Chapter 9: Ecology and

Nature Conservation) and therefore an assessment of dust impacts on ecological receptors has been scoped out of this assessment.

Demolition

7.6.9 There are several buildings located on Trafford Wharf Road which would be demolished in order to make way for the Metrolink Trafford Park Line. These are: one factory building, Samuel Platt's public house and Wharfside Business Centre (units 1 - 9). It is also likely that there would be demolition of canal side walls and retaining walls within the section of route between the Trafford Road Bridge and Trafford Wharf Road (east of Sir Alex Ferguson Way). In addition, Subway on Village Road would be demolished. The total building volume for demolition is estimated to be between 20,000 and 50,000 m^3 and therefore the emission magnitude is medium.

7.6.10 There is more than one receptor of medium sensitivity within 20 m of demolition areas. Sensitivity of the area to dust soiling due to demolition is therefore assessed as medium.

7.6.11 An area of medium sensitivity with a medium emission magnitude site is at medium risk of adverse impacts due to construction dust effects on amenity and property. Site specific mitigation measures, such as those set out in Section 7.5, would therefore be required to minimise emissions of dust. With site specific mitigation, impacts due to construction dust effects on amenity and property should be reduced to minor adverse.

7.6.12 Annual mean PM_{10} background concentrations along the Metrolink Trafford Park Line are currently less than 24 $\mu g/m^3$, with between 1 and 10 medium sensitivity receptors within 20 m of demolition works. The sensitivity of the area to human health impacts from construction dust is therefore medium risk. Mitigation measures, such as those set out in Section 7.5 would reduce the exposure to PM_{10} at levels that could exceed the 24 hour air quality limit to a minor adverse risk.

Earthworks

7.6.13 Site clearance works, the digging of trenches for foundations and utilities and temporary stockpiling of material represent the principal activities that may generate emissions of particulate material.

7.6.14 The potential for stockpiles of materials to generate dust depends on the nature of the material. Earth is soft and friable compared to hardcore; however, hardcore generally has lower moisture content than soil, and consequently they can both be a potential source of dust.

7.6.15 The construction of the Metrolink Trafford Park Line would be subdivided into a number of zones. A programme of works would be developed once the scheme detailed design is finalised. It is assumed that the selected construction contractor would undertake works in a number of zones at the same time to minimise the overall length of the construction programme.

7.6.16 For the purposes of this ES it is assumed that the area of the largest zone is likely to be greater than 10,000 m^2 and therefore the potential dust emission magnitude for earthworks is assessed as large.

7.6.17 As there is likely to be more than one medium sensitivity receptor within 20 m of earthworks, the sensitivity of the area to dust soiling due to earthworks is assessed as medium.

7.6.18 An area of medium sensitivity with a large dust emission magnitude site is at medium risk of adverse impacts due to construction dust effects on amenity and property. Site specific mitigation measures, such as those set out in Section 7.5 would therefore be required to minimise emissions of dust. With site specific mitigation, impacts due to construction dust effects on amenity and property should be reduced to minor adverse.

7.6.19 Annual PM_{10} concentrations in the vicinity of the Metrolink Trafford Park Line are currently less than 24 $\mu g/m^3$, with between 1 and 10 medium sensitivity receptors within 20 m of earthworks. The sensitivity of the area to human health impacts from construction dust is therefore medium risk. Mitigation measures, such as those set out in Section 7.5 would reduce the exposure to PM_{10} at levels that could exceed the 24 hour air quality limit to a minor adverse risk.

Construction

7.6.20 Dust emissions during construction can give rise to elevated dust deposition and PM_{10} concentrations. These are generally short-lived changes over a few hours or days, which occur over a limited time period of several weeks or months.

7.6.21 The likely construction activities associated with the Metrolink Trafford Park Line are highlighted in Chapter 4: Development Description.

7.6.22 The construction material volume is estimated to be between 25,000 and 100,000 m^3, with potentially dusty construction material (e.g. concrete). The potential dust emission magnitude for construction is therefore assessed as medium.

7.6.23 There is more than one medium sensitivity receptor within 20 m of construction works. Sensitivity of the area to dust soiling due to construction is therefore assessed as medium.

7.6.24 An area of medium sensitivity with a medium dust emission magnitude site is at medium risk of adverse impacts due to construction dust effects on amenity and property. Site specific mitigation measures, such as those set out in Section 7.5 would therefore be required to minimise emissions of dust. With site specific mitigation, impacts due to construction dust effects on amenity and property should be reduced to minor adverse.

7.6.25 Annual PM_{10} concentrations at the Metrolink Trafford Park Line are currently less than 24 $\mu g/m^3$, with between 1 and 10 medium sensitivity receptors within 20 m of construction works. The sensitivity of the area to human health impacts from construction dust is therefore medium risk. Mitigation measures, such as those set out in Section 7.5 would reduce the exposure to PM_{10} at levels that could exceed the 24 hour air quality limit to a minor adverse risk.

Trackout

7.6.26 No data are currently available regarding the number of daily HDV movements. The maximum distance which could be travelled on unpaved road is estimated, for the purpose of this ES, to be less than 50 m, based on the close proximity of the Metrolink Trafford Park Line to existing highways. The surface material is estimated to be moderately dusty. The potential dust emission magnitude for trackout is therefore assessed as medium.

7.6.27 There is more than one medium sensitivity receptor within 20 m of construction works. Sensitivity of the area to dust soiling due to trackout is therefore assessed as medium.

7.6.28 An area of medium sensitivity with a medium dust emission magnitude site is at low risk of adverse impacts due to construction dust effects on amenity and property. Site specific mitigation measures, such as those set out in Section 7.5 would therefore be required to minimise emissions of dust. With site specific mitigation measures, impacts due to construction dust effects on amenity and property should be reduced to negligible.

7.6.29 Annual PM_{10} concentrations at the Metrolink Trafford Park Line are currently less than 24 $\mu g/m^3$; with between 1 and 10 medium sensitivity receptors within 20m of trackout. The sensitivity of the area to human health impacts from construction dust is therefore medium risk. Mitigation measures, such as those set out in Section 7.5 would reduce the exposure to PM_{10} at levels that could exceed the 24 hour air quality limit to a minor adverse risk.

7.6.30 The risk of impacts with mitigation applied is determined by combining the dust emission magnitude with the sensitivity of the area. The significance of the

identified risk associated with construction phase activities is summarised in Table 7.20.

Table 7.20 Summary of Construction Phase Dust Effects				
Potential Impact	**Demolition**	**Earthworks**	**Construction**	**Trackout**
Effects on amenity and property	Minor Adverse	Minor Adverse	Minor Adverse	Negligible
Exposure to PM_{10} at levels that could exceed the 24 hour air quality objective	Minor Adverse	Minor Adverse	Minor Adverse	Minor Adverse
Overall Effect	Minor Adverse and Not Significant			

Operation

7.6.31 The predicted annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the 24-hour 50 µg/m^3 air quality objectives at the selected receptors for the 2020 Do Something scenario are listed in Table 7.21.

Table 7.21 Air Quality Statistics Predicted for the 2020 Do Something Scenario				
Receptors	**Annual Mean Concentration (µg/m^3)**			**No. Days PM_{10} > 50 µg/m^3**
	Annual Mean NO_2 (µg/m^3)	**Annual Mean PM_{10} (µg/m^3)**	**Annual Mean $PM_{2.5}$ (µg/m^3)**	
R1	24.0	18.9	12.3	3
R2	35.2	21.1	13.7	5
R3	**47.1**	21.0	13.7	5
R4	30.9	24.8	16.0	12
R5	**43.3**	19.5	13.2	3
R6	28.5	18.0	12.2	2
R7	37.4	20.4	13.6	4
R8	30.6	21.3	14.1	6
R9	25.3	19.1	12.7	3
R10	34.9	18.0	12.1	2

Table 7.21 Air Quality Statistics Predicted for the 2020 Do Something Scenario				
Receptors	Annual Mean Concentration (μg/m^3)			No. Days PM_{10} > 50 μg/m^3
	Annual Mean NO_2 (μg/m^3)	Annual Mean PM_{10} (μg/m^3)	Annual Mean $PM_{2.5}$ (μg/m^3)	
R11	30.8	18.7	12.3	3
R12	26.2	19.3	12.8	3
R13	17.8	21.1	13.7	5
R14	26.7	22.4	14.9	8
R15	21.8	18.6	12.4	2
R16	26.6	17.7	11.9	2
R17	**43.4**	20.9	13.8	5

* numbers **in bold** denote an exceedance of the annual mean objective

7.6.32 As in the 2020 Do Minimum scenario, predicted annual mean concentrations of NO_2 for three receptors (R3, R5 and R17) are above the air quality mean objective across the air quality Study Area. There are fourteen receptors which are below the objective value, of which: one receptor is just below, five receptors are below, and eight receptors are well below the annual mean objective. All NO_2 concentrations are well below the annual mean equivalent value (60 μg/m^3) for the hourly mean NO_2 objective.

7.6.33 In the 2020 Do Something scenario, annual mean concentrations of PM_{10} and $PM_{2.5}$ are predicted to be well below the air quality objective for that pollutant at all receptors within the air quality Study Area. The number of exceedances of the 24-hour PM_{10} objective is also well below the relevant air quality objective.

7.6.34 The surrounding area near the Metrolink Trafford Park Line is predominantly of commercial or industrial use and concentrations at receptors in the air quality Study Area are below the objective for NO_2, PM_{10} and $PM_{2.5}$; therefore it is concluded that the site is suitable for development of the Metrolink Trafford Park Line. It is unlikely the revised route would affect the overall conclusions of this assessment as the elements of the route which have been revised are distant from relevant sensitive receptors and any changes in traffic are considered unlikely to significantly affect the predictions presented herein for the previous design.

7.6.35 For each of the selected air quality receptors, the changes that are predicted to occur as a result of 2020 Do Something scenario, compared with the 2020 Do Minimum scenario, are listed in Table 7.22.

Table 7.22 Change in Air Quality Statistics Predicted for the 2020 Do Something Scenario

Receptors	Annual Mean Concentration (µg/m^3)			No. Days PM_{10} > 50 µg/m^3
	Annual Mean NO_2 (µg/m^3)	Annual Mean PM_{10} (µg/m^3)	Annual Mean $PM_{2.5}$ (µg/m^3)	
R1	+<0.1 (I)	+<0.1 (I)	+<0.1 (I)	+<1 (I)
R2	+<0.1 (I)	+<0.1 (I)	+<0.1 (I)	+<1 (I)
R3	+0.7 (S)	+<0.1 (I)	+<0.1 (I)	+<1 (I)
R4	-0.1 (I)	+0.1 (I)	+0.1 (I)	+<1 (I)
R5	+<0.1 (I)	+<0.1 (I)	+<0.1 (I)	+<1 (I)
R6	+<0.1 (I)	+<0.1 (I)	+<0.1 (I)	+<1 (I)
R7	+<0.1 (I)	+<0.1 (I)	+<0.1 (I)	+<1 (I)
R8	+0.1 (I)	+<0.1 (I)	+<0.1 (I)	+<1 (I)
R9	-0.1 (I)	-0.1 (I)	-0.1 (I)	+<1 (I)
R10	+<0.1 (I)	-0.1 (I)	+<0.1 (I)	+<1 (I)
R11	-0.5 (S)	+<0.1 (I)	+<0.1 (I)	+1 (I)
R12	-0.3 (I)	+<0.1 (I)	+<0.1 (I)	+<1 (I)
R13	+<0.1 (I)	+<0.1 (I)	+<0.1 (I)	+<1 (I)
R14	+0.1 (I)	+<0.1 (I)	+<0.1 (I)	+<1 (I)
R15	+<0.1 (I)	+<0.1 (I)	+<0.1 (I)	+<1 (I)
R16	-0.1 (I)	+<0.1 (I)	+<0.1 (I)	+<1 (I)
R17	-0.1 (I)	+<0.1 (I)	+<0.1 (I)	+<1 (I)

*Compared against the 2020 Do Minimum scenario

Magnitude of change displayed in parentheses: (I) = Imperceptible, (S) = Small, (M) = Medium, (L) = Large.

7.6.36 With regards to annual mean concentrations of NO_2, two receptors located within the air quality Study Area are predicted to experience a small change. R3 (Iona Way) is predicted to experience a small increase and is above the annual mean objective value in both the 2020 Do Minimum and 2020 Do Something scenarios. This small change would therefore cause a minor adverse effect. R11

(Barton Road) is predicted to have a small decrease and is below the annual mean objective value in both the 2020 Do Minimum and 2020 Do Something scenarios. This small change is therefore of negligible significance. All other receptors have imperceptible changes and are of negligible significance.

7.6.37 The Metrolink Trafford Park Line is also predicted to have an imperceptible impact on annual mean concentrations of PM_{10} and $PM_{2.5}$ at all receptors, which is an impact of negligible significance.

7.6.38 There is also an imperceptible change in the number of days of exceedances of the 24-hour PM_{10} concentration, which is of negligible significance.

7.6.39 In summary, the impact of the Metrolink Trafford Park Line would have, at worst, a minor adverse effect on surrounding receptors. Therefore, the overall effect of the proposal on local air quality is considered to be not significant.

7.7 Additional Mitigation

7.7.1 During the construction of the Metrolink Trafford Park Line, minor adverse effects have been identified. Site specific mitigation measures set out in Section 7.5 would reduce dust effects such that they are not significant.

7.7.2 No significant adverse effects have been identified during the operation of the Metrolink Trafford Park Line, and as such no additional mitigation is required.

7.8 Residual Effects and Conclusions

7.8.1 A summary of residual air quality arising from the construction and operation of the Metrolink Trafford Park Line is shown in Table 7.23.

Table 7.23 Summary of Air Quality Residual Effects

Stage of Development	Description of Effect	Residual Effect Significance	Nature of Effect	Geographic Scale
Demolition and construction	Effect of dust pollution on local residents from demolition and construction activities	Minor Adverse	Mt, R	Local
Operation	Effect of the operation of the Metrolink Trafford Park Line on local air quality	Minor Adverse	Lt, P	Local

St = short term, Mt = medium term, Lt = long term, P = permanent, D = direct, InD = indirect, R = reversible, IR = irreversible, N/A = not applicable

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Transport for Greater Manchester

Chapter 8:

Landscape and Visual

Transport for Greater Manchester

8 LANDSCAPE AND VISUAL

8.1 Introduction

8.1.1 This chapter of the Environmental Statement (ES) considers the landscape and visual implications of the proposed Metrolink Trafford Park Line. Throughout the assessment the appraisal has sought to distinguish between the direct effects upon the physical landscape and the visual implications of the development of the scheme upon the observer. The chapter is supported by Technical Appendix C (Volume II of this ES) and Figures 8.1 to 8.5 (Volume III of this ES).

8.1.2 The landscape and visual assessments are set against an understanding of the existing landscape character and context. The impact of the Metrolink Trafford Park Line on this existing context is appraised and where significant impacts occur to either the landscape character or visual amenity, appropriate forms of mitigation to alleviate these impacts are proposed and described. The proposed scheme is set within an urban context and whilst the terms landscape and townscape are interchangeable with respect to Landscape and Visual Impact Assessment (LVIA), for the purposes of this appraisal and to retain consistency, the term landscape has been used throughout.

8.1.3 The visual assessment aims to identify and assess the significance of the likely visual impacts of the proposed scheme upon both the alignment footprint and the surrounding area. Visual effects relate closely to landscape effects, but concern the potential changes in and impacts on views within the LVIA Study Area (see section 8.3). Visual assessment concerns people's perception and response to changes in visual amenity. Effects may result from new elements within the landscape that cause visual intrusion or new features that obstruct views across the landscape.

8.1.4 The appraisal assesses the predicted impacts on the landscape of the application area and its immediate vicinity and recognised elements of cultural or heritage interest as represented by designated and non-designated historic structures. In this respect, the text should be read in conjunction with Chapter 12: Cultural Heritage. Similarly, there are frequent interrelated impacts between landscape and ecological effects and here, this section of the report should be read alongside Chapter 9: Ecology and Nature Conservation. Any collective effects emerging are discussed in Chapter 15: Cumulative Effects.

8.1.5 As with all aspects of appraisal, landscape and visual effects can be positive or negative.

8.2 Legislation and Planning Policy Context

National Planning Policy

8.2.1 At a National level, policy and guidance on matters to be taken into consideration in addressing environmental issues associated with new development, is provided by Government through the National Planning Policy Framework (NPPF) (Ref. 8-1) published on 27 March 2012 and Planning Practice Guidance, published on 6 March 2014. The overarching themes of this policy and guidance are described in Chapter 5: Planning Policy Context.

8.2.2 The aim of these documents is to promote sustainable growth and development, whilst protecting the natural environment and cultural assets.

8.2.3 The key themes of the NPPF of greatest relevance to landscape and visual considerations with respect to the Metrolink Trafford Park Line are:

- Promoting Sustainable Transport;
- Meeting the Challenge of Climate Change, Flooding and Coastal Change;
- Conserving and Enhancing the Natural Environment; and
- Conserving and Enhancing the Historic Environment.

8.2.4 These themes, their relevance and effect are discussed in Chapter 5: Planning Policy Context, and are enacted through Local Planning Policy.

Trafford Local Plan – Core Strategy

8.2.5 Policy R3 of the Trafford Local Plan – Core Strategy (Ref. 8-2), sets out the aspiration for the enhancement of environmental assets through the promotion of Green Infrastructure (GI):

"Trafford contains a range of physical environmental assets, collectively referred to as green infrastructure (GI), which provide multiple social, economic and environmental benefits. The Council will promote a cross cutting initiative, which can integrate GI with social and economic priorities, and thus help contribute to the development of sustainable communities."

8.2.6 Of particular relevance to the LVIA Study Area (see Section 8.3) and the Metrolink Trafford Park Line, R3.1 of policy R3 includes the following aims in developing GI:

- *"Protect and provide appropriate natural space to connect landscapes and allow wildlife to move through them to adapt to climate change;*
- *Mitigate the negative effects of climate change and support biodiversity, for example inclusion of ...tree planting;*

- *Maximise the potential climate change benefits of the network and deliver, where appropriate, the opportunities and requirements set out in Policy L5, including enhanced flood risk management through water storage or run-off protection, integrating mitigation measures such as SUDS into the design, controlling temperatures through shade and other cooling effects, and reducing air and water pollution; and*
- *Create appropriate access for a wide range of users to enjoy the countryside, including improved linkages to formal and informal recreation opportunities..."*

Trafford Local Plan: Land Allocations Consultation Draft

8.2.7 Paragraph 23.24 of the Trafford Local Plan: Land Allocations Consultation Draft (Ref. 8-3) outlines the expectation on new development to further the aims and contribute to GI. The following Justifications are particularly relevant to the tram proposals:

8.2.8 Paragraph 23.26 points out that new tree planting is often a very effective GI treatment as trees have multiple benefits, one of which is that they can create a strong framework of street trees to enclose or mitigate the visual impact of a development.

8.2.9 Paragraph 23.28 suggests that any planting should be in keeping with the locality using native species wherever appropriate.

8.2.10 The Land Allocations Plan also identifies in Chapter 23.10, the Bridgewater Way along the canal corridor, as an area of GI importance and will look to safeguard and mitigate any adverse impacts upon this asset arising from development.

Trafford Local Plan: Land Allocations Consultation Draft Topic Paper Chapters

8.2.11 Topic Paper 21 (Ref. 8-4), informing the Land Allocations Consultation Draft, focuses on the issues to be addressed through GI policy and initiatives, including areas with a high proportion of hardstanding, similar to the conditions found within Trafford Park, which could be subject to a greater risk of flooding and higher temperatures in future climate change projections. Both the Red Rose Forest Team, in drawing up the Trafford Forest Plan, and Manchester University in evidence based studies, have contributed to the formation of policy and the drafting of the Topic Paper, highlighting the important role that trees play in mitigating these detrimental environmental effects.

8.2.12 Trafford Metropolitan Borough Council (TMBC) indicate in chapter 23.13 of the Consultation Draft, that they *"…will work with partners such as the Red Rose Forest and Environment Agency to develop and implement GI initiatives across the Borough."*

8.2.13 This indicates that the Local Authority has identified Trafford Park as a focus area for GI, due to the current level of hardstanding, as such it can be assessed that TMBC will be looking to maximise the potential for GI as part of the Metrolink Trafford Park Line, with a view to promote tree planting, heat reduction, SUDS, connected wildlife and activity corridors.

8.3 Assessment Methodology and Effect Significance Criteria

General

8.3.1 The overall methodology for the Environmental Impact Assessment (EIA) is set out in Chapter 2: EIA Assessment Methodology. This includes a description of the various assessment scenarios. The methodology adopted for this landscape and visual assessment follows the recommendations and guidance set out in the 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA), Third Edition (Ref. 8-5).

8.3.2 Through the identification of impacts and assessment of the potential effects for each assessment scenario, distinctions may be drawn between temporary, permanent, short-term and long-term impacts and effects. Landscape and visual impacts and effects may be further categorised as being either direct, that is, within the LVIA Study Area as determined by the Zone of approximate Visual Influence (ZVI) (see Figure 8.3, ES Volume III), from where views of the proposed scheme may be available; or indirect, for example, the visual impact of construction traffic moving off-site.

8.3.3 This chapter considers the potential for adverse and beneficial effects on the landscape and visual receptors, as a consequence of the construction activity, opening and operation of the proposed scheme. The assessment also includes consideration of the potential effects on those residents, businesses and other receptor groups within and around the development area.

8.3.4 The operation assessment year allows time for any mitigation measures to establish, for example, any associated planting to become mature and effective as a screen or significant visual presence. The significance of effects has been assessed against the pre-construction baseline year of 2014.

8.3.5 Terminology and a detailed methodology relating to the landscape and visual assessment and the impact and effect evaluation can be found in Technical Appendix C (Volume II of this ES).

The Urban Landscape

8.3.6 In an urban context, landscape character primarily results from the built form. This may have evolved through planned historical development or the accretion of haphazard development over centuries.

8.3.7 The urban landscape can therefore be defined by the presence or the absence of heritage assets or interrelationship between old and new. The spaces between buildings, the way they interact with one another and how they are perceived or experienced are as important to defining character as the built structures.

8.3.8 It is recognised that impacts upon landscape character are a cumulative effect of impacts upon individual features and that impacts on a specific feature may differ from the overall effect on character.

8.3.9 Urban landscape character is one that is constantly changing and evolving, particularly where economic and political aspirations are driving regeneration and development. Considerations of landscape must have regard to the features, layout, density and mix, scale, appearance, cultural and human interaction. This last category is important to the Metrolink Trafford Park Line, as whilst this is a busy working environment, the opportunities for human interaction within the urban realm are limited.

LVIA Study Area

8.3.10 The LVIA Study Area for the landscape assessment has largely been contained within the road corridors along which the Metrolink Trafford Park Line would operate. To the north of the LVIA Study Area, within the waterside area of the Quays, the physical effects of the proposed scheme remain focussed on the immediate route alignment to the south of the canal, with impacts extending southward to Trafford Wharf Road. The majority of the LVIA Study Area comprises the industrial area of Trafford Park with the concentration of retail and leisure activity at the intu Trafford Centre to the south west. To this extent, the LVIA Study Area for the physical landscape assessment is contained within the ZVI, but not defined by it.

8.3.11 The LVIA Study Area for the visual assessment is defined by the ZVI, where the containment of the built elements and tree planting to either side of the road corridors is the strongest influence (see Figure 8.3, ES Volume III). Within the waterside area to the north of the LVIA Study Area, views extend across the

canal and basins to the residential, retail and commercial areas of Salford Quays. A number of developments at Salford Quays are high rise in nature with wide-ranging and open views to the south towards Trafford Park and the proposed scheme.

8.3.12 The underlying topography plays a minor, if not imperceptible, role in defining the LVIA Study Area, whereas the localised topography of road and canal embankments can have fundamental effects on the containment of the scheme. It is the built up urban fabric and roadside planting that has the defining influence.

Desktop Study

8.3.13 The baseline landscape and visual assessment comprised a desktop study of the following data sources:

- Ordnance Survey Explorer Map 277, Manchester and Salford at 1:25,000 scale (Ref. 8-6);
- Aerial photography available from Google Maps (www.google.co.uk/maps);
- Relevant legislation and national planning policy guidance;
- Trafford Local Plan: Core Strategy (Ref. 8-2);
- Trafford Local Plan: Land Allocations - Consultation Draft (Ref. 8-3);
- Trafford Local Plan: Land Allocations - Consultation Draft, Topic Paper Chapters (Ref. 8-4); and
- A set of illustrative Technical Development Scheme Plans submitted with the TWAO Application.

Consultation

8.3.14 A meeting was held with TMBC on 14th July 2014 to discuss the potential impact of the Metrolink Trafford Park Line on Green Infrastructure (GI) policy within the Local Plan, with particular reference to trees and the mitigation of potential tree losses. It was confirmed that there were no Tree Preservation Orders (TPOs) within the area, but that the Trafford Park area had been identified as a target for the adoption of GI initiatives, not just with respect to tree planting, but also sustainable urban drainage, urban heat reduction and connecting wildlife and recreational corridors. It was agreed that at the appropriate stages of future design development, Transport for Greater Manchester and TMBC would work together to identify areas suitable for tree planting within the Trafford Park area, but outside the proposed Metrolink corridor.

8.3.15 An EIA scoping response was received from Natural England 0n 2nd June 2014, which included a recommendation and expectation that *"the assessment should refer to the relevant National Character Areas which can be found on our website."* Also, that *"The assessment should also include the cumulative effect of the development with relevant existing or proposed developments in the area".*

8.4 Baseline Conditions

Conservation Areas and Listed Buildings

8.4.1 There are no Schedule Monuments, Registered Parks and Gardens, or Conservation Areas within the LVIA Study Area.

8.4.2 Listed buildings have been considered in this chapter to ascertain key landscape features and their sensitivity, particularly where the listed buildings contribute to the establishment of the local landscape character.

8.4.3 There are three listed buildings within 250 m of the Metrolink Trafford Park Line (see Technical Appendix G, ES Volume II and Figure 12.1, ES Volume III):

- Trafford Road Bridge is a grade II listed structure and spans the Manchester Ship Canal to the north east of the LVIA Study Area. The proposed scheme would pass beneath the southern abutment of the bridge, through an existing underpass located in a relatively recently modified part of the bridge structure;
- Trafford Park Hotel is also grade II listed and is located to the south of the A5081, Village Way. The proposed alignment would run to the north of the road corridor; and
- Entrance Portal and Lodges to Former White City Greyhound Track is a grade II listed structure located on Chester Road. The setting of the structure would not change as a result of the Metrolink Trafford Park Line as there is no visual relationship with the route.

Vegetation

8.4.4 There are no TPOs within the LVIA Study Area.

8.4.5 The extent of vegetation is mapped on Figure 8.2 (ES Volume III) and has distinguished between individual street trees and areas of woodland vegetation. Individual tree sizes and species have not been established at this stage.

8.4.6 At this stage of the scheme development, it is anticipated that approximately 350 individual street trees and around 2 km² of woodland vegetation could be removed. The trees are primarily located within the roadside verges along the entire length of the alignment and along the waterfront promenade.

Trends in the Landscape

8.4.7 The industrial area of Trafford Park has a constant churn of users and businesses with the resultant rebuilding, upgrading and refurbishment of the industrial and commercial units. This generally leads to an improvement in appearance, whilst the character tends to remain constant.

8.4.8 There are two consented developments within the LVIA Study Area that would have a significant effect on the character and quality. Firstly the former Kratos Site at the junction of Barton Dock Road and Park Way which is planned for hotel and office development; and secondly, the Westinghouse Point development site, south of Parkway Circle. The intended usage is for a petrol filling station, with A3 uses and a car wash. These are described and assessed in Chapter 15: Cumulative Effects.

Landscape Character

8.4.9 The Metrolink Trafford Park Line passes through Trafford Park, the world's first planned industrial estate. Trafford Park is almost entirely surrounded by water; the Bridgewater Canal forms its south-eastern and south-western boundaries, and the Manchester Ship Canal, which opened in 1894, its north-eastern and north-western boundaries.

8.4.10 Natural England's 'National Character Area Profile 55: Manchester Conurbation' (NCA) (Ref. 8-7) sets the broader context for establishing the various character zones (see Figure 8.1, ES Volume III) along the proposed alignment and many of the key attributes and characteristics of the wider NCA feature strongly within the LVIA Study Area:

"River valleys form important corridors of semi-natural habitats and natural greenspace – with open grassland, woodland and wetland – linking urban centres with open countryside. The industrial heritage now provides sites of wildlife interest in the urban environment. Canals that weave through the conurbation not only offer opportunities for access and recreation, but also form a network of wetland habitats...Woodland cover is generally low, but variable – and significant for such a heavily urban location. New areas of community woodland have been created in the Red Rose Forest …"

8.4.11 With respect to the built environment, the NCA states that:

"The history of the landscape is evident through the legacy of industrial archaeology, particularly relating to the textile industry. In the late 18th century the area became rapidly industrialised, with dramatic growth in the cotton industry and expansion in ancillary trades...Red brick and sandstone buildings are

prominent in the city and town centres, alongside buildings using a mix of modern materials, high-rise buildings, and landmark 19th-, 20th- and 21st-century buildings."

8.4.12 These areas of former industrial and port activity have been reinvented with city waterfronts rediscovered, the NCA recognises this and, pertinent to the LVIA Study Area, comments that:

"Significant regeneration has taken place in the Manchester Conurbation during the late 20th and early 21st centuries. Several high-profile regeneration development projects have taken place, such as Salford Quays, MediaCity…Service industries have emerged, with retail and leisure facilities particularly around the M60 corridor, including around the Trafford Centre area…The canals, once important for trade, are now mainly used for recreation, although the Manchester Ship Canal still links Salford Quays with the Mersey Estuary. There has been significant development along the Manchester Ship Canal corridor."

8.4.13 The first of the three Character zones of the proposed scheme is a good example of the effects of the regeneration discussed above and from Pomona to Imperial War Museum North, passes through an area that has benefitted from the adjacent regeneration of Salford Quays and has an attractive waterside setting. There are landmark buildings in this section of the route including the Imperial War Museum North and Quay West.

8.4.14 The second zone of the proposed route passes through the industrial heartland of the estate, which is typified by industrial buildings of varying age and appearance.

8.4.15 The third zone of the route that has been identified runs adjacent to EventCity and the intu Trafford Centre. Well-managed landscapes and eye catching architecture give this area a distinctive character.

8.4.16 Each of these sections has different characteristics and form the basis of the character zones for the development. The following provides a description of each of these zones.

Character Zones

Waterside Zone

8.4.17 This area extends from the existing Pomona Stop, along Trafford Wharf Road to the Imperial War Museum North. The character of this area is closely linked to that across the Manchester Ship Canal in Salford Quays, as it responds to the waterside setting and the opportunities for leisure and access this brings. The

scale, density and height of development to the south of the canal do not match that of Salford Quays to the north. The two pedestrian and cycle bridges, the Lowry Millennium Lift Bridge and the Media City footbridge (which cross the canal to the east and west of the Imperial War Museum North), link the two areas directly and are contemporary landmarks within their own rights.

8.4.18 To the east of the area, two further points of connection across the canal exist with the Grade II listed Trafford Road Bridge carrying northbound traffic across the canal into Salford and immediately adjacent the more modern bridge carrying the southbound traffic. The historic steel arch bridge is widely visible from the towpaths and walkways alongside the canal to the east and is an integral component in establishing the character of the canal in this area. From the bridge long views along the canal are afforded taking in the Trafford and Salford waterfronts and focused on the Lowry Millennium Lift Bridge.

8.4.19 Old Trafford, Manchester United's football stadium, forms a backdrop to the eastern section of this zone when viewed from Salford and has influenced the character of development around the stadium with extensive areas of car parking either side of the Bridgewater Canal spilling into temporary car parking and signage within the LVIA Study Area.

8.4.20 Samuel Platts public house is locally prominent along the canal, visible from both banks and with an element of the pub located within the canal itself on previous bridge structure. The pub has limited opening hours, mainly on match days and for private functions, and as such (and in common with much of the surrounding environment around the stadium), can look fairly desolate at other times.

8.4.21 Trafford Wharf Road runs straight from Samuel Platts to Warren Bruce Road and is bordered by industrial and commercial buildings in well-established and mature landscapes. The character is that of a working environment, with vans, lorries and car parking prominent. The exception to this is the striking curved silver shards of the Imperial War Museum North, which forms a major tourist attraction for the Regional Centre, sitting over the canal from the Lowry, but somewhat incongruously, immediately adjacent on Trafford Wharf Road, to the Rank Hovis Mill.

8.4.22 The Trafford waterside promenade provides extensive views over and along the canal and, is a popular pedestrian and cycle route, particularly noticeable during the morning and evening commute. This increase in activity is especially apparent between the Millennium Bridge and the point of connection of the promenade to Trafford Wharf Road. This section of the promenade is slightly more elevated and broader, which allows the inclusion of seating, planting areas and sculptural features. To the east of this connection point, the promenade is

lower to the canal and narrower. With only the uninviting underpass beneath Trafford Road bridges offering connections to the east and backed by empty car parks and hardstandings, the section of promenade between Samuel Platts and the bridge in particular has a degraded, misused and underused appearance.

8.4.23 A select palette of hard materials has been effectively used within the Quays based around brindled clay pavers, granite kerbs and blue engineering bricks on walls. Views across the Quays to neighbouring landmark developments typify this section of the route along with Pine and Eucalyptus trees along Trafford Wharf Road and the waterside promenade that contribute towards the local character of this zone. Walking routes defined by linear areas of public realm that link Salford Quays, MediaCity and Irwell River Park form an important part of this character zone.

8.4.24 Pedestrian and cycle movements within this area are varied. Despite the significant daily influx of workers into the area, little of this movement back from the waterfront is on foot or on bike. The waterfront, however, is frequented by both visitors and local workers.

Trafford Park Industrial Zone

8.4.25 This zone extends from Warren Bruce Road, along Village Way past the historic village core of Trafford Park to the junction of Barton Dock Road and Park Way. It is typified by industrial buildings with large footprints of varying heights. Servicing and access points are dominant features within this zone due to the concentration of freight and large vehicle movement. Boundary treatments are varied and many have been enhanced through work by the former Trafford Park Development Corporation and feature high quality clay brick walls, ornamental planting, street trees and railings. Along Village Way the presence of the former village core of Trafford Park is denoted by the Trafford Park Hotel (Grade II listed). The smaller scale buildings, shops and former residential property are off-route and are not considered further.

8.4.26 Along the proposed route, the corridor effect of the roads, enclosing industrial units and boundaries is broken at the two significant roundabout junctions of Village Circle and Parkway Circle. Whilst both extensive roundabouts provide a sense of landscaped open space, they are markedly different in character. Village Circle is predominantly open, with isolated stands of trees (including a group of Black Poplars). By contrast, the approaches to Parkway Circle from the east and west accommodate belts of woodland planting of closely growing trees and shrubs that create a 'green' and wooded feel to this section of Trafford Park. The planting has been managed to utilise areas of embankment as the roadway elevates to cross the canal. Immediately adjacent to this area are industrial

buildings, which typify this character zone along the Metrolink Trafford Park Line route.

8.4.27 Apart from a few marked hotspots, around the Subway food outlet on Village Way for example, there is little human interaction within the zone, with most travel being undertaken by car.

Leisure and Residential Zone

8.4.28 From the junction with Barton Dock Road, past EventCity to the Trafford Centre Stop the character alters within the Leisure and Residential Zone.

8.4.29 Again, and in common with many of the roads within the industry park, Barton Dock Road runs straight and the avenue trees to the north combined with the generous set back of the building lines, creates an avenue or boulevard effect.

8.4.30 The former Kratos Site is located on the junction of Barton Dock Road and Park Way. This prominent gateway site is subject to a planning application to build high class office and hotel accommodation with supporting public realm. The development has been planned to accommodate the Metrolink Trafford Park Line. The proposed public realm includes 'buffer' planting to mitigate views between the new development and Barton Dock Road.

8.4.31 The singular character of the landscape and architecture of the intu Trafford Centre is in marked contrast to the industrial zone to the north and east, but the scale and boulevard character of the road infrastructure within the industry park leads comfortably into that of this major shopping centre. Extensive areas of surface and multi-storey car parking surround the two malls and EventCity. EventCity itself, although of differing use, being a steel clad portal construction, is of a similar height, scale and character to the preceding industrial units.

8.4.32 There is a significant increase in human interaction around the retail centre and Barton Square, but this tends to be very localised (and internalised) to the malls and bus station. The car dominates as the mode of transport and walking within the public realm is limited to pedestrians making their way from car to shop.

Existing Visual Baseline

Zone of Visual Influence

8.4.33 The Zone of approximate Visual Influence (ZVI) is the area from which the Metrolink Trafford Park Line or part of the scheme may be visible. The potential ZVI was noted during the site visits and the resulting Visual Envelope Map (VEM) is shown on Figure 8.3 (ES Volume III). The VEM reflects the visibility of the site based upon the topography of the surrounding area and known elements such as buildings and the existing vegetation, where noted in the visual assessment,

which provide all year screening. It should be noted that there are areas within the VEM which do not have views of the Metrolink Trafford Park Line (due to the localised screening effects of vegetation, structures, topographical formations, etc.), but it is an approximate guide used to assist in identifying key visual receptors and viewpoints.

8.4.34 Along most of the route alignment, views are confined to within the road corridor along which the tram is running. Between Pomona and Trafford Road Bridge, the visual envelope increases to the towpath to the north of the Ship Canal and the residential and commercial properties that front the canal. These views are quite close and extensive.

8.4.35 To the west of Trafford Road Bridge, the alignment of the Metrolink Trafford Park Line up to Quay West is along the waterside promenade, thereby open to views across the canal from the frontage development and public realm along the northern side of the Quays and from the Lowry Millennium Lifting Bridge.

8.4.36 At the Village Circle and Parkway Circle roundabouts, views of the alignment are afforded along the other approach roads and other connecting secondary roads provide very narrow fields of view.

8.4.37 Within the environment of the intu Trafford Centre the visual envelope opens out as the buildings step back, but views of the alignment are still contained within the confines of the adjacent built forms.

Selection of Viewpoints

8.4.38 Viewpoints are chosen to study the potential visual effects of the Metrolink Trafford Park Line. The principal criterion is that they must be representative of the range of views and viewer types within each character area, which are likely to experience significant impacts. Each of the six stops is included in at least one of the viewpoints and viewpoints have been selected at locations that are currently accessible to the public and are likely to remain so, should the scheme be developed, for example, towpaths, footpaths and cycleways. Specific points may also be chosen because they are important existing viewpoints in the landscape, even though from these, the visual effects may not be significant. The viewpoint locations are shown on Figure 8.4 (ES Volume III).

8.4.39 Due to the location of the Metrolink Trafford Park Line within an industrial area, there are few residential receptors that would be affected by the scheme. The main visual receptors include:

- Visitors to local attractions including Old Trafford football ground, Imperial War Museum North, Salford Quays, EventCity and the intu Trafford Centre;

- Users of the Bridgewater Canal;
- Users of local footpath and cycle network;
- Users of the local road networks; and
- Longer distance views from taller residential blocks around the Salford Quays area.

8.4.40 View types included:

- Areas of high value such as recognised recreation routes and canal corridors;
- Viewpoints that may have wide panoramic views or by contrast focused views;
- Viewpoints at different distances;
- Viewpoints at different elevations;
- Viewpoints from different aspects;
- Viewpoints from which there would only be partial views of the tram, stops or infrastructure; and
- Sequential views for instance along National Cycle Routes.

8.4.41 Viewer types included:

- Views from residences, roads or recreational points where visitors may experience the landscape; and
- Viewpoints where viewers would be likely to be stationary or moving through the landscape.

Selected Views

8.4.42 Using the above criteria, twenty views were selected for consideration of impact and production of photomontages (Figure 8.5a – 8.5t, ES Volume III). The location of each of these viewpoints is shown on Figure 8.4 (ES Volume III).

- Figure 8.5a - East to Pomona Viaduct from River Irwell Towpath South of Exchange Quay;
- Figure 8.5b - West to Trafford Road Bridge from River Irwell Towpath South of Exchange Quays;
- Figure 8.5c - West to Samuel Platts and Millennium Bridge from Trafford Road Bridge;
- Figure 8.5d - Northwest to Samuel Platts from Wharf End;

- Figure 8.5e - Southeast to Trafford Road Bridge from Towpath at Clippers Quay;
- Figure 8.5f - West Across and Along Canal from Clipper's Quay;
- Figure 8.5g - South Across Central Bay from Salford Watersports Centre;
- Figure 8.5h - East from The Lowry Frontage Towards the Trafford Waterfront;
- Figure 8.5i - West Along Trafford Waterfront Promenade;
- Figure 8.5j - West on Trafford Wharf Road to Imperial War Museum North;
- Figure 8.5k - North Along Warren Bruce Road;
- Figure 8.5l - West to Village Circle from Wharfside Way;
- Figure 8.5m - East Along Village Way by Trafford Park Hotel;
- Figure 8.5n - West on Village Way;
- Figure 8.5o - West to Parkway Circle from North of Village Way;
- Figure 8.5p - East to Proposed Viaduct from Bridgewater Canal Towpath;
- Figure 8.5q - Northeast Along Parkway Slip Road from Barton Dock Road Junction;
- Figure 8.5r - Northwest from Barton Dock Road to Barton Square;
- Figure 8.5s - Southeast Along Barton Dock Road; and
- Figure 8.5t - West to Multi-Storey Car Park from Traders Avenue Roundabout.

8.4.43 Not all the viewpoints necessarily generate a Viewpoint Figure, as on assessment it could be that no impacts would be realised from the particular location. Where this occurs, the reason for the omission is explained.

Future Baseline

8.4.44 The future baseline in year 2020 without the Metrolink Trafford Park Line would be much as described in the current baseline, with the additional influence of those developments already consented or identified and as described in Chapter 15: Cumulative Effects. The nature of these developments would influence both the landscape character and visual baseline as they represent new uses of a different mix, layout and character to the existing baseline.

8.4.45 The future baseline in 2035 without the Metrolink Trafford Park Line would be much as the 2020 baseline, but with the future influence of further developments that might be proposed. Given emerging trends and planning policy, this is likely to be within the waterside zone and the introduction of a

further and richer mix of development across the industrial park. Again, these developments would influence both the landscape and visual baseline of the LVIA Study Area.

8.5 Mitigation

8.5.1 Mitigation measures can be implemented at various stages of the development process and can take a variety of forms, from the application of sensitive design through the design development process, mindful of likely adverse impacts, through to the implementation of measures both during and after construction. Offsite works can also be undertaken to substitute for unavoidable adverse impacts within the site. In terms of impacts on landscape, the following mitigation measures would be considered, and if appropriate, implemented as the scheme develops:

- Avoidance – seeking to relocate damaging or adverse impacts to less sensitive locations;
- Modification – modifying the design to achieve a reduction in impacts upon the landscape, heritage features and the visual domain through the implementation of sensitive design, lessening physical impacts or impacts upon the setting;
- Substitution – substituting features or areas with improved compensatory areas or features; and
- Enhancement – introduction or reintroduction of features or areas which might have been lost, or rectifying previous poor development.

8.5.2 The need to consider substitution mitigation for the loss of trees within the corridor has already been discussed with TMBC, and Transport for Greater Manchester would work closely with TMBC and their partners to agree a suitable scheme of mitigation as the detailed design is developed.

Construction

8.5.3 The continued development of a considered and planned programme of construction methods during the construction period would ensure that landscape and visual disruption would be minimised or avoided.

8.5.4 Work would be carried out in line with Transport for Greater Manchester's Code of Construction Practice (CoCP) and a Construction Environmental Management Plan (CEMP) specific to the Metrolink Trafford Park Line would be prepared by the appointed contractor. These plans would provide guidance on appropriate working method, outlining suitable adverse impact avoidance measures and mitigation strategies. As these measures are inherent in the proposed

construction methods, no assessment of the significance of effects without these measures has been undertaken.

Operation

8.5.5 In developing the Metrolink Trafford Park Line alignment, a number of route options were explored, where the impact upon the landscape character and visual domain were considered within the assessment and route selection. The proposed scheme alignment aims to contribute positively to pedestrian and cyclist access to both the immediate area and the long-distant recreational routes.

8.5.6 Examples of such modifications are:

- The location and arrangement of the EventCity and Trafford Centre Stops, where the orientation and exact location of the stops were redefined to create a more accessible urban realm, avoiding conflict with key views and vistas.
- The detailed design and location of the Wharfside Stop as an extension and key component of an improved urban realm, to encourage easy access to the lower level waterside promenade and safe queuing facilities for match days.
- The detailed routing of the alignment along the Trafford Waterfront to retain a safe and attractive public realm corridor along the waterside, whilst providing stunning views across the Quays for the tram user.

8.5.7 Detailed design would be undertaken and would be subject to approval from TMBC. Details would be developed in line with standard Metrolink design and established standards, which, where appropriate have evolved and improved as new lines come into operation, whilst remaining constant to Metrolink branding and corporate identity.

8.5.8 To mitigate the loss of tree cover along the route corridor, all tree replacement would be carried out in consultation with TMBC, with the aim of furthering the aspirations of GI initiatives and policy. All replacement or new tree planting would be incorporated in an overall landscape scheme to support the development which would be approved by the Local Planning Authority. The details of this requirement would be covered by planning conditions.

8.5.9 The Metrolink Trafford Park Line would introduce additional lighting into the urban realm environment, but urban illumination is an existing element of the landscape and visual baseline, most closely associated with the existing highways network. Whilst receptors would be aware of the lighting associated with the

proposed scheme, these effects would be further minimised by the use of appropriate fittings and luminaires.

8.6 Summary of Potential Effects of Aspects of the Development

8.6.1 Table 8.1 summarises the potential effects of elements of the Metrolink Trafford Park Line together with the potential consequences of the development.

Table 8.1 Summary of potential effects of the development

Aspect of the Development	Potential Change
Construction Phase	
Construction vehicle movement	Landscape/ Physical attributes: elements and pattern of the landscape not effected; Perceptual characteristics: temporary increase in vehicular activity/ visual clutter.
Cranes/ lifting equipment	Landscape/ Physical attributes: unaffected, but temporary on skyline pattern; Perceptual characteristics: cranes impose height and potential prominence.
Construction of infrastructure and landscape spaces	Landscape/ Physical attributes: introduction of new elements and immature planting and loss of existing elements, site furniture and mature tree cover Perceptual characteristics: temporary increase in activity/ visual clutter
Completion/Operation Phase	
The Tram Line	Landscape/ Physical attributes: introduction of new, large scale, continuous infrastructure, compatible with the existing built context, but imposing a new linear urban pattern across the area; Perceptual characteristics: possible effect upon scale of existing transport corridors and their barrier effect and, through loss of roadside vegetation, a 'hardening' of the local environment.
Urban spaces	Landscape/ Physical attributes: introduction of new, quality spaces linked to existing development and landscape, improving both permeability and pattern. Perceptual characteristics: potential positive effect upon urban character of the area, with an increased sense of continuity and provision for human interaction.

Landscape Effects

8.6.2 In assessing the effects of the Metrolink Trafford Park Line on the landscape, the following criteria of landscape assessment were evaluated and considered with respect to the established assessment scenarios:

Impacts to Layout/ Urban Grain

8.6.3 The tram alignment forms a linear transport feature, which, in following existing transport corridors would complement and reinforce the urban grain of the area and avoid conflict with the current built layout. Effects would be moderate beneficial.

Scale

8.6.4 The scale of the tram system – the Overhead Line Equipment (OHLE), stops and tram units are entirely appropriate to the robust scale of the landscape of the Quays, the Industry Park and intu Trafford Centre. The proposed alignment of the route is considered as having a positive impact on key views and the effects would be slight beneficial.

Architectural Style

8.6.5 The Metrolink Trafford Park Line is entirely modern in its design and would assist in signposting the regeneration of the area. The design is both sensitive to its surroundings and of a high quality, creating attractive public spaces and facilities, which remain alive through the daytime and evening throughout the week and form a natural and attractive link from Manchester city centre through to the important employment zone of Trafford Park and out to the intu Trafford Centre.

8.6.6 The introduction of new, modern design and urban realm improvements into the application area would have a moderate beneficial effect upon landscape character.

Human Interaction

8.6.7 The application area currently has little interaction with the general public, limited to access around key areas and not widespread across the entirety of the route. The tram would bring foot passengers to the stops along the alignment, furthering pedestrian movement within the urban realm and altering movement patterns and modes. The knock-on effects could also be to further retail and food outlets along the route and bring an improved sense of personal security, particularly after dark.

8.6.8 As part of the design process Metrolink also considerthe use and safetyof long distance footpaths and cycleways, through improved connections, road crossings, signage and access.

8.6.9 The effect on human interaction would be substantial beneficial.

Waterside Zone – Landscape Effects at Construction

8.6.10 Construction activity within this zone would have a fundamental and adverse impact on the character and quality of the landscape. Public access to the waterfront would be heavily restricted or denied during the period of construction and demolition of Samuel Platts and the commercial properties between Trafford Wharf Road and the Waterfront would significantly alter the character and built structure.

8.6.11 Significant tree losses would also occur in the maturing planting belts between the waterfront urban realm and the commercial units, as this would be the footprint of the Metrolink Trafford Park Line.

8.6.12 The effect on the landscape would therefore be substantial adverse during construction.

Trafford Park Industrial Zone – Landscape Effects at Construction

8.6.13 Along the majority of the route in this character zone, the proposed alignment is located within the highway verges and margins. This reduces landtake or possible demolitions to either side of the road corridor, whilst retaining or improving vehicle flows on the roads. As the alignment is segregated running for much of its length, the stops and infrastructure tend also to be located to either one side or the other of the existing roads and, therefore, within the highways verges. Existing trees must be cut back or removed and as these verges are generally mature, with either semi-mature or mature trees, tree losses are relatively extensive and unavoidable.

8.6.14 The mature tree belts and street trees bordering the road corridors throughout the area are a key characteristic of the industry park and provide continuity to the landscape in what would otherwise be a fractured environment dominated by industrial units and yards. Potential tree losses, therefore, would have a substantial adverse effect on the landscape during construction.

Leisure and Residential Zone – Landscape Effects at Construction

8.6.15 The impact of the Metrolink Trafford Park Line on the existing tree infrastructure is not as marked within this character zone and the character, which is largely determined by the striking and singular architecture of the intu Trafford Centre, would not be significantly affected. However, all the aforementioned negative

effects of construction would still apply. Landscape effects are slight adverse during this phase.

Waterside Zone – Landscape Effects at Opening

8.6.16 The urban waterfront is predominantly a hard landscape area and as such would present a repaired and intact character at opening. The Metrolink Trafford Park Line would complement a reinvigorated urban realm and existing sculptural features, particularly the extensive 'Silent Cargo' installation, removed during construction is expected to be relocated. Landscape effects along the immediate promenade would be moderate beneficial.

8.6.17 The interplay of the tram line with the Trafford Road Bridge would be entirely in keeping with the transport related character of the listed bridge structure and aesthetically compliment the setting of the bridge. The immediate local area of Wharfside, which is currently run down would be re-energised leading to a substantial beneficial effect.

8.6.18 The void between Trafford Wharf Road and the waterfront would still be apparent and would have a significant effect on the character of this zone. On balance, therefore, landscape effects would be neutral.

Trafford Park Industrial Zone – Landscape Effects at Opening

8.6.19 For safety and operational reasons a clear corridor is required around the tram route to avoid contact with the OHLE and to maintain visibility. Given these restrictions, the opportunities for new tree planting alongside the tram route are limited. With the removal of trees during construction opening up of new and often raw views of the industrial areas, there would remain a moderate adverse effect. Trafford Park is a focus for Green Infrastructure initiatives by TMBC who are seeking to increase tree coverage within the area. Transport for Greater Manchester would work with TMBC to further these aims during the dischargement of planning conditions process, as appropriate.

8.6.20 The construction of the viaduct to carry the alignment over the Bridgewater Canal alongside the existing Park Way Bridge would result in tree losses and increase the distance the canal is covered, creating a slightly extended, more heavily shadedenvironment for the canal user and the cyclists or pedestrians on the towpath. Here the effect would be slight adverse and permanent.

8.6.21 Although the Metrolink Trafford Park Line would be clearly apparent within the setting of the listed Trafford Park Hotel on Village Way, the character would be substantively unaffected as the alignment lies to the northern side of the road and the road would remain the dominant influence on the setting. The overall effect would therefore be neutral.

Leisure and Residential Zone – Landscape Effects at Opening

8.6.22 The Metrolink Trafford Park Line would have a moderate beneficial effect on opening, as the success of the scheme is not reliant on planting to provide structure, the tram would be entirely within character and keeping with the existing area and would also create opportunities for enhanced urban realm and therefore, human interaction.

Waterside Zone – Landscape Effects at Operation

8.6.23 As new development on the Trafford waterfront begins to reconstruct the character of the southern half of the Quays, the Metrolink Trafford Park Line would be central to a quality and re-energised urban environment. New planting, although not critical to creating structure, would have matured and the scheme would be well integrated into the waterfront environment. Landscape effects would be moderate beneficial.

Trafford Park Industrial Zone – Landscape Effects at Operation

8.6.24 As off-site and on-site vegetation matures and establishes and new development addresses the proposed alignment, so the character would be reinstated with the potential for the Metrolink Trafford Park Line to complement emerging and improving trends within Trafford Park. Landscape effects would be moderate beneficial.

Leisure and Residential Zone – Landscape Effects at Operation

8.6.25 Landscape effects would be moderate beneficial as the continuing maturing of the landscape and new tree planting would further integrate the Metrolink Trafford Park Line into the environment in this section of the proposed route.

Landscape Effects Conclusion

8.6.26 Effects on Landscape are an aggregation and balancing of numerous individual issues, some of which carry a greater significance depending upon the particular area that is being studied. In the case of the Metrolink Trafford Park Line, it is located within a site that has a low Landscape value, but the potential impact on tree numbers within the area would be a substantial adverse effect.

8.6.27 In terms of landscape character, the current urban environment, whilst being located within an important employment and regeneration area is generally of low to medium value, with specific and identified hotspots of recognised medium value, and medium sensitivity. The application area, whilst containing a few structures of historic value, also has a number of structures and buildings that do not enhance the character of the area and detract from the broader environment.

8.6.28 The urban grain is strong with a clear hierarchy of roads, reinforced by mature roadside vegetation, which often screens less attractive industrial areas; masks fractured built frontages; and provides a continuity and consistency to the landscape of the proposed route. As an industrial park with good highways connections, there is subsequently little human interaction within the site as the general public are not encouraged to the central employment and industrial areas and the use of the car predominates throughout. The landscape value of the site is therefore considered low, despite its significant location.

8.6.29 The importance of these issues has been identified within the design approach, which identified the appropriate alignment for the route within the application area in terms of being acceptable to the key views and experience of heritage assets within the vicinity.

8.6.30 Without offsite mitigation, on balance the effects on landscape would be slight to moderate adverse at opening and during operation. However, with offsite mitigation through enhanced tree planting and improved connectivity, the assessment has established that the Metrolink Trafford Park Line would have a moderate beneficial effect upon the quality and value of the landscape within the application area, as the development achieves the following criteria:

- The proposals would fit well with the urban grain/ layout, mix, scale, and cultural aspects of the landscape;
- Whilst detrimentally impacted within the LVIA Study Area, there is the potential, primarily through mitigation off site, to offset the impact of tree losses and further the aims of Green Infrastructure policy and enhancement of the Red Rose Forest initiative;
- The improvements in public realm provision and access would introduce a greater level of human interaction with the application site;
- The development would enable a sense of place to be restored through a well-designed urban realm;
- The development would enable a sense of quality to be restored or enhanced through beneficial and sensitive design in landscape; and
- The development would further government objectives with respect to the regeneration of urban areas and enhancement of the visitor offer.

Visual Effects

8.6.31 Following a desk based study and series of trips to site, key areas from which the alignment is visible have been established. The process of then selecting both indicative and particular viewpoints has already been described and using the ZVI and knowledge of the site and the development, these effects are summarised.

8.6.32 The photographs and tables describing viewpoints 1 – 20 (Figures 8.5a – 8.5t, ES Volume III) illustrate the visual effects of key and representative aspects of the development on receptors. These provide an assessment of sensitivity of the viewpoint, magnitude of the effect and thus the significance overall upon the viewpoint.

Potential Visual Impacts During Construction

8.6.33 The viewpoint tables identify the possible source of construction impacts. All the impacts are assumed to be adverse during the construction phase and for viewpoints closest to the site effects would be significantly adverse due to the disruption. However, these effects would only be temporary and would become beneficial on completion.

Potential Visual Impacts On Opening

8.6.34 The effects at each viewpoint are detailed within the tables which accompany the photographs, but are summarised below:

Viewpoint 1 - East to Pomona Viaduct from River Irwell Towpath South of Exchange Quay

8.6.35 This view looks eastwards along the enclosed canal corridor towards the stub end of the existing Pomona viaduct, which carries Metrolink across the canal. The proposal would be to fall westward from the existing Pomona Stop level of the viaduct to follow the southern bank of the canal. This would mean the loss of the trees to the south of the canal, and replacement with open views across the canal to moving vehicles and tram infrastructure, fundamentally altering the character of the canal corridor in this section.

8.6.36 The sensitivity of the view is medium as the view is from the towpath and busy recreation route looking across the River Irwell. The magnitude of the effects is considered to be high as the change through the loss of the wooded and parkland edge would be fundamental and irreversible. Therefore the visual effect is assessed as substantial adverse.

Viewpoint 2 - West to Trafford Road Bridge from River Irwell Towpath South of Exchange Quays;

8.6.37 Although this view is similar in many respects to Viewpoint 1, it looks east towards Trafford Road Bridge and the industrial developments beyond. There would still be significant tree losses, but the potential exists to retain a number of trees beyond the alignment as a backdrop, as the landscape area widens out in this area.

8.6.38 The sensitivity of the view remains medium, however, the magnitude of effects is lessened to medium through the retention of trees beyond the alignment, but the visual impact is moderate neutral as the tram would not be seen as incongruous against the industrial backdrop and character area.

Viewpoint 3 - West to Samuel Platts and the Millennium Bridge from Trafford Road Bridge

8.6.39 Looking along the canal in a westerly direction from the northern end of Trafford Road Bridge, the view is towards Samuel Platts public house and the terraced urban landscape of Wharfside, but backdrop to the Imperial War Museum North, Millennium Lifting Bridge and high rise apartments on Salford Quays draws the eye. Although Wharfside is relatively well-used, signs of neglect are evident with weed growth emerging from the brick faced retaining walls. The Wharfside Stop would entirely fill this view eastwards of Samuel Platts, on the upper level of thelandscape area. The lower towpath level would be unaffected, with new points of connection. With the demolition of Samuel Platts and the commercial units to the north of Trafford Wharf Road as far as the Data Centre, views would be opened up to the promenade. With the Metrolink Trafford Park Line alignment running through the landscape corridor to the back of the promenade, during construction visual effects would be substantially adverse.

8.6.40 The sensitivity of the view from the towpath and waterfront would be medium from this elevated viewpoint. The magnitude would be high due to the severity of change and impact on character. However, by the design year, visual impact would be substantial beneficial as the stop and improvements to the urban realm would be appropriate to the urban setting and result in the enhancement of the urban waterfront landscape.

Viewpoint 4 - Northwest Towards Samuel Platts from Wharf End;

8.6.41 Samuel Platts public house is the focus of the view from the extensive paved areas either side of Wharf End. The high-rise commercial and residential buildings of Salford Quays are visible beyond and the overgrown and slightly neglected car park areas of the pub are just visible at the lower level behind the

footpath railings. Trafford Wharf Road, curving away to the front of the pub would be closed to traffic and pedestrianised and the entire middle distance of the photograph would be taken up by the Wharfside Stop.

8.6.42 The sensitivity of the view is medium and the magnitude would be low, as the roadside and avenue trees framing and filtering the view would be maintained, with little loss of trees on the site, the removal of an untidy car parking area and introduction of a quality urban realm around the stop. The visual effect would be, therefore, moderate beneficial.

Viewpoint 5 - Southeast to Trafford Road Bridge from Towpath at Clippers Quay;

8.6.43 Looking eastward over the canal from the towpath at the waterfront end of Clipper's Quay the view is towards the southern end of the listed Trafford Road Bridge and the terraced urban landscape of Wharfside. Relics of dock infrastructure sit within the canal in the foreground and development is visible above the trees along Wharfside. The portal entrance to the underpass beneath the two bridges, through which the tram would run, is apparent immediately to the south of the bridge, behind the steel stair tower. Although Wharfside is relatively well-used, signs of neglect are evident with weed growth emerging from the brick faced retaining walls and overgrown planting areas. The line would be immediately apparent either side of the bridge.

8.6.44 The sensitivity of the view from the towpath and waterfront would be high from this recognised recreational route, as views are drawn across the canal towards Wharfside and the landmark feature of the listed bridge structure. The magnitude would be medium as there would be noticeable change to the setting of the listed structure, however, the introduced elements would be in keeping with the urban setting and industrial character of the bridge. The visual impact would be substantial beneficial as the improvements to the urban realm would be appropriate to the urban setting and character and result in the enhancement of the urban waterfront landscape.

Viewpoint 6 - West Across and Along Canal from Clipper's Quay;

8.6.45 The layers of development to the south of the canal are well-described in this view, moving back from the promenade, landscape screenand industrial units, backed by the taller buildings of Rank Hovis, Quay West and the Imperial War Museum North. The Millennium Bridge is a constant focus to views westward and with the Imperial War Museum North and The Lowry (not visible in this view) contains the landscape compartment.

8.6.46 The sensitivity of the view would be high from the popular recreational route of the towpath. The magnitude would be medium, as the demolitions and loss of

trees backing the promenade would be a significant change in the view and character. However, the views would be framed by the landscape of the Trafford Wharf Road corridor and the skyline would remain intact. The development of the tram would also be entirely within keeping of the linear urban working environment and transport corridor and once new development occurs between Trafford Wharf Road and the promenade, the appearance would be much enhanced. The overall visual effect would be, therefore, moderate adverse during construction, neutral at completion and slight beneficial as the development visually beds in, change is accepted as the landscape of the promenade matures and adapts.

Viewpoint 7–South Across Central Bay from Salford Watersports Centre:

8.6.47 Views across the expanse of Central Bay basin and the canal towards Quay West and the commercial and industrial development between Trafford Wharf Road and the waterside promenade. The mature landscape of the Quays urban realm is to the right, with the lifting towers of the Millennium Bridge rising above. From the left of the photo, with the exception of the Data Centre, all the industrial units up to Quay West would be demolished. The belt of landscape planting to the back of the promenade would also be removed to a point to the east of the Data Centre, where the proposed alignment would swing southward to connect to Trafford Wharf Road. The background trees and commercial properties along Trafford Wharf Road would continue to form the background of the promenade.

8.6.48 Sensitivity would be high as the receptors would be the users of the Watersports Centre and pedestrians walking around the waterfront enjoying extensive vistas over the Quays. Magnitude would also be medium given the extensive demolitions and tree removal, mitigated by the backdrop of the mature tree lined vegetation of Trafford Wharf Road.

8.6.49 The development of the tram would be entirely within keeping of the linear urban working environment and once new development occurs between Trafford Wharf Road and the promenade, the appearance would be much enhanced. The overall visual effect would be, therefore, moderate adverse during construction, neutral at completion and moderate beneficial as the development visually beds in, new development occurs along the waterfront and the landscape of the promenade matures and adapts.

Viewpoint 8–East from The Lowry Frontage Towards the Trafford Waterfront

8.6.50 Views across the canal towards the waterside promenade, visible beneath the span of the Millennium Bridge, which dominates the view. The commercial and industrial units fronting the promenade are visible, but mainly screened by the mature vegetation that backs the promenade. With the exception of the Data

Centre, all the units would be lost to the tram alignment and the landscape belt to the left of the 5 mph roadsign, but the background trees and commercial properties along Trafford Wharf Road would continue to frame the promenade.

8.6.51 Sensitivity would be moderate as the area is a popular location on the waterfront, enjoying extensive vistas over the canal. Magnitude would be medium given the extensive demolitions and tree removal, mitigated by the backdrop of the mature tree lined vegetation of Trafford Wharf Road and the focus of the view on the bridge.

8.6.52 The development of the tram would be entirely within keeping of the linear urban environment and once new development occurs between Trafford Wharf Road and the promenade, the appearance would be much enhanced. The overall visual effect would be, therefore, moderate adverse during construction, neutral at completion and moderate beneficial as the development visually beds in, the waterfront becomes redeveloped and the landscape of the promenade matures and adapts.

Viewpoint 9–West Along Trafford Waterfront Promenade

8.6.53 Views along the promenade towards the visually dominant Millennium Bridge lifting towers. The artwork, 'Silent Cargo' is visible to the left, backed by the mature vegetation of the belt of landscape between the promenade and the industrial units. Further public artwork is located along the promenade. Quay West is just visible above the trees, as is a shard of the Imperial War Museum North (just discernable against the sky). The waterfront is popular with cyclist and walkers, particularly between the bridge and the connection behind to the left of the photo location, onto Trafford Wharf Road. The alignment of the tram would run along the line of the landscape belt and, therefore, the vegetation and the commercial and industrial units behind would be demolished and removed as part of the scheme development. The landscape frontage to Quay West would be retained; however, 'Silent Cargo' would require relocating.

8.6.54 Sensitivity would be high as the area is a popular walking and recreation route, enjoying extensive vistas over the canal. Magnitude would also be high given the extensive demolitions and tree removal.

8.6.55 The development of the tram would be entirely within keeping of the linear urban environment and once new development occurs between Trafford Wharf Road and the promenade, the appearance would be much enhanced. It is unlikely access would be available to the promenade during construction, but the overall visual effect would be substantial adverse during construction, neutral at completion and moderate beneficial as the development visually beds in, the

waterfront becomes redeveloped and the landscape of the promenade matures and adapts.

Viewpoint 10 - West on Trafford Wharf Road Towards Imperial War Museum North

8.6.56 View looking westward along Trafford Wharf Road, again showing the linear nature of the road alignment, with the striking silver shards of the Imperial War Museum North apparent above the roadside vegetation. The brick industrial unit to the right (Communisis), and the soft landscape areas to the road frontage of the Quay West (again, rising above the treeline) would be lost to the scheme alignment and the Imperial War Museum Stop, as the alignment swings from the promenade to provide the stop to the north of Trafford Wharf Road. This would immediately open up views to the frontage of development and the promenade. Although not visible in this shot due to the existing planting, the design of the Imperial War Museum North landscape is very crisp, angular, hard and urban. With the removal of the planting scheme, the relationship of the stop to the Imperial War Museum North would be more pronounced. The alignment would curve back across the road at the traffic lights in the distance to enter Warren Bruce Road.

8.6.57 Sensitivity would be medium as the receptors would generally be visitors and workers travelling along the road in cars and magnitude would be moderate, as the loss of the Communisis unit to the north of the road and thelandscape frontage and trees would be a major change to the view. The visual effects would be moderate adverse during completion, but improving to slight beneficial during design year, as the loss of the landscape frontage and trees would be adverse, but the creation of a modern transport facility and improved hard landscape frontage to the museum would be complementary in character with the major tourist facility.

Viewpoint 11- North Along Warren Bruce Road

8.6.58 View looking along Warren Bruce Road towards the ITV Studios (Coronation Street set) and the high-rise development on Salford Quays beyond. The photograph shows the continuous tree belt to the west of the road, screening the tired industrial units beyond. This belt would be entirely lost with the development of the route, exposing the backs of the industrial units.

8.6.59 Sensitivity would be medium as the receptors would generally be visitors and workers travelling along the road in cars. Magnitude would be medium to high as the loss of the landscape screen and tree belt would cause a major change in the quality of the current view. Visual effects would be, therefore, moderate adverse in the short term, but as the new exposed frontage of the industrial area is

redeveloped over time to accommodate and acknowledge the tram line, then visual effects would become moderate beneficial.

Viewpoint 12 - West Towards Village Circle from Wharfside Way

8.6.60 This view shows the group of black poplars on Village Circle, but also illustrates that the landscape of the roundabout is generally open with views of the industrial and commercial units to the far side of the roundabout. This group of trees would be lost as the alignment exits Warren Bruce Road to the right and swings westward across the roundabout.

8.6.61 Sensitivity would be medium as the receptors would generally be visitors and workers travelling along the road in cars. Magnitude would be medium to high as the poplar group forms a major visual landmark within the area, but the introduction of the tram would not be considered uncharacteristic. The visual effect would be moderate adverse on completion, but as the proposed landscape of the roundabout matures, the effect would be slight beneficial.

Viewpoint 13 - East Along Village Way by Trafford Park Hotel

8.6.62 The Grade II listed Trafford Park Hotel is in the right hand foreground of the photograph, and this southern side of Village Way would remain directly unaffected by the proposals as the alignment would run to the northern side of the northern carriageways, partially within the landscape road boundaries. The Black Poplars on Village Circle are visible on the skyline. Village Stop would be constructed diagonally opposite the hotel to the northeast.

8.6.63 Sensitivity would be medium as the receptors would generally be visitors and workers travelling along the road in cars, although the development would sit within the setting of a listed structure. Magnitude would be medium to low. Whilst there would be loss of roadside vegetation, the development would be in keeping with the character of the area and although visible within the setting of the hotel, the effects on the listed setting would be negligible. The visual effect would be slight adverse on completion, but as the revisions to the landscape of the road corridor matures and the neighbouring built environment recovers to accommodate and accept the tram, effects would be slight beneficial.

Viewpoint 14 - West on Village Way

8.6.64 Looking through the junction of Village Way and Fifth Avenue, this view exemplifies the appearance and character of the Village Way road corridor, with car show rooms, commercial, retail and industrial units hard to the road alignment. A more generous landscape strip exists to the northern road margin and the wooded landscape of Parkway Circle is visible beyond the second traffic controlled junction.

8.6.65 Sensitivity would be medium as the receptors would generally be visitors and workers travelling along the road in cars. Magnitude would be low. Whilst there would be loss of roadside vegetation, this would not have such a fundamental effect on the nature of the road as the commercial and industrial units already have a stronger influence on the character of the road than elsewhere on the park and the development would be in keeping with the character of the area. The visual effects would be slight adverse on completion, but as the revisions to the landscape of the road corridor matures and the neighbouring built environment recovers to accommodate and accept the tram, effects would be slight beneficial.

Viewpoint 15 - West Towards Parkway Circle from North of Village Way

8.6.66 It is difficult to obtain a photograph that typifies the character and potential impact of the Metrolink Trafford Park Line on Parkway Circle, as the area of the significant roundabout is so well vegetated. This view is from the northeast of the junction looking west towards the proposed Parkway Stop and park and ride facility beyond. This area would undergo radical change with the replacement of the roundabout with a major controlled junction. Most of the trees and woodland belts around the existing junction would be lost.

8.6.67 Sensitivity would be medium as the receptors would generally be visitors and workers travelling along the road in cars and on the tram. Magnitude would be moderate to high, with the significant loss of trees and vegetation, which create the current baseline condition. The area would undergo fundamental change with the infrastructure of the park and ride facility opening up the area further and introducing lighting, fencing and parked cars. The visual effects would be substantial adverse on completion, but as the landscape proposals of the new road junction and park and ride facility matures, effects would be slight adverse.

Viewpoint 16 - East Towards the Proposed Viaduct from the Bridgewater Canal Towpath

8.6.68 This view is taken from the Bridgewater Canal towpath to the west of Park Way and shows the Park Way viaduct crossing the canal. Industrial units are visible beyond, but the environment is generally well wooded and the canal and towpath a recognised recreation amenity with plans for further enhancement. The proposal would run the tram on a separate but immediately adjacent structure, thereby visually widening the bridge span and introducing OHLE equipment onto the skyline. The view of the corridor towards the bridge and new proposals would be very narrow above the canal.

8.6.69 Sensitivity would be high as the canal corridor is a recognised amenity and recreation facility, with views channelled along the canal towards the bridge.

From distant views the magnitude would not be so great, but as the bridge is approached, particularly from the west, effects would increase and the magnitude would be medium. The visual effects would be localised, but would be substantial adverse on completion, with little scope to mitigate.

Viewpoint 17 - Northeast Along the Park Way Slip Road from the Barton Dock Road junction

8.6.70 View looking northwards up the slip road, with the industrial units off Mercury Way just visible above the tree screen to the west. The development would run along this landscape margin and require the removal of most of the vegetation, opening up the industrial area to views from traffic on the Park Way. The development of the former Kratos Site on the corner of Park Way and Barton Dock Road would completely transform the view with new development and landscape fronting onto the road corridors.

8.6.71 Sensitivity would be medium as the receptors would generally be visitors and workers travelling along the road in cars. Magnitude would be medium to high as the loss of the landscape screen and tree belt would cause a major change in the quality of the current view, opening up the industrial area and placing OHLE on the skyline. However, the development of the former Kratos Site would address any negative issues considerably on this corner and within this view, by the time the Metrolink line is developed. Visual effects would therefore be considered to be moderate neutral.

Viewpoint 18 - Northwest from Barton Dock Road to Barton Square

8.6.72 With the reconfiguration of the existing roundabout to a controlled junction, this frontage area would undergo significant change. The EventCity Stop would also sit immediately in the middle distance to the frontage of British Home Stores with a revised hard landscape area linking the stop and Barton Square. This landscape area would also become a queuing area for the tram when major events are scheduled in EventCity.

8.6.73 Sensitivity would be medium to high as the receptors would generally be visitors, workers and shoppers travelling along the road in cars, however, there would be an increase in pedestrian movement as passengers are attracted to the tram stop. Magnitude would be low as there would be little loss of significant mature landscape and the development of the Metrolink would complement the character and use of the intu Trafford Centre, bringing further pedestrian animation to the external areas. Visual effects would be moderate beneficial.

Viewpoint 19 - Southeast Along Barton Dock Road

8.6.74 Looking southeast along the landscape frontage to EventCity onto Barton Dock Road. The proposed alignment would run along this corridor and the photograph is taken from what would become the eastern edge of the urban realm adjacent to the EventCity Stop. The avenue of poplars along Barton Dock Road, which helps create the boulevard feel, would be lost to the development.

8.6.75 Sensitivity would be medium to high as the receptors would be a combination of visitors and workers travelling along the road in cars, but also pedestrians moving between Barton Square, EventCity and the stop. Magnitude would be negligible, as the poplar avenue could be replaced by more appropriate street trees to enhance the approach to the retail centre and the development would be in keeping with the context. Visualeffects would be moderate beneficial.

Viewpoint 20 - West Towards the Multi-storey Car Park from Traders Avenue Roundabout

8.6.76 The frontage landscape area to the multi-storey car park would undergo significant change with the construction of the Trafford Centre Stop. The stop would sit between the two stair towers (the second tower is just visible behind the group of trees).

8.6.77 Sensitivity would be medium to high as the receptors would be visitors, workers and shoppers travelling along the road in cars, however, there would be an increase in pedestrian movement as the tram is introduced with increase footfall to the stop. Magnitude would be low to medium as there would be little loss of significant mature landscape and the development of the Metrolink would complement the character and use of the intu Trafford Centre, bringing further pedestrian animation to the external areas. Visual effects would be moderate beneficial as the character of the major visitor attraction is enhanced through modern transport architecture and infrastructure and highly visible animation of the urban realm.

Visual Impact Conclusion

8.6.78 The visual impacts of the Metrolink Trafford Park Line development have been assessed through the selection and assessment of a number of representative and specific viewpoints that best describe the potential effects on the baseline visual environment. It is concluded that visual effects would be adverse for viewpoints close to the site during construction, but that these impacts would only be temporary in nature and that at opening and particularly during operation, once the scheme has bedded into the receiving environment, effects would be almost entirely beneficial.

8.6.79 The exceptions to this are localised with the potential for sufficient mitigation unachievable in the following locations:

- The impact on the central canal corridor section to the east of Trafford Road Bridge, where construction of the tram alignment would result in significant loss of mature trees to the canal bank; and
- The impact on the Bridgewater Canal corridor through the increased width of the bridged section and the inclusion of OHLE on the skyline.

8.7 Residual Effects and Conclusions

8.7.1 All built developments generate landscape and visual effects, but those carefully designed to accommodate these impacts create environments that fit appropriately into the site context and result in positive change. With the exception of the few isolated instances noted in paragraph 8.7.79, this is the case with respect to this development. The loss of trees, providing visual continuity and coherence would be replaced by a contemporary, high quality design tram system, immediately in keeping with the grain and qualities of the employment and leisure areas of Trafford Park.

8.7.2 The location, scale and detail of the tram system would be entirely appropriate to the site and surrounding buildings, with the introduction of urban spaces, cycleways and footpaths, improving human interaction and creating links to the surrounding areas.

8.7.3 Much can be achieved through sustainable drainage and improved pedestrian and cycle routes to support and not conflict with the aspirations and policy for improving Green Infrastructure and extending the Trafford Park Forest initiatives. However, enhancing tree cover would require extensive off site planting mitigating the losses that would occur along the route alignment. This would be undertaken in close consultation with TMBC and the Mersey Forest Team.

8.8 References

Ref. 8-1 Department for Communities and Local Government (DCLG) (2012). 'The National Planning Policy Framework (NPPF)'. DCLG, London.

Ref. 8-2 Trafford Metropolitan Borough Council (2012). 'Core Strategy Development Plan Document'. TMBC, Trafford.

Ref. 8-3 Trafford Metropolitan Borough Council (2014). 'Land Allocations – Consultation Draft'. TMBC, Trafford.

Ref. 8-4 Trafford Metropolitan Borough Council (2014). 'Land Allocations – Consultation Draft, Topic Paper Chapters'. TMBC, Trafford.

Ref. 8-5 Landscape Institute and Institute of Environmental Management & Assessment (2013). 'Guidelines for Landscape and visual Impact Assessment'. Routledge.

Ref. 8-6 Ordnance Survey. (2014). Sheet 277, Manchester & Salford. 1:25,000. OS Explorer map. Ordnance Survey.

Ref. 8-7 Natural England (2013). 'National Character Area Profile 55: Manchester Conurbation'.

Transport for Greater Manchester

Chapter 9:

Ecology and Nature Conservation

9 ECOLOGY AND NATURE CONSERVATION

9.1 Introduction

9.1.1 This chapter of the Environmental Statement (ES) reports the findings of an assessment of the potential ecological and nature conservation effects as a result of the construction and operation of the proposed Metrolink Trafford Park Line in Trafford, Greater Manchester.

9.1.2 This chapter is supported by Technical Appendices D1 – D5 (provided in ES Volume II) and Figures 9.1 and 9.2 (provided in ES Volume III).

9.2 Legislation and Planning Policy Context

Legislative Background

9.2.1 The following legislation relates to species and habitats that could potentially occur within the vicinity of the Metrolink Trafford Park Line:

- Conservation of Habitats and Species Regulations 2010 (as amended) (Ref. 9-1);
- Wildlife and Countryside Act 1981 (as amended) (Ref. 9-2);
- Countryside and Rights of Way (CRoW) Act 2000 (Ref. 9-3);
- Natural Environment and Rural Communities (NERC) Act 2006 (Ref. 9-4); and
- Wild Mammals (Protection) Act 1996 (Ref. 9-5).

Planning Policy Context

9.2.2 This assessment has taken into account relevant legislation and guidance as set out in national and local planning policy (as summarised in the sections below). The policy requirements of relevance to ecology and nature conservation have informed the preparation of this chapter.

National Planning Policy Framework

9.2.3 In March 2012 the UK Government published the National Planning Policy Framework (NPPF) (Ref. 9-6), which guides local planning authorities in developing their planning policies and when to consider planning applications affecting protected habitats, sites and species.

9.2.4 In respect of the natural environment, the NPPF states that:

"….the planning system should contribute to and enhance the natural and local environment by:

- *protecting and enhancing valued landscape, geological conservation interests and soils;*
- *recognising the wider benefits of ecosystems services;*
- *minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures…."*

Local Planning Policy

9.2.5 Relevant local planning policy comprises the Trafford Core Strategy Local Plan, adopted in January 2012 (Ref. 9-7). The policies which are most relevant to this ecological and nature conservation impact assessment are:

Policy R2: Natural Environment

"To ensure the protection and enhancement of the natural environment of the Borough, developers will be required to demonstrate through a supporting statement how their proposal will:

- *Protect and enhance the landscape character, biodiversity, geodiversity and conservation value of its natural urban and countryside assets having regard not only to its immediate location but its surroundings; and*
- *Protect the natural environment throughout the construction process."*

Policy R3: Green Infrastructure

"The Council working with local communities, developers and partners, will develop an integrated network of high quality and multi-functional green infrastructure……"

Other Relevant Policy, Standards and Guidance

9.2.6 Through national planning policy and Section 40 of the NERC Act 2006 (Ref. 9-4), local planning authorities have a duty to consider habitats and species listed as being of principal importance for nature conservation in England (Section 41 (S41) of the Act) when considering a planning application.

9.2.7 In addition, the biodiversity duty of local planning authorities also covers species and habitats listed in local biodiversity action plans. The Greater Manchester

Biodiversity Action Plan (Ref. 9-8) lists habitats and species that are rare or threatened in the region and for which action plans have been prepared. The following Species Action Plans (SAPs) and Habitat Action Plans (HAPs) are considered potentially relevant due to the habitat context as associated with the Metrolink Trafford Park Line:

- SAPs – water vole (*Arvicola terrestris*), black redstart (*Phoenicurus ochruros*), native black poplar (*Populus nigra var ssp. betulifolia*), and bats; and
- HAPs – canals and urban managed greenspace.

9.3 Assessment Methodology and Effect Significance Criteria

9.3.1 This section presents the following:

- Identification of the information sources that have been consulted to prepare this ecology and nature conservation impact assessment chapter;
- A summary of the terminology used in the Chartered Institute of Ecology and Environmental Management (CIEEM) significance criteria and how those relate to terminology adopted in the wider ES;
- Details of impact assessment guidance used to define the methodology applied;
- Details of the consultation activities undertaken with respect to ecology; and
- Baseline surveys undertaken.

Methods for Determining Baseline Conditions and Sensitive Receptors

Desk Study

9.3.2 A search on the Multi Agency Geographic Information for the Countryside (MAGIC) (Ref. 9-9) for statutory designated sites (internationally and nationally important sites for ecology) and S41 habitats of principal importance within 2 kilometres (km) of the Metrolink Trafford Park Line was undertaken in May 2014.

9.3.3 The Greater Manchester Ecology Unit (GMEU) was contacted in May 2014 for information on non-statutory designated sites (important locally) and protected and/ or notable species within 2 km of the Metrolink Trafford Park Line.

9.3.4 The GMEU do not hold comprehensive records for birds and therefore the Greater Manchester Bird Recording Group was also contacted in May 2014.

9.3.5 In July 2014, the Environment Agency was contacted to obtain records of water vole, otter (*Lutra lutra*) and American mink (*Neovison vison*) within a 2 km search radius from the boundary of the Metrolink Trafford Park Line.

9.3.6 Habitats and other notable species listed in the Greater Manchester Biodiversity Action Plan were also considered.

Field Surveys

9.3.7 An Extended Phase 1 Habitat Survey of the Metrolink Trafford Park Line route was undertaken in July 2013 to inform the Environmental Impact Assessment (EIA) Scoping process. An Extended Phase 1 Habitat Survey Report was prepared and submitted as an appendix to the EIA Scoping Report (this report has been included in Technical Appendix D1, ES Volume II). During the survey, habitat types were recorded in accordance with published guidelines for Phase 1 Habitat Survey (Ref. 9-10) and the potential for protected and/ or notable species to occur, based on habitats present within and immediately adjacent to the survey area, was noted. Habitats and other notable species listed in the Greater Manchester Biodiversity Action Plan and invasive non-native plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) (Ref. 9-2) were also recorded.

9.3.8 Further design information for the Metrolink Trafford Park Line route and the potential construction footprint of the proposed scheme became available as the proposed design evolved between May 2014 and September 2014. The revisions to the design slightly increased the potential area of influence of the Metrolink Trafford Park Line (the combined construction and operational footprints) from that considered in the 2013 Extended Phase 1 Habitat Survey. It was therefore deemed necessary to revise the Study Area and undertake an Extended Phase 1 Habitat Survey for those areas that had not previously been surveyed. The additional areas were surveyed in May, June and September 2014 using the methods detailed in Section 9.3.7. The survey results obtained for the additional areas are detailed in the relevant section below.

9.3.9 The combined results of the 2013 and 2014 Extended Phase 1 Habitat Surveys and the revised Study Area are shown on Figure 9.2 (ES Volume III).

9.3.10 It should be noted that within the 2013 Extended Phase 1 Habitat Survey Report an area to the west of the intu Trafford Centre and north of the Bridgewater Circle was mapped using aerial photographs. This area has been removed from the revised Study Area as it no longer forms part of the proposed scheme footprint.

9.3.11 The following ecological surveys were also undertaken to support this impact assessment:

- An otter and water vole appraisal (refer to Technical Appendix D2, ES Volume II);
- A bat roost potential appraisal (refer to Technical Appendix D3, ES Volume II);
- A walkover survey to record Schedule 9 plant species (refer to Technical Appendix D4, ES Volume II); and
- Follow up detailed bat surveys for structures along the Metrolink Trafford Park Line identified as having bat roost potential (including external and internal inspections, dusk emergence and dawn re-entry surveys) (refer to Technical Appendix D5, ES Volume II).

9.3.12 A summary of the survey methods used is provided in Sections 9.3.14 to 9.3.20, whilst details are provided in the relevant survey reports (see Appendices D2 – D5, ES Volume II).

9.3.13 The Study Area for these surveys was determined as the potential area of influence of the Metrolink Trafford Park Line (based on the indicative scheme drawings and potential construction footprint provided by Transport for Greater Manchester). Appropriate Survey Areas were determined for each survey using the Study Area boundary as a reference.

Otter and Water Vole Appraisal

9.3.14 The survey and assessment was undertaken on 16th June 2014 and 22nd September 2014 by suitably qualified ecologists (full membership of CIEEM). Sections of the Manchester Ship Canal and Bridgewater Canal within and immediately adjacent to the Study Area were assessed for water vole and otter suitability.

Bat Surveys

9.3.15 All buildings, trees and structures within the Study Area were assessed for their bat roost potential on 2nd, 3rd, and 4th June 2014 and 22nd September 2014 (see Technical Appendix D3, ES Volume II).

9.3.16 Several structures within the Study Area were identified as having potential to support roosting bats. These structures were subject to more detailed follow up survey work (see Technical Appendix D5, ES Volume II) comprising:

- A detailed external survey, using a thermal imaging camera, of the Trafford Road Bridge undertaken in August 2014; and

- Dusk emergence surveys and dawn re-entry surveys of Samuel Platts Public House undertaken in July 2014.

9.3.17 In addition, two bat activity transects, concentrated along the Manchester Ship Canal and Bridgewater Canal, were undertaken in July and August 2014.

9.3.18 All bat surveys were undertaken in accordance with standard guidance for bat surveys (Ref. 9-11) and were undertaken by a URS ecologist who holds a Natural England class licence to take and disturb bat species (Licence Number CLS01204) assisted by suitably qualified ecologists when required.

Schedule 9 Plant Species Survey

9.3.19 A walkover of the Study Area plus a radius of up to 7 metres (m) from the Study Area boundary was undertaken on 3rd and 5th June 2014 and 22nd September 2014 to identify the presence of Schedule 9 plant species.

9.3.20 Where invasive species were identified, photographs were taken and the visible dimensions (including footprint and height) of identified species were recorded.

Assessment Methodology

9.3.21 The ecological and nature conservation impact assessment methodology is based on the CIEEM Guidelines for Ecological Impact Assessment (Ref. 9-12). The approach to the assessment is as follows:

- Habitats and species that might be affected by the Metrolink Trafford Park Line have been considered and baseline conditions (both those likely to be present at the time when works begin, and for the sake of comparison, those predicted to be present at a particular time in the future) defined through a combination of desk-based study and field survey work;
- The importance of each habitat and species (that is both present and could be affected by the development) has been evaluated to place their relative biodiversity/ nature conservation value, social/ community value and economic value into context. The ecology of the habitats and species present have also been considered;
- The changes or perturbations predicted to result as a consequence of the Metrolink Trafford Park Line (i.e. impacts), that could potentially affect habitats or species, have been identified and their nature described. Established best-practice, legislative requirements or other incorporated design measures to minimise or avoid impacts are described and have been taken into account;

- The likely effects (beneficial or adverse) of these impacts on species and their habitats have then been assessed, and where possible quantified. These have been compared against the level at which such effects are determined to be significant or not;
- Measures to avoid or reduce any significant effects, if possible, have then been developed in conjunction with other elements of the design (including mitigation for other environmental disciplines). If necessary, measures to compensate for effects on features of nature conservation importance have also been included;
- The residual ecological effects of the Metrolink Trafford Park Line have been defined; and
- The scope for any enhancement measures has been considered.

Sensitivity/ Importance of the Receptor

9.3.22 In accordance with CIEEM methodology, a geographic scale of importance has been used, ranging from international to site level. Section 9.4 identifies environmentally sensitive receptors (i.e. features of the baseline) that have potential to be affected by the Metrolink Trafford Park Line.

Determining Value of Ecological Features

9.3.23 In order to objectively assess impacts arising from a particular development/ activity, it is essential to establish the nature conservation value of each ecological feature/ receptor likely to be affected by the proposals, both within and adjacent to the development/ activity area.

9.3.24 The importance of each ecological feature identified through consultation and survey has been evaluated according to its importance in a geographical context, each falling into one (or more) of the following categories:

- International (in this case within the EU, unless stated otherwise);
- National (within England);
- Regional (North West England);
- County/District (Greater Manchester);
- Local (Trafford);
- Site (within the area of influence of the Metrolink Trafford Park Line (the Study Area));
- Of negligible importance.

Significance of Effect

9.3.25 The matrix as provided in Table 2.3 (Chapter 2: EIA Assessment Methods) has been applied to assign effect significance, taking into account the magnitude of the predicted impact (negligible, low, medium or high) and the receptor sensitivity (as detailed above).

9.3.26 It should be noted that the terms introduced in Table 2.3 for effect significance criteria differ to the CIEEM criteria. Where a major effect is considered herein, this refers to a significant effect at a regional, national or international level (in accordance with the CIEEM guidance). Ecological effects can be either adverse or beneficial. Table 9.1 provides a comparison of relevant comparable terms as applied in this ES with the CIEEM guidelines.

Table 9.1 Relevant Comparable Terms Used in this ES and Comparison with CIEEM Guidelines

Effect Significance		Equivalent CIEEM Assessment
Significant	Major Beneficial	Significant Positive Impact on ecological integrity or conservation status at Regional, National or International level.
	Moderate Beneficial	Significant Positive Impact on ecological integrity or conservation status at District – County level.
Non-significant	Minor Beneficial	Significant Positive Impact on ecological integrity or conservation status at Site – Local level.
Neutral	Negligible	No significant Impact on ecological integrity or conservation status
Non-significant	Minor Adverse	Significant Adverse Impact on ecological integrity or conservation status at Site – Local level.
Significant	Moderate Adverse	Significant Adverse Impact on ecological integrity or conservation status at District – County level.
	Major Adverse	Significant Adverse Impact on ecological integrity or conservation status at Regional, National or International level.

Consultation

9.3.27 As detailed in the sections above, a range of organisations were contacted in order to obtain relevant baseline ecological data.

9.3.28 An EIA Scoping Report was issued to the Secretary of State (SoS) for Transport (14th May 2014). A consultation response to the EIA Scoping Report was received

from Natural England on 2nd June 2014 (included in Technical Appendix A2, ES Volume II).

9.3.29 The South Lancashire Bat Group was also consulted in July 2014. They did not have any specific observations about the Metrolink Trafford Park Line and its potential effects on the bat populations (response included within Technical Appendix A3, ES Volume II).

Assumptions and Limitations

9.3.30 Information obtained during the course of the desk study, which contributed to the definition of baseline ecological conditions, is dependent upon people and organisations having made and submitted ecological records for the area of interest. As such, a lack of records for a particular protected species does not automatically mean that such species do not occur in the Study Area. Likewise, the presence of records for protected species does not automatically mean that these species still occur within the Study Area or are relevant. However, a desk study does help characterise the baseline context of a scheme and can provide valuable background information that would not be captured by a site visit alone.

9.4 Baseline Description

Study Area

9.4.1 The defined Study Area includes all ecological receptors which have the potential to be directly or indirectly affected by the Metrolink Trafford Park Line. Direct impacts would be restricted to the area within the Metrolink Trafford Park Line construction and operational footprint.

9.4.2 Potential indirect impacts on statutory and non-statutory designated sites within 2 km of the Metrolink Trafford Park Line have also been assessed (refer to Figure 9.1, ES Volume III).

Statutory and Non-Statutory Designated Sites

9.4.3 The Trafford Ecology Park Local Nature Reserve (LNR) is located approximately 500 m to the north of the Metrolink Trafford Park Line. The LNR comprises wetland, woodland and grassland. This LNR is of National Importance.

9.4.4 There are four non-statutory designated sites within 2 km of the Metrolink Trafford Park Line as follows (of County Importance):

- **Bridgewater Canal Site of Biological Interest (SBI)** intersects and is adjacent to the Metrolink Trafford Park Line in several places. The SBI supports diverse aquatic and bankside vegetation;

- **Trafford Ecology Park SBI** is located approximately 500 m to the north of the Metrolink Trafford Park Line. Habitats within the SBI include ponds, a small lake, woodland and neutral grassland. In addition, the SBI provides important habitat for birds and supports great crested newt (*Triturus cristatus);*
- **Salford Quays (North) SBI** is located approximately 75 m to the north-east of the Metrolink Trafford Park Line. A section of the Manchester Ship Canal is used by wintering wildfowl; and
- **Salford Quays (South) SBI** is located approximately 120 m to the north-east of the Metrolink Trafford Park Line. A section of the Manchester Ship Canal is used by wintering wildfowl.

S41 Principal Habitats

9.4.5 An area of deciduous woodland (S41 habitat of principal importance) is located within the boundary of the Metrolink Trafford Park Line adjacent to the Bridgewater Canal (Ref. 9-4) (Identified using the MAGIC website). There is another strip of deciduous woodland located in the east of the Metrolink Trafford Park Line close to the existing Metrolink Pomona stop and adjacent to the Manchester Ship Canal.

Protected and/ or Notable Species

9.4.6 Records received from GMEU identified the following relevant protected and/ or notable species records (i.e. based on habitats present within and immediately adjacent to the Metrolink Trafford Park Line) within the Study Area (results are also included within Technical Appendix D1, ES Volume II):

- Signs of badger (*Meles meles*) activity have been recorded approximately 350 m to the west of the Study Area;
- Records of great crested newt located approximately 500 m to the north of the Metrolink Trafford Park Line within the Trafford Ecology Park LNR and records located approximately 1.5 km to the south;
- Records of water vole located approximately 1.2 km to the west of the of the Study Area;
- Records of the following bat species: brown long-eared (*Plecotus auritus*), common pipistrelle (*Pipistrellus pipistrellus*), Daubenton's (*Myotis daubentonii*), *Myotis sp*., pipistrelle sp. (*Pipistrellus sp*.) and soprano pipistrelle (*Pipistrellus pygmaeus*). A number of bat roost records were also

identified, the closest being a pipistrelle roost located approximately 150 m north-east of the Study Area; and

- The following S41 species were identified: bullfinch (*Pyrrhula pyrrhula*), house sparrow (*Passer domesticus*), dunnock (*Prunella modularis*) starling (*Sturnus vulgaris*) and a species of bryophyte, (*Tortula freibergii)* which is located adjacent to the Metrolink Trafford Park Line.

9.4.7 GMEU notes that their records are not comprehensive and a negative result does not indicate that protected and/ or notable species are absent from the search area.

9.4.8 The Environment Agency hold records of otter on the Irwell catchment (Manchester Ship Canal), but none within the Study Area. There are also records of American mink within the lower reaches of the River Irwell.

9.4.9 Records returned from the Greater Manchester Bird Recording Group are summarised in Table 9.2.

Table 9.2 Greater Manchester Bird Recording Group

Species	Conservation Status
Black redstart (*Phoenicurus ochruros*)	Schedule 1
Brambling (*Fringilla montifringilla*)	Schedule 1
Fieldfare (*Turdus pilaris*)	Schedule 1, Red List
Kingfisher (*Alcedo atthis*)	Schedule 1,
Peregrine (*Falco peregrinus*)	Schedule 1
Redwing (*Turdus iliacus*)	Schedule 1, Red List
Bullfinch (*Pyrrhula pyrrhula*)	Red List, S41
Dunnock (*Prunella modularis*)	S41
House sparrow (*Passer domesticus*)	S41, Red Listed
Lesser redpoll (*Carduelis cabaret*)	S41, Red Listed
Linnet (*Carduelis cannabina*)	S41, Red Listed
Song thrush (*Turdus philomelos*)	S41, Red Listed
Starling (*Sturnus vulgaris*)	S41, Red Listed
Yellow wagtail (*Motacilla flava flavissima*)	S41, Red Listed

Habitats

9.4.10 A detailed description of the findings of the 2013 Extended Phase 1 Habitat Survey is given in Technical Appendix D1 (ES Volume II). A summary is provided below along with the findings of the additional Phase 1 Habitat Survey undertaken in 2014. The combined survey results are illustrated in Figure 9.2 (ES Volume III). Habitat types are described and evaluated below for their nature conservation value, in the context of the broader landscape.

9.4.11 Overall the Metrolink Trafford Park Line is located within a built urban environment with small areas of semi-natural habitat largely associated with the Bridgewater Canal (also a non-statutory designated site for nature conservation as described above) and the Manchester Ship Canal.

Introduced Scrub

9.4.12 Scattered throughout the site are areas of introduced scrub including butterfly-bush (*Buddleja davidii*), cotoneaster (*Cotoneaster sp*.), laurel (*Laurel sp*.), hebe (*Hebe sp*.) and cherry (*Prunus sp*.). The introduced scrub within the Study Area is of negligible conservation value.

9.4.13 The following Schedule 9 species have been identified within the Study Area: Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*), Japanese rose (*Rosa regusa*), and small-leaved cotoneaster (*Cotoneaster microphyllus*). The latter two species were associated with ornamental planting in landscaped areas.

Amenity Grassland

9.4.14 Amenity grassland is a common habitat within the Study Area, particularly associated with the roundabouts and roadside verges. The amenity grassland within the Study Area is of negligible conservation value.

Semi-Improved Grassland

9.4.15 There is a small strip of semi-improved grassland located along Westinghouse Road. Semi-improved grassland within the Study Area is of negligible conservation value.

Tall Ruderals

9.4.16 There are several patches of tall ruderal habitat scattered within the Study Area, particularly associated with the roadside verges – this includes the species common ragwort (*Senecio jacobaea*), mugwort (*Artemisia vulgaris*), colt's foot (*Tussilago farfara*), common nettle (*Urtica dioica*), common hogweed

(*Heracleum sphondylium*) and broad-leaved dock (*Rumex obtusifolius*). The tall ruderal habitat within the Study Area is of negligible conservation value.

Dense Scrub

9.4.17 There are areas of dense scrub within the Study Area, particularly associated with the Parkway Circle and road side verges/ areas. Species identified were bramble (*Rubus fruticosus*), elder (*Sambucus nigra*), hawthorn (*Crataegus monogyna*) and rose (*Rosa sp*.). The dense scrub within the Study Area is of negligible conservation value.

Broad-leaved Woodland

9.4.18 There is a strip of plantation broad-leaved woodland adjacent to the Bridgewater Canal which contains sycamore (*Acer pseudoplatanus*), alder (*Alnus glutinosa*) and oak (*Quercus sp*.). The strip lies between Park Way and industrial buildings and acts as a screen to the road. Although this woodland has been identified as being a S41 habitat of principal importance (identified on the MAGIC website); this woodland is considered to be of conservation value at a Site level only. This is due to the small size of the strip, lack of connectivity with other habitat of ecological value, lack of species present and poor ground flora.

9.4.19 A second area of broad-leaved woodland lies adjacent to the Manchester Ship Canal to the west of the existing Metrolink Pomona stop. This area of woodland is also considered to be of conservation value at a Site level only. This is because extensive stands of Japanese knotweed are present, the ground flora is poor and the woodland is not long established. In 2013 this area was mapped as dense scrub, following the update survey in 2014 this area was re-assessed and is now mapped as broad-leaved woodland.

Scattered Trees

9.4.20 Scattered trees are common along the Metrolink Trafford Park Line, largely associated within the amenity grassland – species include London plane (*Platanus acerfolia*), black poplar (*Populus nigra*), white poplar (*Populus alba*), sycamore and birch (*Betula sp*.). The scattered trees along the Metrolink Trafford Park Line are of conservation value at a Site Level. Native black poplar has been evaluated within the section below.

Watercourses

9.4.21 The Metrolink Trafford Park Line crosses the Bridgewater Canal on Park Way and the Study Area abuts the Manchester Ship Canal between the existing Pomona stop and the Data Centre on Trafford Wharf Road. Canals are habitats of principal importance (S41) and listed within the Greater Manchester Local

Biodiversity Action Plan. In addition, the Bridgewater and Manchester Ship Canals are also identified as wildlife corridors in Trafford Metropolitan Borough Council's adopted Core Strategy (Ref. 9-7). These canals are of conservation value at a Local level.

Buildings, Hard-standing and Structures

9.4.22 Adjacent to the Metrolink Trafford Park Line are large areas of hard-standing and numerous buildings, many of which are industrial warehouses with corrugated iron roofs and steel clad walls. There are also some brick built structures and bridges over the canals. The buildings, hard-standing and structures within the Study Area are of negligible conservation value.

Protected and Notable Species

9.4.23 The potential for protected/ notable species to be present within the Study Area was identified through the consideration of desk study records, as well as an assessment of the suitability of identified habitats to support such species, as detailed in the paragraphs above. The potential presence for the following protected/ notable species has been identified: water vole, bats, breeding birds, hedgehogs (*Erinaceus europaeus*) and otter. The value of the Study Area for these species is evaluated below.

Bats

9.4.24 The majority of the structures within the Study Area were found to have negligible bat roosting potential. Seven structures within the Study Area were identified as having bat roost potential (see Technical Appendix D3, ES Volume II).

9.4.25 Follow up surveys were recommended for three of the structures assessed as having either 'low' or 'low to moderate' bat roost potential. The remaining four structures were identified as having 'low to negligible' bat roost potential and no follow up survey work was recommended. At the time of the follow up surveys, no bats or evidence of roosting bats was found (see Technical Appendix D5, ES Volume II).

9.4.26 Although roosting bats is unlikely within the seven structures identified as having bat roost potential, demolition or works to these structures should only be undertaken following a conservation method statement, as detailed within Section 9.6.

9.4.27 A low level of foraging activity was recorded during the transect surveys and only one species of bat, common pipistrelle, was recorded during the surveys (see Technical Appendix D5, ES Volume II). The majority of habitats within the Study

Area are of limited value to foraging bats (hard-standing and buildings). The Study Area is considered to be of negligible conservation value for foraging bats.

Breeding Birds

9.4.28 The desk study returned records of specially protected (Schedule 1 of Wildlife and Countryside Act) and NERC S41 bird species within 2 km of the Metrolink Trafford Park Line.

9.4.29 Woodland, dense scrub, trees, introduced shrub, buildings and waterways have the potential to support breeding birds. Common species such as black bird (*Turdus merula*), blue tit (*Cyanistes caeruleus*), great tit (*Parus major*), chaffinch (*Fringilla coelebs*), magpie (*Pica pica*) and wood pigeon (*Columba palumbus*) were noted within the Study Area, particularly around areas of dense scrub and woodland. These habitats within the Study Area are therefore considered to be of potential value for breeding birds at a Site level.

9.4.30 A single record of black redstart was identified within 2 km of the Metrolink Trafford Park Line; this record was not within the Study Area boundary. In addition, records of peregrine falcon (*Falco peregrinus*) were also identified within 2 km of the Metrolink Trafford Park Line. No habitats that could support breeding peregrine or black redstart were identified within the Study Area.

9.4.31 Wading birds were noted around the south wharf of the Manchester Ship Canal, including grey heron (*Ardea cinerea*), mallard (*Anas platyrhynchos*) and other waterfowl species.

9.4.32 The Salford Quays (North) and (South) SBIs are important for their wintering wildfowl. The Metrolink Trafford Park Line would not directly result in any adverse impacts to these SBIs. In addition, there are no habitats present within the Study Area which are suitable to support wintering birds. The Study Area is therefore considered to be of negligible conservation value for wintering birds and thus they are not considered further in this chapter.

Hedgehog

9.4.33 No records of hedgehog were returned from GMEU. The dense scrub, amenity grassland and woodland provide potential nesting and foraging habitat for hedgehog. Hedgehogs are a S41 species of principal importance. The habitats within the Study Area are characteristic of the surrounding landscape and as such it is considered to be of value for hedgehog at a Site level.

Otter and Water Vole

9.4.34 There are no records of water vole within the Study Area. The closest record of water vole is approximately 1.2 km from the Study Area.

9.4.35 Otter is recorded as being present within the Irwell catchment (Manchester Ship Canal) but no records were returned for the Study Area.

9.4.36 The sections of the Bridgewater Canal and Manchester Ship Canal within the Study Area were assessed for their suitability to support water vole and otter (for full details refer to Technical Appendix D2, ES Volume II).

9.4.37 Both canals were considered to be unlikely to support water vole. As water vole was found to be absent within the Study Area, it is considered to be of negligible conservation value for water vole and as such this species is not considered further within this assessment.

9.4.38 In addition, no suitable resting or breeding sites for otter were identified, although the canals may provide habitat for commuting otter. The sections of canals within the Study Area are relatively urban and are therefore considered to be of conservation value at a Site level.

Black Poplars

9.4.39 There are three native black poplar trees located in an area of semi-natural plantation woodland at the Village Circle roundabout. Native black poplar is included within the Greater Manchester Local Biodiversity Action Plan. The native black poplars located within the Study Area are considered to be of conservation value at a Local level.

Schedule 9 Plant Species

9.4.40 The following Schedule 9 plant species have been identified within the Study Area: Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*), Japanese rose (*Rosa rugosa*), Virginia creeper (*Parthenocissus quinquefolia*), Small-leaved cotoneaster (*Cotoneaster integrifolius*). These species are mapped within Technical Appendix D4 (ES Volume II). These species are invasive non-native plant species and have therefore not been evaluated for their nature conservation value.

9.5 Mitigation and Impact Avoidance Measures

9.5.1 The selected construction contractor would be required to prepare and implement a Construction Environmental Management Plan (CEMP) and to carry out the works in accordance with Transport for Greater Manchester's Code of Construction Practice (CoCP). The contractor's CEMP would include the mitigation measures detailed within this ES. Mitigation measures which are applicable to ecological receptors are detailed below.

9.5.2 Construction works would be undertaken in a manner that aims to minimise pollution and silt runoff into any watercourses. Chapter 11: Water Resources and

Flood Risk includes details of mitigation measures that would be implemented in order to protect water resources, including adherence to relevant Environment Agency Pollution Prevention Guidelines such as PPG1 (Ref. 9-13), PPG5 (Ref. 9-14) and PPG6 (Ref. 9-15).

9.5.3 In addition to the above, Chapter 6: Noise and Vibration provides details of the measures to be implemented to minimise noise levels, whilst as indicated in Chapter 7: Air Quality, standard best practice measures would be implemented to minimise the generation of dust.

9.5.4 The CEMP should pay particular attention to where the proposed construction works would be carried out adjacent to the Manchester Ship Canal and where the Metrolink Trafford Park Line crosses the Bridgewater Canal on Park Way. Specific method statements should be developed for demolition and construction works in the vicinity of these waterways.

9.5.5 With regard to the Bridgewater Canal crossing, a detailed method statement should be prepared by the selected construction contractor and agreed with the Bridgewater Canal Trust (and the Peel Group) and the Environment Agency prior to commencement of works on the canal crossing. As part of the method statement and subsequent works, the selected construction contractor should ensure that biodiversity resources along the canal are protected. Based on consultation with the Bridgewater Canal Trust (the navigation authority for the canal), the method statement would need to include design measures such as:

- A single span crossing of the canal, towpath and offside land; and
- Minimum finished clearance of 3.60 m above the normal water level.

9.5.6 During the detailed design stage of the Metrolink Trafford Park Line, further discussions would be undertaken with both the Bridgewater Canal Trust (and the Peel Group) and the Environment Agency to establish any further requirements that may influence the design of the new canal crossing.

9.5.7 In addition to the measures highlighted above, it is recommended that the following measures be undertaken to avoid or minimise potential ecological effects:

- Construction lighting may be required notably for health and safety reasons. All such lighting should be low energy level where possible, of the minimum height required, and be positioned pointing downwards and into the construction zone to minimise light spill;

- Metrolink Trafford Park Line construction activities resulting in the loss of vegetation and buildings should be undertaken outside of the breeding bird season;
- In areas of vegetation suitable for hedgehog, vegetation clearance should be undertaken following a method statement which reduces the potential for injury or death of hedgehogs;
- A number of buildings are expected to be demolished as part of the construction works. As a precautionary measure to protect bats, it is recommended that structures are demolished sensitively under an ecological watching brief;
- Mitigation planting should take place in line with Transport for Greater Manchester's Wildlife Habitat and Tree Replacement Policy (Ref. 9-16);
- Given the rapid spread of Schedule 9 species, it is recommended that a pre-construction survey is undertaken to confirm the locations and extent of these species within the construction footprint. A Schedule 9 plant species treatment and control management plan should also be prepared and implemented.

9.6 Assessment of Impacts and Effects

Demolition and Construction Phase Effects

9.6.1 As stated in Section 9.5, the Metrolink Trafford Park Line construction activities would be undertaken in accordance with the selected construction contractor's CEMP, as well as Transport for Greater Manchester's CoCP. Such measures would assist in minimising potential adverse effects on the ecological receptors described in Section 9.4.

9.6.2 Given the specific implementation of dust control measures (refer to Chapter 7: Air Quality), the potential effects of dust on ecological receptors during the Metrolink Trafford Park Line construction phase is considered to be of negligible significance. In addition, in view of the urban character of the Metrolink Trafford Park Line and adherence to the noise control methods as detailed in Chapter 6: Noise and Vibration, the potential effect of noise and vibration disturbance on ecological receptors during the construction phase is considered being of negligible significance.

9.6.3 The Metrolink Trafford Park Line is located within an urban environment which is already subject to high light levels. With the implementation of the mitigation measures are detailed in Section 9.5, the potential effect of light disturbance on

ecological receptors during the Metrolink Trafford Park Line construction phase is considered to be of negligible significance.

9.6.4 The sections below consider the potential effects of the Metrolink Trafford Park Line construction works on baseline ecological resources as detailed in Section 9.4, focusing upon the effects associated with habitat losses.

Statutory and Non-Statutory Designated Sites

9.6.5 The Trafford Ecology Park LNR and SBI is located approximately 500 m to the north of the Metrolink Trafford Park Line. No impacts are anticipated on this LNR/ SBI due to the distance from the works area and lack of suitable habitat connectivity between the Metrolink Trafford Park Line and the LNR/ SBI. The potential for direct effects on the LNR/ SBI as a result of Metrolink Trafford Park Line construction is negligible.

9.6.6 The Metrolink Trafford Park Line would not result in any habitat loss to the Bridgewater Canal, Salford Quays (North) or (South) SBIs. With the application of standard mitigation measures for pollution control, as detailed in Section 9.5, the potential for impact upon these SBIs is assessed as being of negligible significance.

Habitats within the Metrolink Trafford Park Line

9.6.7 Construction of the Metrolink Trafford Park Line would result in the direct loss of the following habitats within the Study Area:

- Amenity grassland;
- Semi-improved grassland;
- Introduced, dense and scattered scrub;
- Buildings and hard-standing;
- Scattered trees;
- Broad-leaved woodland; and
- Tall ruderals.

9.6.8 The loss of amenity grassland, semi-improved grassland, scrub, buildings, hard-standing and tall ruderals is considered to have an ecological effect of negligible significance.

9.6.9 The loss of scattered trees within the Study Area is considered to be of significance at a Site level (the effect thus being Minor adverse significance). As indicated in Section 9.5, mitigation planting would take place following completion of the construction works – such planting would be undertaken in

line with Transport for Greater Manchester's Wildlife Habitat and Tree Replacement Policy (Ref. 9-16). With this mitigation in place, the loss of trees is assessed as being of negligible significance.

9.6.10 The loss of broadleaved woodland within the Metrolink Trafford Park Line is also considered to be of significance at a Site level (Minor adverse significance). Mitigation for loss of broadleaved woodland would be in line with Transport for Greater Manchester's Wildlife Habitat and Tree Replacement Policy (Ref. 9-16) and, where appropriate, in agreement with Trafford Metropolitan Borough Council (TMBC).

9.6.11 The Metrolink Trafford Park Line would not result in the loss of any watercourses (i.e. Manchester Ship Canal or Bridgewater Canal) and as detailed in Section 9.5 measures would be put in place to protect these canal environments. Effects associated with the construction of the Metrolink Trafford Park Line on the Manchester Ship Canal or Bridgewater Canal are considered to be of negligible significance.

Black Poplars

9.6.12 Three native black poplars located within the Village Circle roundabout would be lost as a consequence of constructing the Metrolink Trafford Park Line. Native black poplars are included within the Greater Manchester Biodiversity Action Plan and the loss of these trees is considered to be significant at a Local level (the effect thus being of Minor adverse significance).

Breeding Birds

9.6.13 Metrolink Trafford Park Line construction activities resulting in the loss of vegetation and buildings should be undertaken outside of the breeding bird season. Avoidance of the bird breeding season would result in effects of negligible significance to breeding birds. Should construction works be undertaken within the breeding bird season (March to August inclusive), then the works would have the potential to disturb or damage active bird nests. Such disturbance of active breeding bird nests within the Metrolink Trafford Park Line development footprint would be significant at a Site level (the effect thus being of Minor adverse significance). To ensure that active nests are not impacted by construction works undertaken during the breeding bird season, a suitably qualified person should check vegetation that is to be cleared prior to the works. If an active nest were to be found, it would be cordoned off (minimum 2 m buffer) until the eggs have hatched and the chicks have fledged. Provided that this approach is adhered to, effects upon breeding birds would remain to be of negligible significance.

9.6.14 Construction of the Metrolink Trafford Park Line would result in the small loss of low quality nesting habitat for some common bird species. The potential consequences of this habitat loss for breeding birds are limited given the Site level value of the Study Area for breeding birds. All of the species recorded within the Study Area are common and widespread in the UK. The loss of suitable habitat for the small breeding bird population using the Study Area would not reasonably be expected to adversely affect the integrity of the wider population of these species. The bird species currently using the Study Area would not be lost to the breeding population and are likely to disperse into other suitable habitats in the wider landscape. It is assessed that the loss of nesting habitat during the Metrolink Trafford Park Line construction phase would result in an effect of negligible significance on the local breeding bird population.

Hedgehog

9.6.15 The Metrolink Trafford Park Line would result in a very small loss of suitable foraging habitat for hedgehog (i.e. scrub and amenity grassland). Vegetation clearance associated with the Metrolink Trafford Park Line construction phase may result in disturbance to hedgehogs, should they be present. As detailed in Section 9.5, vegetation clearance within habitats suitable for hedgehog should be undertaken following a method statement, which would reduce the potential for injury or death of hedgehogs. It is assessed that the loss of foraging habitat during the Metrolink Trafford Park Line construction phase would have an effect of negligible significance on the local hedgehog population.

Bats

9.6.16 Trafford Road Bridge is considered to have low bat roost potential, whilst the Samuel Platts Public House is considered to have a low to moderate bat roost potential (refer to Technical Appendix D3, ES Volume II). However, no evidence of roosting bats was identified during the survey work (refer to Technical Appendix D5, ES Volume II). As a precautionary measure, it is recommended that these structures are demolished sensitively under a watching brief. Several other structures to be demolished have been identified as having negligible to low bat roost potential. For such buildings, it is advised that these structures are also demolished sensitively, under a conservation method statement. Although these structures have some external features suitable for bats, they are located within areas of limited foraging and connectivity to foraging areas. With the implementation of these measures, impacts to bats during the demolition phase are assessed as being of negligible significance.

9.6.17 Survey work suggests that bat foraging and commuting activity is low within the Study Area. No impacts (negligible significance) on bat foraging and commuting activity are anticipated during the construction phase.

Otter

9.6.18 Given the implementation of the mitigation measures to protect the Bridgewater Canal and the Manchester Ship Canal (as detailed in Section 9.5) construction of the Metrolink Trafford Park Line is assessed as having an effect of negligible significance upon commuting otters.

Operational Phase Effects

9.6.19 Operation of the Metrolink Trafford Park Line is not assessed as having a potential effect on nearby statutory and non-statutory sites (refer to Section 9.4). This is due to the distance and lack of habitat connectivity between the sites and the Metrolink Trafford Park Line and the appropriate design of the Metrolink Trafford Park Line's surface water drainage system (refer to Chapter 11: Water Resources and Flood Risk).

9.7 Additional Mitigation

9.7.1 To mitigate for the loss of the three black poplars located within the Village Circle roundabout, replacement native black poplars would be planted in accordance with Transport for Greater Manchester's Wildlife Habitat and Tree Replacement Policy (Ref. 9-16) and in agreement with TMBC. With this mitigation in place, this impact is assessed as being of negligible significance. In the long term, replacement planting would potentially result in a minor beneficial impact.

9.8 Residual Effects and Conclusions

9.8.1 Table 9.3 provides a summary of the predicted residual ecological and nature conservation effects of the Metrolink Trafford Park Line.

Table 9.3 Summary of Residual Effects

Receptor	Impact	Magnitude of Impact	Mitigation	Residual Effect
Demolition and Construction Phase				
Trafford Ecology Park LNR and SBI	No potential impacts identified	N/A	N/A	N/A

Table 9.3 Summary of Residual Effects				
Receptor	**Impact**	**Magnitude of Impact**	**Mitigation**	**Residual Effect**
Salford Quays (North)	Pollution (and silt) runoff into watercourse	Adverse	Good site practices as indicated in Chapter 11: Water Resources and Flood Risk.	Negligible
Salford Quays (South)	Pollution (and silt) runoff into watercourse	Adverse	Good site practices as indicated in Chapter 11: Water Resources and Flood Risk.	Negligible
Bridgewater Canal SBI	Pollution (and silt) runoff into watercourse	Adverse	Appropriate design and construction of the proposed Bridgewater Canal crossing and good site practices as indicated in Chapter 11: Water Resources and Flood Risk.	Negligible
Amenity grassland, semi-improved grassland, scrub, buildings, hard-standing and tall ruderals	Loss of habitats	Adverse	N/A	Negligible
Scattered trees	Loss of scattered trees	Adverse	Planting in line with Transport for Greater Manchester's Wildlife Habitat and Tree Replacement Policy (Ref. 9-16).	Negligible

Table 9.3 Summary of Residual Effects				
Receptor	**Impact**	**Magnitude of Impact**	**Mitigation**	**Residual Effect**
Broadleaved woodland	Loss of woodland	Adverse	Planting in line with Transport for Greater Manchester's Wildlife Habitat and Tree Replacement Policy (Ref. 9-16) and, where appropriate, in agreement with TMBC.	Minor Adverse
Black poplar	Loss of three black poplars	Adverse	Replacement native black poplars planted in accordance with Transport for Greater Manchester's Wildlife Habitat and Tree Replacement Policy (Ref. 9-16) and in agreement with TMBC.	Negligible.
Breeding birds	Loss of habitat and disturbance to active nests	Adverse	Vegetation clearance undertaken outside of the breeding bird season. Any vegetation to be disturbed/ cleared in the breeding bird season (March – August) should be checked by an ecologist for active bird nests prior to the works.	Negligible

Table 9.3 Summary of Residual Effects				
Receptor	**Impact**	**Magnitude of Impact**	**Mitigation**	**Residual Effect**
Hedgehogs	Loss of habitat and disturbance to hedgehogs (should they be present)	Adverse	Vegetation clearance to be undertaken under a method statement to minimise potential for injury or death of hedgehogs.	Negligible
Bats	Loss of roosts and disruption to bat foraging and commuting activity	Adverse	Buildings demolished sensitively, under a conservation method statement or ecological watching brief as applicable.	Negligible
Otter	Disturbance to otter (should they be present) due to pollution (and silt) runoff into watercourses	Adverse	Good site practices as indicated in Chapter 11: Water Resources and Flood Risk.	Negligible
Operational Phase				
Statutory and Non-Statutory Designated Sites	No potential impacts identified	N/A	N/A	N/A

9.9 References

Ref. 9-1 Her Majesty's Stationery Office (HMS) (2010). 'Conservation of Habitats and Species Regulations' (as amended).

Ref. 9-2 HMSO (1981). 'Wildlife and Countryside Act' (as amended).

Ref. 9-3 HMSO (2000). 'Countryside and Rights of Way (CRoW) Act'.

Ref. 9-4 HMSO (2006). 'Natural Environment and Rural Communities (NERC) Act'.

Ref. 9-5 HMSO (1996). 'Wild Mammals (Protection) Act'.

Ref. 9-6 Department for Communities and Local Government (2012). 'National Planning Policy Framework'.

Ref. 9-7 Trafford Metropolitan Borough Council (TMBC) (2012). 'Core Strategy Development Plan Document (Adopted 2012)'. TMBC, Trafford.

Ref. 9-8 Greater Manchester Ecological Unit website: Greater Manchester Biodiversity Action Plan. Available from: http://www.gmbp.org.uk/. Accessed 10.10.14.

Ref. 9-9 Multi Agency Geographic Information for the Countryside (MAGIC) website. Available from: http://www.magic.gov.uk/. Accessed 10.10.14.

Ref. 9-10 Joint Nature Conservation Committee (JNCC) (2012). 'Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit'.

Ref. 9-11 Hundt, L (2012). 'Bat Surveys – Good Practice Guidelines'. Bat Conservation Trust.

Ref. 9-12 Chartered Institute of Ecology and Environmental Management (CIEEM) (2006). 'Guidelines for Ecological Impact Assessment.

Ref. 9-13 Environment Agency (2007b). 'Pollution Prevention Guidelines 1 – General Guide to the Prevention of Pollution'. Environment Agency, Bristol.

Ref. 9-14 Environment Agency (2007a). 'Pollution Prevention Guidelines 5 – Works and Maintenance in or Near Water'. Environment Agency, Bristol.

Ref. 9-15 Environment Agency (2007c). 'Pollution Prevention Guidelines 6 Working on Construction and Demolition Site'. Environment Agency, Bristol.

Ref. 9-16 Transport for Greater Manchester (2011). 'Wildlife Habitat and Tree Replacement Policy'. Transport for Greater Manchester, Manchester

Transport for Greater Manchester

Chapter 10:

Ground Conditions

Transport for Greater Manchester

10 GROUND CONDITIONS

10.1 Introduction

10.1.1 This chapter of the Environmental Statement (ES) identifies baseline conditions with reference to soils, geology and potential ground contamination along the route of the proposed Metrolink Trafford Park Line in Trafford, Greater Manchester. The chapter then considers the potential impacts and effects associated with ground conditions during the construction and operation of the Metrolink Trafford Park Line. The need for mitigation measures is addressed and any residual effects are identified.

10.1.2 This chapter is supported by Technical Appendices E1 to E5 (ES Volume II) and Figures 10.1, 10.2 and 10.3 (ES Volume III).

10.1.3 Chapter 11: Water Resources presents an assessment of potential impacts on surface water resources, flood risk and drainage.

10.2 Legislation and Planning Policy Context

10.2.1 Those planning policies legislations and guidance documents relevant to the Metrolink Trafford Park Line, in relation to ground conditions, are outlined within Table 10.1.

Table 10.1 Legislation, Planning Policy and Guidance Documents Summary

European Directives	Water Framework Directive (WFD) (Directive 2000/60/EC) (Ref. 10-1)	
Legislation and National Policy	National Legislation	Part 2A of the Environment Protection Act 1990 (Part 2A EPA 1990) (Ref. 10-2)
		Water Resources Act 1991 (WRA 1991) (Ref. 10-3)
		Town and Country Planning Act 1990 (TCPA 1990) (Ref. 10-4)
		The Building Act 1984 (Ref. 10-5) (as amended) The Building Regulations 2000 (Ref. 10-6)
		Environmental Damage (Prevention and Remediation) Regulations 2009 (EDR 2009) (Ref. 10-7)
		Environmental Permitting Regulations 2010 (EPR 2010) (Ref. 10-8)
		Anti-Pollution Works Regulations 1999 (APWR 1999) (Ref. 10-9)

Table 10.1 Legislation, Planning Policy and Guidance Documents Summary		
	National Planning Policy	National Planning Policy Framework (NPPF) (2012) (Ref. 10-10)
Local and Regional Policy	Trafford Metropolitan Borough Council (TMBC) Unitary Development Plan (UDP) (Ref. 10-11)	
	Local Policy: Trafford Local Development Plan (LDP) (Ref. 10-12)	
	TMBC Contaminated Land Strategy (Ref. 10-13)	
Other Relevant Policy, Standards and Guidance	Model Procedures for the Management of Land Contamination (CLR11) (Ref. 10-14)	
	Guiding Principles for Land Contamination (Environment Agency 2010) (Ref. 10-15)	
	Groundwater Protection: Principles and Practice (GP3) (Ref. 10-16)	
	A Framework for Assessing the Sustainability of Soil and Groundwater Remediation SuRF-UK 2010 (Ref. 10-17)	
	Relevant Pollution Prevention Guidelines (Environment Agency Pollution Prevention Guidance Notes)	PPG1: General Guide to the Prevention of Pollution (Ref. 10-18)
		PPG2: Above Ground Oil Storage Tanks (Ref. 10-19)
		PPG3: Use and Design of Oil Separators in Surface Water Drainage Systems (Ref. 10-20)
		PPG4: Treatment and Disposal of Sewage where no Foul Sewer is Available (Ref. 10-21)
		PPG5: Works and Maintenance in/ or Near Water (Ref. 10-22)
		PPG6: Working at Construction and Demolition Sites (Ref. 10-23)
		PPG7: Safe Storage: The Safe Operation of Refuelling Facilities (Ref. 10-24)
		PPG20: Dewatering of Underground Ducts and Chambers (Ref. 10-25)
		PPG21: Incident Response Planning (Ref. 10-26)

Table 10.1 Legislation, Planning Policy and Guidance Documents Summary		
	Construction Industry Research and Information Association (CIRIA) Guidance	Guidance C532 Control of Water Pollution from Construction Sites: Guidance for Consultants and Contractors (Ref. 10-27)
		Guidance C665 Assessing Risks Posed by Hazardous Ground Gases to Buildings (Ref. 10-28)
		Guidance C697 The SUDS Manual (Ref. 10-29)
		Guidance C692 Environmental Good Practice On Site (Third Edition) (Ref. 10-30)

10.2.2 A description of these policies, legislations and guidance documents and their relevance to the Metrolink Trafford Park Line is presented within Technical Appendix E1 (ES Volume II).

10.3 Assessment Methodology and Effect Significance Criteria

Scope of the Assessment

10.3.1 The assessment of the potential impacts of the Metrolink Trafford Park Line (during construction and operation) on ground conditions and any pre-existing contamination has been undertaken within the Study Area as shown on Figure 10.1 (ES Volume III).

10.3.2 The scope of the ground conditions assessment is as follows:

- To establish the existing baseline ground conditions in the defined Study Area, with respect to soil, groundwater and ground-gas, in order to define sensitive receptors and their associated sensitivity;
- To assess the risks of baseline ground contamination impacting on human health or the environment as a result of construction and operational activities associated with the Metrolink Trafford Park Line;
- To identify appropriate mitigation measures or remedial works required to avoid, reduce or offset significant adverse environmental effects which may occur as site preparation works or as part of the main construction phase; and
- Definition of residual effects following implementation of defined mitigation measures.

Establishing the Baseline Condition

10.3.3 The existing baseline conditions in the defined Study Area were established taking into account the known history or conditions (potential contaminant sources). The baseline information was obtained through:

- Review of available reports, publications and information and consideration of previous land uses including the study of historic site maps and anecdotal information;
- Consultation with Trafford Metropolitan Borough Council (TMBC) and the Environment Agency; and
- Observations made during a site walkover.

Available Reports and Information Sources

10.3.4 Available information pertaining to the current conditions of the geology, soils, hydrogeology and contamination along the route of the Metrolink Trafford Park Line has been obtained from the following sources of information:

- Mott MacDonald 'Geotechnical and Geo-Environmental Desk Study' (October 2013) (Ref. 10-31);
- Historical mapping of the defined Study Area;
- Environmental database report (Ref. 10-32);
- Environment Agency information and mapping (Ref. 10-33) (accessed June 2014);
- British Geological Survey (BGS) mapping available on the BGS website (Ref. 10-34) (accessed June 2014) (presented in Figure 10.2 (ES Volume III) overlain on the Metrolink Trafford Park Line route);
- BGS borehole logs available on the BGS website (Ref. 10-35) (accessed June 2014); and
- Multi-Agency Geographic Information for the Countryside (MAGIC) (Ref. 10-36).

Consultation

10.3.5 The Environment Agency and TMBC were consulted during the EIA Scoping stage (see Chapter 2: EIA Assessment Methods). In addition, a request for information relating to potentially contaminated sites along the route of the Metrolink Trafford Park Line was issued to TMBC and the Environment Agency. The purpose of the request was to identify any sites that TMBC has keen interest in

(potentially as outlined in the UDP, LDP and CLS) and any areas of concern to the Environment Agency. Table 10.2 summarises the results of these consultations.

Table 10.2 Consultation Summary

Consultee	Date	Method	Summary of Response
Mark Goucher/ Helen Telfer Environment Agency	Initial Contact: May 2014	E-mail	Advised to contact TMBC for pertinent information.
Richard Pollitt/ Rob Haslam TMBC	Initial Contact: May 2014	E-mail	No data received at the time of ES publication.

Walkover Survey

10.3.6 A walkover survey of the Metrolink Trafford Park Line was undertaken on 29 May 2014 by a suitably qualified and experienced environmental engineer. The weather conditions during the survey were dry and overcast, and therefore suitable for the work carried out. Technical Appendix E2 (ES Volume II) includes a photographic record of the site walkover.

10.3.7 The survey included inspection of visible evidence of contamination along the route of the Metrolink Trafford Park Line, such as surface staining, seepages of contaminated water, or landforms suggesting the presence of made ground or contaminated material.

10.3.8 Due to the nature of the site, not all areas were accessible on the day by foot as parts of the route are along main roads with no footpath access and other areas were located on private land.

Assessment Methodology

10.3.9 Following the definition of baseline ground conditions along the Metrolink Trafford Park Line as detailed above, the assessment methodology aims to evaluate the nature of potential impacts, and the significance of resultant effects, as associated with the proposed scheme.

10.3.10 The impact assessment methodology applied has been defined by taking into account the large body of technical guidance that has been produced in the UK for the assessment of ground conditions and water resources by the government i.e. DEFRA and its predecessor and successor departments; agencies such as the Environment Agency and Contaminated land: Applications in Real Environments

(CL:AIRE); and British Standards. In relation to the assessment methodology the following guidance documents are considered to be of most importance (refer to Section 10.2 for details):

- CLR11 (Ref. 10-14);
- Statutory Guidance to Part 2A EPA 1990 (Ref. 10-2);
- British Standard 10175 Investigation of Potentially Contaminated Sites Code of Practice (Ref. 10-37);
- CL:AIRE Definition of Waste: Development Industry Code of Practice (CL:AIRE CoP) (Ref. 10-38);
- NPPF 2012 (Ref. 10-10); and
- R&D 66 (Ref. 10-39).

10.3.11 The guidance within CLR11 (Ref. 10-14) provides for a staged and risk-based approach. In accordance with CLR 11, the impacts or risks associated with contaminated land are generally identified through the development of a conceptual site model which outlines the potential source-pathway-receptor (the Contaminant Linkage), where the following definitions apply:

- Source = source of contamination;
- Receptor = the entity that is vulnerable to harm from the source; and
- Pathway = the means by which the source can come into contact with the receptor.

10.3.12 This assessment as presented herein considers both the impacts of potential existing contaminants within the defined Study Area and the potential for it to impact on land quality (related to contamination) and receptors on and immediately adjacent to the Study Area.

Receptors and Receptor Importance and Sensitivity

10.3.13 The presence and importance/ sensitivity of receptors at risk from potential land contamination and risks to geological/ geomorphologic features has been evaluated by consideration of the following factors:

- Surrounding land uses based on mapping and site visits and consideration of the occupants of adjacent sites;
- Proposed end-use based on the nature of the proposed scheme;
- Type of construction operations that would be necessary as part of the site development;

- Surrounding sites of nature conservation importance;
- Underlying groundwater;
- Surrounding sites and/ or areas of geological importance; and
- Geology, hydrogeology and hydrology of the site and its surrounding area.

10.3.14 The importance/ sensitivity of potential receptors or geological features to ground condition impacts have been described qualitatively according to the categories in Table 10.3.

Table 10.3 Descriptive Scale for Importance/ Sensitivity of Receptors

Qualitative Description	Receptor Importance/ Sensitivity		
	Low	**Moderate**	**High**
Surrounding land uses	Industrial area	Open space or commercial area	Residential area
Construction workers	Minimal disturbance of ground	Limited earthworks	Extensive earthworks, and demolition of buildings
End users (operational workers/ visitors)	"Hard" end use (e.g. industrial, car parking)	Landscaping or open space	Residential, allotments, play areas
Ecological sites	No sites of significant ecological value	Locally designated ecological sites	Nationally or internationally designated ecological sites
Built environment	Not applicable	Buildings, including services and foundations	Nationally or internationally designated sites of historic value or other sensitivity
Geology/ geomorphology	Areas of superficial geology or geomorphologic features with no special significance	Other areas of potential mineral resources Exposed geological features of local importance or educational value	Nationally or internationally designated geological sites Regionally Important Geological Site (RIGS) Mineral reserve allocated on Local Minerals Plan
Groundwater	Non Aquifer and Secondary B Aquifer. Low quality resource. No abstraction within 1 km	Secondary A Aquifer. Abstraction point within 1 kilometre (km) Groundwater Source Protection Zone (SPZ) within 1 km of the site	Principal Aquifer. High quality resource. Abstraction point within 250 m, SPZ on Site

Identification of Potential Impacts and Impact Magnitude

10.3.15 If a contaminant hazard has been identified and potentially sensitive receptors are present, then the likely impacts can be predicted by considering the pathways by which the hazard may affect the receptors. Table 10.4 indicates the likely potential impacts that may occur as a result of the construction and operation of the Metrolink Trafford Park Line for different categories of sensitive receptor.

Table 10.4 Summary of the Most Likely Sources of Potential Land Contamination Impacts Upon Sensitive Receptors

Surrounding Land Uses	Construction Workers	End Users (operational workers/ visitors)	Sensitive Water Resources	Ecological Sites	Built Environment
Inhalation or deposition of wind-borne dust (construction)	Direct or indirect ingestion of contaminated soil (construction)	Direct or indirect ingestion of contaminated soil (operation)	Existing and/ or new pollutant pathways (construction)	Phytotoxic impacts on plants (operation)	Chemical attack of buried concrete structures (operation)
Migration of contamination in sub-surface strata (including gases) (construction)	Concentration of flammable or asphyxiating gases in confined spaces (construction)	Concentration of flammable or asphyxiating in-ground gases in enclosed spaces (operation)	Generation of liquid and/ or mobile contaminants (operation)	Toxic impacts on fauna (operation and/ or construction)	Concentration of flammable/ explosive gases in confined spaces. Permeation of water supply pipelines (operation)
-	Inhalation of contaminants during building demolition (construction)	Inhalation of harmful in-ground vapours/ dusts indoors and outdoors (operation)	-	Indirect impacts via contamination of water resources (operation and/ or construction)	-

10.3.16 The magnitude of a potential ground condition impact can be described by using the terms as defined in Table 10.5.

Table 10.5 Qualitative Terminology used to Describe the Magnitude of Potential Impacts	
Magnitude of Impact	**Examples of Typical Impacts**
Severe	Loss of exposed designated geological feature Very high risk of exposure of a sensitive receptor to potentially harmful levels of contamination via a confirmed pathway
Moderate	Quarrying of rock for imported fill, or substantial changes due to cuttings Proven contaminant – pathway – receptor pollutant linkage identified with elevated level of contamination recorded
Slight	Superficial disturbance to geology; changes in geomorphology Identified contaminant – pathway – receptor pollutant linkage identified but contamination likely to be low risk
Negligible	Changes to made ground deposits No contaminant – pathway – receptor pollutant linkage identified

Significance of Effect

10.3.17 For each of the potential impacts identified, an assessment has been made of the likely level of significance of the resulting effects. The definition of effect significance has been made by taking into account both the importance/ sensitivity of the receptor (refer to Table 10.3) and the magnitude of the predicted impact (refer to Table 10.5), using the matrix as presented in Table 10.6, in conjunction with professional judgement of the site-specific factors that may be of relevance.

Table 10.6 Matrix Used to Assess Effect Significance				
		Importance/ Sensitivity		
		High	**Moderate**	**Low**
Magnitude	**Severe**	Major	Major	Moderate
	Moderate	Major	Moderate	Minor
	Slight	Moderate	Minor	Minor
	Negligible	Negligible	Negligible	Negligible

10.3.18 Where site investigation data are available, the significance of effects is based on whether the results exceed relevant contaminant screening levels. Appropriate screening levels are selected based on the nature of the contaminant-pathway-receptor linkage and with reference to current published guidelines.

10.3.19 The definition of negligible, minor, moderate and major effect significance as detailed in Table 10.6 is subjective – a further description of these definitions is provided below:

- **Negligible:** In the case of ground condition, a negligible effect would be one which has neither a beneficial or adverse effect on specific receptors;
- **Minor:** In the case of ground conditions, a minor effect would be defined as degrees of change to the condition of soil and or groundwater that do not result in the site meeting the definition of contaminated land under Part 2A EPA 1990 (Ref. 10-1). In addition, where the site does not meet the definition of contaminated land, for groundwater resources, a slight impact on a groundwater resource of moderate quality; or a moderate impact on a groundwater resource of low quality;
- **Moderate:** In the case of ground conditions, a moderate effect would be defined as one that could result in the land meeting the definition of contaminated land under Part 2A EPA 1990. Additionally, for groundwater resources, a moderate effect can be defined as a slight impact on a groundwater resource of high quality, or a moderate reversible impact on a groundwater resource of moderate quality which would not necessarily result in the land meeting the definition of Contaminated Land under Part 2A EPA 1990;
- **Major:** In the case of ground conditions, a major effect would be defined as an identified significant effect for a specific receptor e.g. a significant effect on geology or in the case of contaminated land on, for example, human health. For groundwater resources, a major effect would occur following a severe impact on a groundwater resource of high or moderate quality, or a moderate impact upon a groundwater resource of high quality.

10.3.20 For the purposes of this assessment, negligible and minor effects are considered to be not significant, while moderate and major effects are assessed to be significant.

Mitigation Measures

10.3.21 The assessment of impacts and resultant effects takes into account the implementation of standard good site practices (see Section 10.7). Generic categories of mitigation measures are outlined in Table 10.7.

Table 10.7 Generic Categories of Mitigation

Category of Mitigation	Description of Mitigation Measure
Remedial works	Remedial work may be required to enable the proposals to proceed. The scope and nature of any remedial work is likely to be highly dependent on the results of investigations and subsequent risk assessment.
Design changes	Significant effects can be reduced by changes in design, e.g. protective measures to prevent build-up of flammable gases, or modification of layouts to ensure that sensitive end uses are sited away from likely areas of contamination. Relocation of built features away from geologically important features.
Protective measures during construction	Many of the potentially significant effects on the construction workforce can be mitigated by the use of appropriate protective equipment, such as gloves and respiratory protection, and effective dust suppression techniques.
Environmental management	Environmental management may be required to prevent construction work and future operations from giving rise to land contamination.

10.3.22 If potentially significant effects are identified following the implementation of standard good site practices, additional measures are proposed to further mitigate them.

10.3.23 Re-assessing the level of effect following the implementation of a suitable mitigation strategy allows the scheme's residual effects to be determined.

Assumptions and Limitations

10.3.24 The information within this assessment is based on the conditions as identified by the information sources reviewed and the information available at the time of writing. As such, the data presented, conclusions and recommendations are accordingly factually limited by these circumstances.

10.3.25 The information contained in this chapter is based upon information provided by others and assumes that all relevant information requested has been provided

and that such information is accurate. Information obtained by URS has not been independently verified by URS, unless otherwise stated.

10.3.26 Issues associated with asbestos within buildings to be demolished does not form part of this assessment – procedures for the management of asbestos in buildings to be demolished would be managed by the selected construction contractor in accordance with applicable legislation.

10.4 Baseline Conditions

Study Area

10.4.1 In order to assess the potential impacts and effects upon the environment and to human health with regards to ground conditions and potential contaminated land, a Study Area has been defined which incorporates the scheme construction footprint plus a 50 metre (m) (unless otherwise stated) surrounding buffer to address potential contamination issues arising from off-site sources (referred to where appropriate as 'off-site'). Figure 10.1 (ES Volume III) illustrates the defined Study Area which has been split into 11 separate sections.

10.4.2 The potential impact on, or of, the underlying geology and geological sites is considered for an area up to 1 km from the defined Study Area.

Previous and Existing Land Uses

10.4.3 Existing and previous land uses within the defined Study Area which have the potential to cause ground contamination have been identified through a combination of a review of historical Ordnance Survey maps (as available within the Environmental Database Report (Ref. 10-32)) identified in paragraph 10.3.4 and a site walkover survey. Technical Appendix E3 (ES Volume II) provides a detailed description of the land uses along the Metrolink Trafford Park Line as detailed in historic maps from 1850, 1889, 1908, 1922, 1954, 1968, 1980, 1990, 1992, 2006 and 2013.

10.4.4 The site walkover survey was undertaken on 29th May 2014. A photographic record of the walkover is presented within Technical Appendix E2 (ES Volume II), whilst Technical Appendix E4 presents an overview of any relevant land use features/ changes observed during the site walkover as compared to the land uses illustrated by the historic mapping.

10.4.5 Based upon the review of historic maps and the walkover survey, Table 10.8 below and Figure 10.3 (ES Volume III) indicate existing and historical land uses that have the potential to cause ground contamination along the Metrolink Trafford Park Line route.

Table 10.8 Potentially Contaminating Historic Land Uses		
Section/ Study Area	**Historic/ Existing Land Use within Study Area**	**Date**
Section 2 The area along the bank of the Manchester Ship Canal	A large warehouse building associated with a timber yard with many rail sidings	c.1908 - c.1968
Section 2 The area along the bank of the Manchester Ship Canal near to Trafford Road Bridge	Samuel Platt's public house	c.1992 - Present
Section 3 The area including and to the north of the proposed Imperial War Museum stop (to the west of the Quay West building) Area to the immediate west of the proposed stop was formerly an oil works/ mill	Depot with approximately 15 large tanks on site and an electrical substation Potentially associated with Trafford Oil Works / Mill to its immediate west	c.1983 - c.1989
Section 3 Area where the Section crosses from the bank of the Manchester Ship Canal to Trafford Wharf Road	Large factory building	c.1991 - Present
Section 4 & 5 The majority of Warren Bruce Road was within the warehouse structure. The garage and rail lines were at the Trafford Wharf Road junction end of the warehouse	Large warehouse/ industrial building with rail lines into the structure and a garage incorporated into the building	c.1908 - c.2006
Section 5 Village Circle roundabout area Working men's club on the site of the roundabout in the line of the proposed tramline	Various historical engineering works and warehouses including a working men's club	c.1932 - Present
Section 3 & 5 Wharfside Way	Tank and depots (Formerly Works and Depots dated back to c.1909)	c.1989 - Present

Table 10.8 Potentially Contaminating Historic Land Uses		
Section/ Study Area	**Historic/ Existing Land Use within Study Area**	**Date**
Section 5 Junction of Wharfside Way and Warren Bruce Road - Which is present within the Study Area at the time of writing.	Warren Bruce Court office development	c.2013 - Present
Section 6 North of Village Road/ Ashburton Road East	Scrapyard (Formerly warehouse and engineering works C.1930, A warehouse remained onsite to 2013)	c.1989 - Present
Section 6 North of Village Road/ Ashburton Road East	Pisces Industrial Estate (Formerly wire works C.1929, timber yard c.1986)	c.2006 - Present
Section 7 Parkway Circle	Historic mound potentially associated with the former steel works to the north-west. The mound included an overhead cable line to the centre of the roundabout from the steel works	c.1929 - c.1979
Section 7 South of Parkway Circle within proposed park and ride site	Warehouse with storage tanks	c.1979 - Present
Section 7 North east of Parkway Circle	Number of depots and industrial/ commercial buildings(A number of which date back to the late 1960s)	c.1969 - Present
Section 8 Southern side of Westinghouse Road	Area formerly occupied by buildings associated with a dye factory	c.1929 - c.1992
Section 11 The majority of the roads to the north of Barton Dock Road within the Study Area pass through a current industrial estate. The current roads pass through the former industrial buildings footprints	Formerly an area of large engineering works for the agriculture and textile industries	c.1954 - c.2013
Section 3, 5, 6 and 7	A number of electrical substations are noted within the Study Area	c.1954 - Present

Section/ Study Area	Historic Land Use in Areas Adjacent to the Study Area	
Section 1	Historic wharf noted to the east of the proposed Pomona stop. The historic mapping is unclear as to the nature of the wharf. A wharf can potentially be a storage yard, but could be inlet from the Bridgewater Canal	c.1889 - c.1922
Section 2 The area along the bank of the Manchester Ship Canal	Five large linked tanks potentially associated with the works to the south	c.1955 - c.1989
Section 2, 3, 5, 6, 7, 8, 10 and 11	A number of electrical substations are noted within the immediate vicinity	c.1954 - Present
Section 8 Southern side of Westinghouse Road	Former dye factory	c.1929 - c.1992
Section 7 North west of Parkway Circle	Former steel works	c.1929 - c.1988
Section 3 Immediately west of the proposed Imperial War Museum stop	Former Trafford Oil Works / Mill	c.1922 - c.1986
Section 1 to 11	Depots, warehouses and historic industrial and commercial developments	c.1908 - Present

10.4.6 In addition to Table 10.8, the mapping on the Environment Agency website indicates a number of historic landfills within and in the vicinity of the defined Study Area, presented as follows and within Figure 10.3 (ES Volume III):

- Within the Study Area:
    - Opposite Trafford Wharf Enterprise Park – A former large landfill which partially encroaches into the defined Study Area on the south side of Trafford Wharf Road and to the north side of Trafford Park Road (in Section 3 of the Study Area). No further information is available regarding this landfill; and
    - BOCM Silcocks Ltd – A former large landfill borders Trafford Wharf Road and covers the area of the Imperial War Museum North and the ITV Studios. The landfill occupies the site of the proposed Imperial War Museum stop (in Section 3 and Section 4 of the Study Area). The landfill operated between 20 November 1984 and 31 January 1985 and took

'*Waste which remains largely unaltered once buried such as glass, concrete, bricks, tiles, soil and stones*'. It is not known to what extent remedial activities may have taken place during the development of the Imperial War Museum North and the ITV Studios; and

- Northern side of Barton Dock Road – A former large landfill which occupies the section of Park Way between the Bridgewater Canal (in Section 9), and Barton Dock Road (in Section 10). The former landfill covers the area of the Park Way road and its embankments including the area which extends along the western embankment. The landfill operated between the 26 February 1994 to the 30 June 1994 and took '*Waste which remains largely unaltered once buried such as glass, concrete, bricks, tiles, soil and stones*'.

- Within 250 m of the Study Area:

  - Pomona Dock No 4 – A former small landfill within one of the Pomona docks approximately 190m north east of the Study Area (Section 1). The former landfill took inert waste which remains largely unaltered once buried such as glass, concrete, bricks, tiles, soil and stones, industrial waste "*from a factory or industrial process excluding waste from mines, quarries and agricultural wastes*";

  - Hilti Site - A former small landfill to the immediately south of the junction between Wharfside Way and Sir Alex Ferguson Way, approximately 5m south of the Study Area within (Section 2). No further information is available regarding this landfill;

  - Wharfside Way/ John Gilbert Way South – A former small landfill adjacent to the Study Area approximately 25 m south of Wharfside Way (in Section 3). No further information is available regarding this landfill;

  - Pomona Dock No 3 – A former small landfill within one of the docks at Pomona Docks approximately 50 m north west of the Study Area (in Section 4). The former landfill took inert waste which remains largely unaltered once buried such as glass, concrete, bricks, tiles, soil and stones, industrial waste "*from a factory or industrial process excluding waste from mines, quarries and agricultural wastes*", commercial waste "*from premises used wholly or mainly for trade, business, sport, recreation or entertainment excluding household and industrial waste*" and household waste "*from dwellings of various types including houses, caravans, houseboats, campsites, prisons and wastes from schools, colleges and universities*";

  - Central Avenue - A former small landfill to the north east of Barton Square, within the north east end of an overflow car park for intu Trafford Centre and EventCity approximately 30m north of the Study Area (Section 10). No further information is available regarding this landfill; and

- Land South of Taylor Road – A former small landfill to the immediately east of Ellesmere Circle to the north of Barton Dock Road approximately 65m north west of the Study Area (Section 11b). No further information is available regarding this landfill.

10.4.7 A number of other in-filled areas with the potential to comprise deeper Made Ground deposits include former ponds, former sand and gravel pits/ quarrying operations are identified in the Environmental Data Report (Ref. 10-32). The most relevant due to their proximity to the Study Area include the following:

- Former sand and gravel pit noted in 1848 in an area west of Sir Alex Ferguson Way in Section 2. Unknown fill activity is also noted at this location in 1994;
- Former sand and gravel pit noted in 1848 in a site west of Warren Bruce Road in Section 5;
- Former sand and gravel pit noted in 1848 in a location off Third Avenue, immediately north of the Study Area in Section 6;
- Former sand and gravel pit noted in 1956 west of Praed Road, north of Westinghouse road, north east of Section 8; and
- Former sand and gravel pit noted in 1956 north-west of the Study Area within what is at present Parkway Industrial Estate, an industrial estate immediately west of Park Way in Section 9.

10.4.8 In addition to the above, the Environmental Data Report indicates a feature around the location of Parkway Circle (in Section 7 of the Study Area) identified as an unknown 'heap' or potential infill. A review of historic mapping identified the heap as being a raised area associated with a former steelworks to the north west of the area. A tramline formerly led to an overhead cable line which ran to the centre of this heap. Based upon the historic mapping it is likely that this was a cable 'dumper' for steel work waste to the mound which was a common practice during the time period.

Unexploded Ordnance (UXO) Risk Potential

10.4.9 A Preliminary UXO Risk Assessment has been carried out by a UXO consultant in August 2013 (Ref. 10-40). The information showed that Trafford Industrial Park and Manchester Docks, located within 100m of the Metrolink Trafford Park Line, were both primary bombing targets in WWII, however, local bomb strike mapping could not be obtained. Although the local bomb strike mapping was not available the UXO consultant estimates the high explosive (HE) bombing density in the area is between 26 and 131 bomb strikes per 1,000 acre.

The Preliminary UXO Risk Assessment indicates that the Metrolink Trafford Park Line is located within a zone of moderate UXO risk. A moderate risk region has a bombing density of between 11 and 50 bombs per 1,000 acres and that may have contained/ contain potential World War II (WWII) targets.

Geology

10.4.10 The sections below consider relevant geological conditions in the defined Study Area plus an area extending to 1 km outside the Study Area. Figure 10.2 (ES Volume III) presents the BGS geological mapping for superficial deposits and bedrock overlain on a map of the Metrolink Trafford Park Line route.

Made Ground

10.4.11 The Study Area predominantly comprises existing roadways and associated landscaping. The Study Area also includes commercial and industrial buildings including depots and warehouses, and areas of car parking and hard standing. Due to a history of significant development across the Study Area as detailed in the section above, Made Ground is anticipated to be present across the majority of the Study Area associated with existing and former buildings and infrastructure.

10.4.12 Historically much of the Study Area has included industrial and commercial buildings associated with the development of the Manchester Ship Canal and the industrialisation of the dock lands and surrounding areas and the development of Trafford Park Industrial Estate (as seen in the historic mapping). These areas are likely to comprise deeper Made Ground deposits due to re-profiling/ earthworks during site redevelopment, potentially with remnant underground features (e.g. former basements and relict slabs/ other buried obstructions). Areas of potential historic landfilling and in-filled areas as detailed above may also contain deeper deposits of Made Ground.

Superficial Geology

10.4.13 The superficial deposits across the Study Area include glacio-fluvial sand and gravel of Devensian age, peat deposits and alluvium sands with clay and gravel.

10.4.14 The majority of the Study Area is underlain by the Devensian sand and gravel deposits. Borehole logs identify variable sequences of sand, gravel and clay which become predominantly glacial clays with depth. Superficial peat deposits are noted within an area between the junction of Fifth Avenue with Village Way in Section 6, and the western side of Parkway Circle, east of the proposed Parkway Circle stop in Section 7. Borehole logs identify that where significant peat deposits were identified these were encountered from ground level or

beneath shallow topsoil to variable depth with a maximum of 3.2m below ground level (bgl) (Borehole SJ79NE65, Section 6).

10.4.15 Alluvium deposits are noted immediately either side of the Manchester Ship Canal and further north across Salford Quays and Ordsall.

10.4.16 The alluvium is noted to underlie the Study Area within a limited area along Trafford Wharf Road from the eastern extent of Section 3 to the western end of the proposed Imperial War Museum stop and within the majority of Section 4, where the alluvium boundary extends north beyond the extent of the Study Area immediately south of the Imperial War Museum North. Alluvium then re-enters the Study Area to the immediate west of the Museum in a south westerly direction encompassing the junction of Trafford Wharf and Warren Bruce Road.

10.4.17 Borehole logs identify significant thicknesses of glacial clay with limited sand bands beneath the glacial sand and gravel, alluvium or peat within the majority of boreholes which penetrated these strata.

Solid Geology

10.4.18 The solid geology underlying the Study Area comprises the Wilmslow Sandstone Formation (WSF) and Cheshire Pebble Bed Formation (CPBF) of the Sherwood Sandstone Group (SSG).

10.4.19 There is a broad north/ south division between the CPBF to the north and the WSF to the south. The boundary between the two formations crosses the Study Area east to west.

10.4.20 The majority of the Study Area lies within the WSF including Section 1, covering the Study Area around the Trafford Road Bridge, and all of the Study Area to the west of Praed Road and Village Road junction through Sections 7 to 11.

10.4.21 The CPBF underlies Section 4 of the Study Area and the following sections cross the boundary between the two formations:

- Within Section 2, the northern section of Trafford Wharf Road and Wharf End including the area of the proposed Wharfside stop are within the CPBF, the southern portion of Trafford Wharf Road, Victoria Place and Wharfside Way are within the WSF;
- Section 3 covers Trafford Wharf Road within the CPBF and Wharfside Way within the WSF;
- Section 5 focuses on the Village Circle Roundabout. The boundary of the two formations runs north east to south west through the roundabout with

Trafford Park Road, Village Way and Warren Bruce Road exits within the CPBF and Europa Way and Wharfside Way within the WSF; and

- Within Section 6, east of Praed Road the Study Area is within the CPBF. The Study Area to the West of Praed Road is within the WSF.

10.4.22 Publically available BGS borehole logs have been reviewed where they are available and relevant to the Study Area and are in agreement with the BGS mapping for the bedrock. A review of the bedrock encountered within the BGS logs is presented within Technical Appendix E5 (ES Volume II).

Geology Summary

10.4.23 Based on the above and the criteria presented in Table 10.3, the geological conditions within the defined Study Area are identified to be of low importance/ sensitivity.

Hydrogeology

10.4.24 As detailed above, superficial geological deposits across the Study Area include predominantly glacial sand and gravel with areas of peat and alluvium. These glacial sand and gravel and the alluvial deposits are considered to be Secondary A Aquifers. These are identified as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

10.4.25 The peat deposits across Section 6 and Section 7 of the Study Area are classified as an unproductive aquifer. These are deposits with low permeability that have negligible significance for water supply or river base flow.

10.4.26 The underlying solid geology, part of the SSG, is classified as a Principal Aquifer. These have high inter-granular and/ or fracture permeability, meaning they usually provide a high level of water storage. They may support water supply and/ or river base flow on a strategic scale. The groundwater vulnerability of the site is considered as 'High' since the site is underlain by a potentially highly permeable Principal Aquifers with a high leaching potential.

10.4.27 It is anticipated that a variable Made Ground cover is likely to exist across the majority of the Study Area. The Made Ground is likely to comprise variable cohesive and granular material which has the potential to act as a migratory path for perched groundwater.

10.4.28 The Environmental Database Report (Ref. 10-32) shows no Groundwater Source Protection Zones (SPZ) within 1 km of the Study Area, although two are located over 1.7 km east of the Study Area. However, the Environment Agency website

identified one SPZ within the Study Area and one approximately 1 km north of the Study Area as follows:

- The SPZ which overlies the Study Area is focussed within the western end of the intu Trafford Centre, to the south west of Section 11. The inner zone (1) of the SPZ is outside of the Study Area. However, the Outer Zone (2) includes the western end of Section 11 up to and including the proposed Trafford Centre stop, whilst the Total Catchment Zone (3) extends radially from the inner zone and covers an area up to the Barton Dock Road junction in Section 10;
- A Total Catchment Zone (3), associated with the second SPZ is approximately 1 km north of Parkway Circle (Section 7). The inner zone (1) of the SPZ is located within Little Bolton approximately 2 km north of Section 7.

10.4.29 There are a number of groundwater abstractions in the vicinity of the Study Area, one lies within 50 m of the Study Area and is noted as being 19 m south of Section 3. The licence was for groundwater extraction for Northern Metals Limited and has been revoked.

10.4.30 Within 250 m of the Study Area there are an additional thirteen groundwater abstractions as follows:

- One 180 m north of the proposed Pomona stop in Section 1 held by CEREP III Investment R Sarl for a single point surface extraction related to general cooling for 'other industrial/ commercial/ public services' last permitted in October 2009 with no end date;
- Two approximately 150 m and 225 m south of Wharfside Way in Section 3 in an area noted as 'Canalside North' held by Trafford Edible Oils Refiners Ltd for cooling and manufacturing and Trafford Edible Oils for cooling;
- One 100 m north of the Study Area outside the Imperial War Museum North on the bank of the Manchester Ship Canal. The license was held by the Imperial War Museum North and related to non-evaporative cooling for 'other industrial/ commercial/ public services' last permitted in January 2000 with no end date;
- One 230 m north of the Study Area north of the proposed Imperial War Museum stop on the north bank of the Manchester Ship Canal next to The Lowry Centre. The license was held by The Lowry Centre Limited related to non-evaporative cooling for 'business parks' last permitted in January 2000 with no end date;
- Three located 90 m, 190 m and 230 m south of Westinghouse Road in Section 8. All were held by Akzo Nobel UK Ltd for a single point surface extraction

related to general cooling for 'chemicals' last permitted in June 2003 with no end date;

- One 105 m south of Westinghouse Road within Section 8. The license was held by Imperial Chemical Industries Ltd related to cooling and drinking, cooking, sanitary and washing for industrial premises. This license has been revoked;
- One noted 160 m north-west of Park Way, west of Parkway Circle in Section 9. The license was held by Ciba-Geigy UK Limited relating to cooling. This license has been revoked;
- One noted 100 m north-west of Park Way, south of Bridgewater Canal in Section 9. The license was for Gec Alsthom relating to cooling. This license has been revoked; and
- Two held by the British Steel Corporation, one being 85 m north of EventCity car park in Section 10 and the second located 57 m north of Phoenix Way in Section 11. The licences related to cooling water extracted from the Bridgewater Canal. Both have been revoked.

10.4.31 Based on the above and the criteria presented in Table 10.3, the hydrogeological conditions within the Study Area are identified to be of moderate/ high importance/ sensitivity.

Consents, Permits and Known Pollution Incidents

10.4.32 There are 21 records of discharge consents within 250 m of the Study Area, the closest on the southern bank of the Manchester Ship Canal east of the Trafford Road Bridge. The consent is for discharge of other matter to surface water relating to a sewage disposal works operated by TMBC.

10.4.33 There are 22 records of Local Authority Pollution Prevention and Control Permits within 250 m of the Study Area and one within the Study Area. The record within the Study Area is associated with PG1/10 'Waste derived fuel combustion processes less than 3MW' at International Timbers south east of the Imperial War Museum North.

10.4.34 There are 21 records of Pollution Incidents to Controlled Waters within 250 m of the Study Area and one within the Study Area. The incident within the Study Area was a Category 3 minor incident to the Manchester Ship Canal involving plastisol caused by a road traffic accident. The incident was within the footpath on the western side of Parkway Circle roundabout in Section 7.

10.4.35 One Category 3 major incident was noted within 250 m of the Study Area. The incident was located in Section 1, 41 m north of the Study Area within the

Manchester Ship Canal west of the Eccles Metrolink line crossing. The details available indicated that a miscellaneous contaminant ended up in the Manchester Ship Canal which resulted in 'fish in distress'.

Other Potential Sensitive Receptors

10.4.36 In addition the prevailing geology and hydrogeology receptors as indicated in the sections above, other potential sensitive receptors of relevance to this assessment include the following:

- Construction workers to be employed during the construction of the Metrolink Trafford Park Line (deemed to be of high importance/ sensitivity in accordance with Table 10.3);
- End users (operational workers/ visitors) of the Metrolink Trafford Park Line (deemed to be of low importance/ sensitivity in accordance with Table 10.3);
- As indicated in Chapter 10: Ecology and Nature Conservation, there is one statutory and four non-statutory designated sites (deemed to be of moderate importance/ sensitivity in accordance with Table 10.3) within 2 km of the Metrolink Trafford Park Line outlined below:
    - The Trafford Ecology Park Local Nature Reserve (LNR) is located approximately 500 m to the north of the Metrolink Trafford Park Line. The LNR comprises wetland, woodland and grassland;
    - Bridgewater Canal Site of Biological Interest (SBI) intersects and is adjacent to the Metrolink Trafford Park Line in several places. The SBI supports diverse aquatic and bankside vegetation;
    - Trafford Ecology Park SBI is located approximately 500 m to the north of the Metrolink Trafford Park Line. Habitats within the SBI include ponds, a small lake, woodland and neutral grassland. In addition the SBI provides important habit for birds and supports great crested newt (*Triturus cristatus);*
    - Salford Quays (North) SBI is located approximately 75 m to the north-east of the Metrolink Trafford Park Line. A section of the Manchester Ship Canal is used by wintering wildfowl; and
    - Salford Quays (South) SBI is located approximately 120 m to the north-east of the Metrolink Trafford Park Line. A section of the Manchester Ship Canal is used by wintering wildfowl.

10.5 Potential Sources of Contamination

10.5.1 The potential sources of contamination outlined within this section have been identified based upon the desk study undertaken as part of this report including a review of the information available to URS outlined in paragraph 10.3.4. The potential sources of contamination have not been surveyed at the time of this

report. However, a ground investigation across the site is being undertaken by Mott MacDonald on behalf of Transport for Greater Manchester, however at the time of writing, no data from the ground investigation are available.

Soil and Leachate Risk Potential

10.5.2 Table 10.9 presents a list of potential contaminants that may be present within the Study Area as based on identified existing and historic land uses (refer to Section 10.4) (also refer to Figure 10.3 in ES Volume III).

Table 10.9 Potential Sources of Contamination within the Study Area and Associated Contaminants

On-Site Historic Land Use	Section/ Area	Potential Contaminants
Samuel Platt's public house	Section 2 The area along the bank of the Manchester Ship Canal near to Trafford Road Bridge	Metals & Metalloids, Total Petroleum Hydrocarbons (TPHs), Polycyclic Aromatic Hydrocarbons (PAHs), asbestos
Large factory building	Section 3 Area where the Section crosses from the bank of the Manchester Ship Canal to Trafford Wharf Road	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, Total Petroleum Hydrocarbons (TPHs), Polycyclic Aromatic Hydrocarbons (PAHs), asbestos and cyanides
Depot with approximately 15 large tanks on site and an electrical substation Potentially associated with oil works to its immediate west	Section 3 The area including and to the north of the proposed Imperial War Museum stop (to the west of the Quay West building) Area to the immediate west of the proposed stop was formerly an oil works	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, Total Petroleum Hydrocarbons (TPHs), Polycyclic Aromatic Hydrocarbons (PAHs), asbestos and cyanides
Former large landfill	Section 3 A former large landfill which partially encroaches into the defined Study Area on the south side of Trafford Wharf Road and to the north side of Trafford Park Road	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, TPHs, PAHs, asbestos and cyanides

Table 10.9 Potential Sources of Contamination within the Study Area and Associated Contaminants		
On-Site Historic Land Use	**Section/ Area**	**Potential Contaminants**
BOCM Silcocks Ltd former landfill	Section 3 & 4 Former large landfill borders Trafford Wharf Road and covers the area of the Imperial War Museum North and the ITV Studios	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, TPHs, PAHs, asbestos and cyanides
Large warehouse/ industrial building with rail lines into the structure and a garage incorporated into the building	Section 4 & 5 The majority of Warren Bruce Road was within the warehouse structure. The garage and rail lines were at the Trafford Wharf Road junction end of the warehouse	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, TPHs, PAHs, asbestos and cyanides
Various historical engineering works and warehouses including a working men's club	Section 5 Village Circle roundabout area Working men's club on the site of the roundabout in the line of the proposed tramline	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, TPHs, PAHs, asbestos and cyanides
Tank and depots	Section 5 Wharfside Way	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, TPHs, PAHs, asbestos and cyanides
Warren Bruce Court office development	Section 5 Junction of Wharfside Way and Warren Bruce Road	New office development. Metals & Metalloids, TPHs, PAHs and asbestos potentially within car parking area
Scrapyard (previously warehouses and engineering works)	Section 6 North of Village Road/ Ashburton Road East	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, TPHs, PAHs, asbestos and cyanides
Pisces Industrial Estate (formerly a wire works)	Section 6 North of Village Road/ Ashburton Road East	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, TPHs, PAHs, asbestos and cyanides

Table 10.9 Potential Sources of Contamination within the Study Area and Associated Contaminants		
On-Site Historic Land Use	**Section/ Area**	**Potential Contaminants**
Historically a mound and a tipping area for a former steel works to the north-west. The mound included an overhead cable tipping line to the centre of the roundabout	Section 7 Parkway Circle roundabout	Metals & Metalloids, coal, coke, slag and clinker
Warehouse with storage tanks	Section 7 South of Parkway Circle within proposed park and ride site	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, TPHs, PAHs, asbestos and cyanides
Number of depots and industrial/ commercial buildings are present, a number of which date back to the late 1960s	Section 7 North east of Parkway Circle	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, TPHs, PAHs, asbestos and cyanides
Area formerly occupied by buildings associated with a dye factory	Section 8 Wider green line boundary southern side of south of Westinghouse Road	Metals & Metalloids, mineral oils, anthrax spores, sulphates, fluoride, phosphates, TPHs, PAHs, Polychlorinated Biphenyls (PCB) asbestos and cyanides
Former land fill	Section 9 and 10 A former large landfill which occupies the section of Park Way between the Bridgewater Canal (in Section 9), and Barton Dock Road (in Section 10)	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, TPHs, PAHs, asbestos and cyanides
Formerly an area of large engineering works for the agriculture and textile industries	Section 11 The majority of the roads to the north of Barton Dock Road within the Study Area pass through a current industrial estate. The current roads pass through the former industrial buildings footprints	Metals & Metalloids, mineral oils, anthrax spores, sulphates, fluoride, phosphates, TPHs, PAHs, PCB, asbestos and cyanides

Table 10.9 Potential Sources of Contamination within the Study Area and Associated Contaminants		
On-Site Historic Land Use	**Section/ Area**	**Potential Contaminants**
A number of electrical substations are noted within the Study Area	Section 3, 5, 6 and 7	PCBs

10.5.3 Table 10.10 presents a list of potential contamination sources outside of the defined Study Area, as based upon identified historic land uses (refer to Section 10.4).

Table 10.10 Potential Sources of Contamination Outside the Study Area and Associated Contaminants		
Off-Site Historic Land Use	**Section/ Area**	**Potential Contaminants**
Historic wharf noted to the east of the proposed Pomona stop. The historic mapping is unclear as to the nature of the wharf. A wharf can potentially be a storage yard, but could be inlet from the Bridgewater Canal	Section 1	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, TPHs, PAHs, asbestos and cyanides
Former small landfill	Section 1 A former small landfill within one of the docks at Pomona Docks approximately 50 m north west of the Study Area	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, TPHs, PAHs, asbestos and cyanides
Five large linked historic tanks (Unknown contents)	Section 3 Between Trafford Wharf Road and the Manchester Ship Canal	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, Total Petroleum Hydrocarbons (TPHs), Polycyclic Aromatic Hydrocarbons (PAHs), and cyanides
Former small landfill	Section 3 A former small landfill adjacent to the Study Area south of Wharfside Way.	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, TPHs, PAHs, asbestos and cyanides

Table 10.10 Potential Sources of Contamination Outside the Study Area and Associated Contaminants		
Off-Site Historic Land Use	**Section/ Area**	**Potential Contaminants**
A number of electrical substations are noted within the immediate vicinity	Section 2, 3, 5, 6, 7, 8, 10 and 11	PCBs
Former dye factory	Section 8 Southern side of Westinghouse Road	Metals & Metalloids, mineral oils, anthrax spores, sulphates, fluoride, phosphates, TPHs, PAHs, PCBs, asbestos and cyanides
Former steel works	Section 7 North west of Parkway Circle	Metals & Metalloids, sulphates, fluoride, phosphates, TPHs, PAHs, PCBs, asbestos and cyanides
Former oil works / mill	Section 3 Immediately west of the proposed Imperial War Museum stop	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, TPHs, PAHs, PCBs, asbestos and cyanides
Depots, warehouses and historic industrial and commercial developments	Section 1 to 11	Metals & Metalloids, Phenols, chlorides, sulphates, sulphides, TPHs, PAHs, asbestos and cyanides

10.5.4 Table 10.9 and Table 10.10 indicate that there is a risk of encountering potentially contaminated ground material along much of the Metrolink Trafford Park Line.

Ground Gas and Vapour Risk Potential

10.5.5 As noted in Section 10.4, Made Ground is likely to be present across the majority of the Metrolink Trafford Park Line route as a result of the different phases of historical development. Given the presence of Made Ground there is the potential for elevated levels of ground gas/ vapour to be present in some locations. No detailed ground gas monitoring or ground investigation of ground gas/ vapour data are available as related to the defined Study Area.

Unexploded Ordnance (UXO) Risk Potential

10.5.6 Section 10.4 indicates that the Metrolink Trafford Park Line is located within a zone of moderate UXO risk. The Preliminary UXO Risk Assessment (2013) (Ref. 10-40) and supporting documents corresponds to a medium/ high probability of encountering UXO within some parts of the defined Study Area.

10.6 Impact Avoidance Measures

10.6.1 The following section contains a list of potential mitigation measures envisaged as likely to be required as part of the Metrolink Trafford Park Line scheme. Dependent on industry standard practice and guidance at the time of implementation the following measures may be amended.

Pre-construction Site Investigation

10.6.2 Due to the historic and current land use both on and off site and the occurrence of Made Ground across much of the Study Area, there is a potential for contamination to be present which could impact upon human health, controlled waters and ecological receptors. An intrusive ground investigation is, therefore, required prior to the commencement of construction works in order to determine the ground conditions and to quantify the potential risks to identified receptors. These investigation works would be undertaken in accordance with the requirements of CLR11 (Ref. 10-14), the Guiding Principles for Land Contamination (Ref. 10-15), GP3 (Ref. 10-16) and the requirements of any relevant consent conditions. The findings of the ground investigation being undertaken by Mott MacDonald in 2014 should be taken into account during the design of the pre-construction site investigation.

10.6.3 The ground investigation should be designed in order to assess the ground conditions across the Metrolink Trafford Park Line construction footprint, including the investigation of the potential for ground contamination associated with the previous land uses and the potential for contamination to have migrated on-site from the adjacent areas. The ground investigation should also assess the current quality of the subsurface soils, which would typically be encountered by the construction works, the quality of groundwater and shallow water and the potential for ground gas generation and migration.

10.6.4 Following completion of such a targeted contamination investigation, it would be possible to define the need for any mitigation measures additional to the measures as identified herein.

Construction Phase Mitigation Measures

10.6.5 As detailed in Section 4.5, the proposed construction works would be carried out in accordance with Transport for Greater Manchester's Code of Construction Practice (CoCP), whilst a scheme-specific Construction Environmental Management Plan (CEMP) would be prepared by the selected construction contractor. These plans would provide guidance on appropriate methods of working and outline suitable impact avoidance measures and mitigation strategies as related to ground conditions.

10.6.6 Mitigation with regards to health and safety of construction workers and pollution prevention during the construction period would be incorporated into the contractor's proposed method of construction in line with current UK legislation, British Industry Standards and guidelines. All workers would be required to wear the appropriate Personal Protective Equipment (PPE), whilst all proposed works would be undertaken in line with best practice guidance, such as guidance contained within CIRIA C692 (Ref. 10-30) (refer to Section 10.2).

10.6.7 The sections below highlight specific actions to be undertaken by the selected construction contractor to avoid and mitigate potential ground pollution (which would be included in the contractor's CEMP).

Soil and Groundwater Contamination

10.6.8 The selected construction contractor would undertake the following with regard to potential soil and groundwater contamination:

- Contamination within soils has the potential to impact adversely the health of construction workers. Health and safety mitigation measures, appropriate to the chemical composition of the ground (and, potentially, the groundwater), would be evaluated and implemented to protect the health of construction workers;
- Excavation earthworks are expected to be an integral part of the Metrolink Trafford Park Line to achieve redevelopment formation levels. Earthworks would be carried out with due regard to the current applicable waste management regulations;
- In order to reduce the volume of materials disposed of offsite, materials would be reused onsite wherever practicable. The procedure for managing the re-use of soils would be documented in a Materials Management Plan, produced in general accordance with CL:AIRE CoP (Ref. 10-38);
- Where surplus soil needs to be disposed of, it would be disposed of to an appropriate, licensed landfill facility, in accordance with current Duty of Care

responsibilities and other statutory requirements. As required by the Landfill Directive, inert, non-hazardous and hazardous waste would require pre-treatment prior to disposal;

- Prior to disposal, soil would need to be characterised following the methodology described in the Environment Agency publications 'Framework for the Classification of Contaminated Soils in Hazardous Wastes', version 1 (Ref. 10-41) and 'Guidelines on Sampling and Testing of Wastes To Meet Landfill Waste Acceptance Procedures' Version 1 (Ref. 10-42);
- Should any potentially contaminated ground, including isolated 'hotspots' of contamination, be encountered during construction, the contractor would be required to investigate the area and then assess whether there is a need for containment or disposal of the material. The contractor would also be required to assess whether any additional health and safety measures are required. Any such investigations would be required to be undertaken in consultation with the Environment Agency and other appropriate consultees. To further minimise the risks of contaminants being mobilised and contaminating other soils/ water during the development of the site, construction workers would be briefed as to the possibility of the presence of such materials;
- The contractor would be required to place arisings and temporary stockpiles away from watercourses and drainage systems, whilst surface water would be directed away from stockpiles to prevent erosion;
- The risk to surface water and groundwater from run-off from any contaminated stockpiles during construction works would be further reduced by implementing suitable mitigation measures including sealing stockpiles to prevent rainwater infiltration. Alternatively bunding and/ or temporary drainage systems would be put in place, designed in line with current best practice, following appropriate guidelines and obtaining all relevant licences including discharge consents.

Storage of Potentially Contaminating Materials and Accidental Spillage

10.6.9 To minimise the risk of oil and hydrocarbon pollutants entering controlled waters, handling and storage of fuels and oils would adhere to Environment Agency PPG1, PPG2, PPG5, PPG6, PPG8 and PPG21 (refer to Section 10.2). These documents recommend various measures to protect controlled waters from the release of oils and hydrocarbons which would otherwise have an adverse impact on groundwater (and surface water) resources at the site. These measures are briefly summarised below:

- Oils and hydrocarbons would be stored in designated locations with specific measures to prevent leakage and release of their contents, including locating the storage area away from surface water drainage system and watercourses on an impermeable base, with an impermeable bund that has no outflow and is of adequate capacity to contain at least 110% of the contents;
- Machinery would be refuelled using a transfer hose and valves. Trigger guns would be protected from vandalism and kept locked when not in use;
- Wherever possible plant and machinery would be kept away from controlled waters and have drip trays beneath oil tanks/ engines/ gearboxes/ hydraulics that would be checked and emptied regularly via a licensed waste disposal operator;
- An emergency spillage action plan would be produced, which site staff would have read and understood. On-site provision would be made to contain serious spill or leakages through the use of spill kits, booms, bunding and absorbent materials. Site staff would be trained in the use of emergency spill response equipment; and
- Tracks would be constructed from locally sourced graded stone where possible. Any imported aggregates would be checked to ensure that they are inert and contain no contaminants.

10.6.10 The measures described above are intended to reduce the number of situations whereby the release of pollutants may arise and restrict their passage to the shallow groundwater.

10.6.11 An emergency spillage action plan would be designed and implemented through the construction programme to minimise the impact of any spillage events.

Disturbance of Contaminated Ground/ Dust

10.6.12 To minimise the risk of site contamination within Made Ground impacting on human health (offsite workers and construction workers etc.), the following dust suppression measures would be implemented as appropriate (also refer to Chapter 6: Air Quality):

- Water sprays, mists or fogging systems;
- Foam methods;
- Barrier systems;
- Vehicle wheel washing; and

- Temporary storage of materials would incorporate appropriate risk control measures (e.g. stockpiles would be appropriately fenced off in designated areas and covered or damped down if likely to generate dust).

Disturbance of Groundwater

10.6.13 If deeper excavations encounter shallow groundwater, then control measures for dealing with groundwater would be as follows:

- Sump pumping in excavation; and
- Well point dewatering.

10.6.14 Control measures such as dewatering excavations could potentially lead to local minor subsidence. However, the effects of any subsidence would be designed out as part of the control measures.

10.6.15 Any waters removed from excavations by dewatering would be discharged appropriately, subject to the relevant licences being obtained.

Ground Gas

10.6.16 The planned geotechnical/ geo-environmental ground investigation as detailed above should include monitoring for the presence of ground gases in accordance with existing guidance published by British Research Establishment (BRE) and British Standards Institution (BSI) standards (BS 8576:2013 (Ref. 10-43) and BS 8485:2007 (Ref. 10-44).

10.6.17 Ground gas mitigation measures are expected to be taken into account during the planning of construction activities, and incorporated as applicable into the Metrolink Trafford Park Line design of any structures or confined spaces requiring manual entry as applicable.

Asbestos

10.6.18 If further testing, prior to the start of construction, identifies the presence of asbestos, then appropriate measures would be implemented to mitigate the risks and deal with the asbestos. This would be in accordance with the CL:AIRE CoP (Ref. 10-38), Hazardous Waste Regulations, Control of Asbestos Regulations 2006 and the relevant Health and Safety guidelines.

10.6.19 If asbestos is identified and mitigation is required, collection and removal of materials containing asbestos would be subject to removal by a licensed contractor in accordance with the applicable waste management practices. Asbestos materials observed onsite may be classified as hazardous waste and potentially require appropriate offsite disposal.

Underground Structures

10.6.20 Prior to the commencement of excavation works, appropriate steps, including a detailed survey of the services locations and depths, would be undertaken to ensure that construction activities do not disturb any live services.

10.6.21 Construction activities would be designed taking into account these services to ensure that any known structures are left *in situ* and undisturbed as far as practicable.

10.6.22 It is likely that the Environment Agency would require foundation works risk assessments to be undertaken in line with guidance in Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance and Pollution Prevention (2001) (Ref. 10-45).

Unexploded Ordnance

10.6.23 A Detailed UXO Risk Assessment should be prepared that enables an estimate to be made of the likelihood of encountering a UXO hazard present within the Metrolink Trafford Park Line construction footprint, giving due consideration to the development type and construction methods to be employed by the selected contractor.

10.6.24 The selected contractor would consider the results of the Detailed Risk Assessment and define an applicable UXO risk mitigation strategy in order to eliminate risks or reduce risks to an acceptable level. The risk mitigation process should provide a framework that identifies appropriate mitigation methods for the various risk scenarios that may be identified by the Detailed Risk Assessment. The contractor's UXO risk mitigation strategy may include mitigating measures including the following:

- Explosive Ordnance Safety and Awareness Briefings for personnel conducting intrusive construction works;
- Unexploded Ordnance Site Safety Instructions for all applicable site personnel;
- Presence of an Explosive Ordnance Disposal (EOD) Engineer on site to supervise open excavations, where relevant; and
- Down-hole intrusive magnetometer surveys of all deep intrusive works and targeted investigation of suspect anomalies.

10.6.25 In addition to the above, an emergency response plan should be prepared that provides clear and unequivocal guidance on what to do should an item of UXO be encountered, with accompanying emergency management team roles and responsibilities identified. This should be included in the Health and Safety Plan

for the proposed works and should be communicated to the work force at the operational level, typically as part of worker briefings.

10.6.26 The defined UXO risk management process would be implemented correctly and efficiently during the construction phase, whilst any UXO works would be verified as having been completed to the required level.

Operational Phase Mitigation

10.6.27 During the Metrolink Trafford Park Line operational phase, the following measures are currently proposed to be implemented as best practice:

- Site workers (i.e. maintenance workers) that are likely to come into contact with potentially contaminated materials would be provided with the appropriate PPE for their designated tasks;
- Any fuels and oils would be stored in accordance with the Control of Pollution (Oil Storage) England Regulations 2001 (Ref. 10-46) and related guidance (e.g. PPG2);
- Oil and chemical spill kits would be made available where appropriate and operatives/ users would be trained in their application where required;
- Appropriate environmental controls for handling chemicals and oils (including COSHH (Control of Substances Hazardous to Health) assessments etc.) would be implemented where required. Any chemicals present within Intermediate Bulk Containers (IBCs) or drums would adhere to storage and handling guidance presented within Pollution Prevention Guidelines Note 26: Drums and Intermediate Bulk Containers (Ref. 10-47);
- Oil and/ or chemical spills would immediately be cleared up and documented. The Environment Agency would be notified of any large spillages of fuel or chemicals; and
- Surface water collection drains can be used in conjunction with interceptors to collect runoff. This would help reduce potential contamination of land and groundwater. The drainage design would be developed in consultation with the Environment Agency.

10.6.28 The planned geotechnical/ geo-environmental ground investigation as detailed above should include monitoring for the presence of ground gases. Dependent upon the classification of the gassing/ vapour regime identified for the site, specific mitigation measures may be incorporated into structural designs as per BS 8485:2007.

10.7 Potential Impacts and Effects

10.7.1 This section identifies the potential ground condition impacts resulting from the construction and operation of the Metrolink Trafford Park Line. The identification of potential impacts has been undertaken post the implementation of legal compliance, associated British Industry Standards and best practices guidance when working with or around contaminated materials (e.g. the impact avoidance and mitigation measures as detailed in Section 10.6).

Construction Phase Impacts and Effects

10.7.2 The primary site preparation activities are expected to include the following:

- General site clearance of surface materials and vegetation;
- Utilities diversion works;
- Excavation and appropriate disposal of invasive plant species (refer to Chapter 8: Ecology and Nature Conservation for details);
- Excavation of soil and brick rubble and removal of any sub-surface obstructions;
- Building demolition and break-up of slabs and hardstanding;
- Crushing of suitable uncontaminated artificial hard material (concrete and brick) for re-use on site;
- Backfill of excavations, with demonstrably clean materials;
- Re-grade of site to required levels; and
- Installation of any gas protection measures to appropriate standards dependent upon findings of pre-construction ground investigations.

10.7.3 The primary construction activities are anticipated to include the following:

- Erection of site fencing and hoardings;
- Provision of site compounds;
- Construction of new structures (e.g. the Pomona Ramp, Bridgewater Canal crossing and retaining walls);
- Highway works;
- Laying of the tramway track slab and surface drains;
- Laying of rails;
- Tram stop construction;

- Erection of OLE, lighting columns, CCTV and signage; and
- Laying of cabling for systems and communications.

10.7.4 Potential impacts arising from the construction phase activities as indicated above include the following:

- Potential disturbance of (contaminated) ground. Where pile foundations are to be used, there is the potential to provide a pathway for any contaminated soil to shallow groundwater, and the underlying sandstone Principal Aquifer;
- Potential disturbance of (contaminated) dust;
- Potential disturbance of shallow groundwater during excavations for site preparation works, or construction of foundations and service trenches;
- Potential storage of potentially contaminating materials and accidental release of oils and hydrocarbons from plant and machinery into the ground;
- Potential disturbance of ground gases and subsequent gas migration;
- Potential disturbance of asbestos or asbestos containing materials;
- Potential disturbance of underground structures and obstructions; and
- Potential for encountering unexploded ordnance during piling and deep excavations.

10.7.5 The sections below consider the significance of potential effects as associated with these various activities.

Disturbance of Contaminated Ground and Contamination of Groundwater

10.7.6 The alignment of the Metrolink Trafford Park Line passes through areas of Made Ground and potential contamination (as discussed in Section 10.4 and 10.5 – also refer to Figure 10.3 in ES Volume III). It is considered that the likelihood of encountering contaminated ground during the proposed excavation works is high and that the range of potential contaminants is wide. If works were to proceed without due consideration, pile foundation works or ground improvement works (if required) could disturb contaminated ground and allow contamination to draw down into the underlying Principal Aquifer.

10.7.7 However, given the implementation of the impact avoidance and mitigation measures as detailed in Section 10.6, it is considered that effects associated with the disturbance of ground contamination during construction activities would be of negligible significance to groundwater.

10.7.8 Therefore it is not anticipated that the disturbance of contaminated ground during construction of the Metrolink Trafford Park Line would significantly

impact upon shallow groundwater and the underlying Principal Aquifer. It is, therefore, considered that the Metrolink Trafford Park Line would not impact upon the WFD status of these water bodies.

Disturbance of Dust

10.7.9 Dust resulting from disturbance during construction activities may arise as a result of the movement of soil by construction machinery (refer to Chapter 6: Air Quality). Any contaminated dust generated has the potential to impact upon health of construction workers and the general public.

10.7.10 Given the implementation of the impact avoidance and mitigation measures as detailed in Section 10.6 (and the dust suppression measures detailed in Chapter 6: Air Quality), it is considered that the effects associated with dust emissions on sensitive receptors during the construction phase would be of negligible significance.

Disturbance of (Contaminated) Groundwater

10.7.11 Excavations for foundations, services and access may encounter shallow groundwater, some of which may be contaminated.

10.7.12 With the implementation of the impact avoidance and mitigation measures as detailed in Section 10.6, it is considered that effects associated with the disturbance of shallow contaminated groundwater would be of negligible significance.

10.7.13 Therefore it is not anticipated that disturbance of contaminated shallow groundwater during the construction of the Metrolink Trafford Park Line would significantly impact upon the underlying Principal Aquifer. It is, therefore, considered that the Metrolink Trafford Park Line would not impact upon the WFD status of these water bodies.

Storage of Potentially Contaminating Materials and Accidental Spillage

10.7.14 During the construction phase, there is the potential for the accidental spillage of contaminants from vehicles and construction materials, and for chemicals, oils or fuels stored on-site to leak or be spilled and so enter the sub-surface. This could detrimentally impact soil and groundwater quality which could, in turn, have an impact on sensitive receptors. Such releases of oils and fuels could result in a reduction in local groundwater quality which could subsequently impact upon abstraction points, watercourses and ecological resources (i.e. water flora and fauna). Similar impacts could also occur if contaminated materials are inappropriately stored.

10.7.15 With the implementation of the impact avoidance and mitigation measures as detailed in Section 10.6, it is considered that effects associated with the storage of potentially contaminated material and accidental oil and hydrocarbon spillages would be of negligible significance.

Ground Gas

10.7.16 Where the Metrolink Trafford Park Line passes through areas identified as having the potential for below ground gas, gas releases/ migration could occur which could present a potential risk to site workers and surrounding land uses.

10.7.17 With the implementation of the impact avoidance and mitigation measures as detailed in Section 10.6, it is considered that effects associated with ground gas would be of negligible significance.

Asbestos

10.7.18 Asbestos is a common contaminant within made ground fill materials and should be included within the suite of determinands scheduled as part of site investigation works for the proposed construction footprint (as detailed in Section 10.6).

10.7.19 There is considered to be a high risk of encountering asbestos containing materials during construction works given the multi-phase historical development which has occurred across the site, whilst asbestos could be encountered during any building demolition activities.

10.7.20 With the implementation of the impact avoidance and mitigation measures as detailed in Section 10.6 (which are primarily designed to investigate, remove and treat asbestos containing materials), it is considered that effects associated with asbestos would be of negligible significance (and potentially beneficial if such materials are removed).

Underground Structures/ Obstructions

10.7.21 Underground structures, such as existing service lines, relict foundations and buried obstructions are potentially present beneath the Metrolink Trafford Park Line. As such, there is a high risk of encountering such structures during the construction phase.

10.7.22 With the implementation of the impact avoidance and mitigation measures as detailed in Section 10.6, it is considered that effects associated with underground structures would be of negligible significance.

Unexploded Ordnance

10.7.23 Section 10.4 indicates that the Metrolink Trafford Park Line is located within a zone of moderate UXO risk. However, risks within areas which are already disturbed to a depth below those which occurred during World War II, the risk of encountering UXO is reduced to negligible.

10.7.24 Section 10.6 provides details of measures that would be undertaken prior to the start of construction activities (e.g. completion of a Detailed UXO Risk Assessment), whilst the selected construction contractor would define an applicable UXO risk mitigation strategy in order to eliminate risks or reduce risks to an acceptable level. Given that the risks for encountering unexploded ordnance during piling and deep excavation and the unknown locations of *in situ* UXO, there is an inherent risk that mitigation cannot remove completely. As such, Section 10.6 also indicates the need for an emergency response plan to be prepared that provides clear and unequivocal guidance on what to do should an item of UXO be encountered.

10.7.25 Whilst the risk of encountering UXO remains moderate, implementation of the mitigation measures as defined in Section 10.6 would eliminate risks or reduce risks to an acceptable level.

Operational Phase Impacts and Effects

10.7.26 Operation of the Metrolink Trafford Park Line is not anticipated to present a risk to land quality and groundwater. With the implementation of the impact avoidance and mitigation measures as detailed in Section 10.6, it is considered that land quality and groundwater effects associated with Metrolink Trafford Park Line operation would be of negligible significance.

10.8 Additional Mitigation

10.8.1 Based upon the evaluation as presented above, other than the impact avoidance and mitigation measures as detailed in Section 10.6, no further mitigation measures are considered to be necessary during the construction and operation of the Metrolink Trafford Park Line.

10.9 Residual Effects and Conclusions

10.9.1 The Metrolink Trafford Park Line route crosses parcels of land that have been historically utilised by land uses that might have resulted in land contamination. The potential impact of the proposals in relation to geology, soils and hydrogeology have been assessed in the context of the baseline conditions, and considering the future use of the site.

10.9.2 A range of impact avoidance and mitigation measures have been proposed based upon legal compliance, associated British Industry Standards and best practices guidance when working with or around contaminated materials.

10.9.3 Table 10.11 provides a summary of the predicted land quality and groundwater effects of the Metrolink Trafford Park Line.

Table 10.11 Summary of Residual Effects

Receptor	Impact	Impact Mitigation	Residual Effect Significance
Construction Phase			
Site workers, surrounding land uses, ecological sites, geology, groundwater	Disturbance of contaminated ground and contamination of groundwater	Pre-construction site contamination investigation Impact avoidance measures and good site practices as defined in the contractor's CEMP	Negligible
	Disturbance of potentially contaminated dust	Dust suppression measures as defined in the contractor's CEMP	Negligible
	Disturbance of potentially contaminated groundwater	Pre-construction site contamination investigation Impact avoidance measures and good site practices as defined in the contractor's CEMP	Negligible
	Impacts due to the storage of potentially contaminating materials and accidental spillages	Impact avoidance measures and good site practices as defined in the contractor's CEMP	Negligible
	Impacts due to ground gas disturbance and subsequent migration	Pre-construction site contamination investigation Appropriate design of Metrolink structures Impact avoidance measures and good site practices as defined in the contractor's CEMP	Negligible

Table 10.11 Summary of Residual Effects			
Receptor	**Impact**	**Impact** **Mitigation**	**Residual Effect Significance**
	Impacts due to asbestos	Pre-construction site contamination investigation Appropriate asbestos investigation, management and disposal practices as defined in the contractor's CEMP	Negligible
	Encountering underground structures	Pre-construction survey of the services locations and depths Appropriate design of Metrolink scheme components Foundation works risk assessments to be undertaken in line with guidance in Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance and Pollution Prevention (2001)	Negligible
	Impacts associated with encountering UXOs	Detailed UXO Risk Assessment Contractor to prepare and implement an applicable risk strategy Contractor to prepare emergency response plan and appropriate staff training	Moderate, although mitigation, implementation of defined mitigation measures would reduce the potential resultant effects as far as practicable
Operational Phase			
Metrolink end users, surrounding land uses, ecological sites, geology, groundwater	Impacts due to Metrolink operation and maintenance activities		Negligible

10.10 References

Ref. 10-1 European Commission (2000) 'EC Directive 2000/60/EC establishing a framework for the Community action in the field of water policy' (The Water Framework Directive (WFD)).

Ref. 10-2 HM Government (1990) 'Environmental Protection Act 1990 (Part IIA)'.

Ref. 10-3 HM Government (1991) 'The Water Resources Act'.

Ref. 10-4 HM Government (1990) 'The Town and Country Planning Act'.

Ref. 10-5 HM Government (1984) 'The Building Act'.

Ref. 10-6 HM Government (2000) 'The Building Regulations 2000'.

Ref. 10-7 HM Government (2009) 'Environmental Damage (Prevention and Remediation) Regulations'.

Ref. 10-8 HM Government (2010) 'Environmental Permitting (England and Wales) Regulations'.

Ref. 10-9 HM Government (1999) 'Anti-Pollution Works Regulations'.

Ref. 10-10 Department for Communities and Local Government (2012) 'National Planning Policy Framework'.

Ref. 10-11 Trafford Metropolitan Borough Council (2006) 'The Unitary Development Plan'.

Ref. 10-12 Trafford Metropolitan Borough Council (2012) 'Development Plan Document DPD1: Trafford Core Strategy, Adopted January 2012'.

Ref. 10-13 Trafford Metropolitan Borough Council (2012) 'Contaminated Land Inspection Strategy 20012-2015, February 2012'.

Ref. 10-14 Environment Agency (2004) 'Contaminated Land Report (CLR) 11, Model Procedures for the Management of Land Contamination.'

Ref. 10-15 Environment Agency (2010) 'Guiding Principles for Land Contamination'.

Ref. 10-16 Environment Agency (2012) 'Groundwater Protection: Principles and Practice (GP3)'.

Ref. 10-17 Contaminated Land: Applications in Real Environments (2010) 'A Framework for Assessing the Sustainability of Soil and Groundwater Remediation'.

Ref. 10-18 Environment Agency/ Scottish Environment Protection Agency/ Northern Ireland Environment Agency (2013) 'Pollution Prevention Guidelines 01: General Guide to the Prevention of Pollution'.

Ref. 10-19 Environment Agency/ Scottish Environment Protection Agency/ Northern Ireland Environment Agency (2011) 'Pollution Prevention Guidelines 02: Above Ground Oil Storage Tanks'.

Ref. 10-20 Environment Agency/ Scottish Environment Protection Agency/ Northern Ireland Environment Agency (2006) 'Pollution Prevention Guidance 03: Use and Design on Oil Separators in Surface Water Drainage Systems'.

Ref. 10-21 Environment Agency/ Scottish Environment Protection Agency/ Northern Ireland Environment Agency (2006) 'Pollution Prevention Guidance 04: Treatment and Disposal of Sewage where no Foul Sewer is Available'.

Ref. 10-22 Environment Agency/ Scottish Environment Protection Agency/ Northern Ireland Environment Agency (2007) 'Pollution Prevention Guidelines 05: Works and Maintenance in or near water'.

Ref. 10-23 Environment Agency/ Scottish Environment Protection Agency/ Northern Ireland Environment Agency (2012) 'Pollution Prevention Guidelines 06: Working at construction and demolition sites'.

Ref. 10-24 Environment Agency/ Scottish Environment Protection Agency/ Northern Ireland Environment Agency (2011) 'Pollution Prevention Guidelines 07: 'Safe Storage: The Safe Operation of Refuelling Facilities'.

Ref. 10-25 Environment Agency/ Scottish Environment Protection Agency/ Northern Ireland Environment Agency (1998); 'Pollution Prevention Guidelines 20: Dewatering Underground Ducts and Chambers'.

Ref. 10-26 Environment Agency/ Scottish Environment Protection Agency/ Northern Ireland Environment Agency (2009) 'Pollution Prevention Guidelines 21: Incident Response Planning'.

Ref. 10-27 The Construction Industry Research and Information Association (2001) 'Guidance C532. Control of Water Pollution from Construction Sites: Guidance for Consultants and Contractors'.

Ref. 10-28 The Construction Industry Research and Information Association (2001); 'Guidance C665. Assessing Risks Posed by Hazardous Ground Gasses to Buildings'.

Ref. 10-29 The Construction Industry Research and Information Association (2001); 'Guidance C697. The SUDS Manual'.

Ref. 10-30 The Construction Industry Research and Information Association (2010) 'Guidance C692 - Environmental Good Practice on Site'.

Ref. 10-31 Mott MacDonald (2013) 'Geotechnical and Geo-Environmental Desk Study'.

Ref. 10-32 Envirocheck Report, customer reference 327511XX01, dated the 30th July 2013.

Ref. 10-33 Environmental Agency www.environment-agency.gov.uk

Ref. 10-34 British Geological Society www.bgs.ac.uk

Ref. 10-35 British Geological Society www.bgs.ac.uk

Ref. 10-36 Multi Agency Geographical Information for the Countryside (MAGIC) website: www.magic.defra.gov.uk

Ref. 10-37 The British Standards Institution (2013) BS 10175:2011+A1:2013 'Investigation of potentially contaminated sites. Code of practice', amended October 2013.

Ref. 10-38 Contaminated Land: Applications in Real Environments (CL:AIRE) (2011) 'Definition of Waste: Development Industry Code of Practice'.

Ref. 10-39 National House Building Council/ Environment Agency/ Chartered Institute of Environmental Health (2008) 'R&D 66, Guidance for the safe development of housing on land affected by contamination'.

Ref. 10-40 Preliminary UXO Risk Assessment.

Ref. 10-41 Environment Agency (2013) 'Framework for the Classification of Contaminated Soils in Hazardous Wastes', version 1.

Ref. 10-42 Environment Agency (2005) 'Guidance on Sampling and Testing of Wastes to Meet Landfill Waste Acceptance Procedures, version 1, April 2005'.

Ref. 10-43 The British Standards Institution (2013) 'BS 8576:2013 Guidance on investigations for ground gas. Permanent gases and Volatile Organic Compounds (VOCs)'.

Ref. 10-44 The British Standards Institution (2007) 'BS 8485:2007 Code of practice for the characterization and remediation from ground gas in affected developments'.

Ref. 10-45 Environment Agency (2001) 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance and Pollution Prevention'.

Ref. 10-46 HM Government (2001) 'The Control of Pollution (Oil Storage) (England) Regulations 2001'.

Ref. 10-47 Environment Agency/ Scottish Environment Protection Agency/ Northern Ireland Environment Agency (2011) 'Pollution Prevention Guidelines 26: Drums and Intermediate Bulk Containers'.

Transport for Greater Manchester

Chapter 11:

Water Resources and Flood Risk

Transport for Greater Manchester

11 WATER RESOURCES AND FLOOD RISK

11.1 Introduction

11.1.1 This chapter of the Environmental Statement (ES) reports the findings of an assessment of potential impacts on water resources, flood risk and drainage as a result of the proposed Metrolink Trafford Park Line in Trafford, Greater Manchester.

11.1.2 The chapter identifies key surface water resources and sensitivities, and considers the potential direct and indirect effects of the Metrolink Trafford Park Line on these resources. The assessment considers potential effects during the scheme construction phase (including any enabling works) and the operational phase. The need for mitigation measures is addressed and any residual effects are identified.

11.1.3 This chapter is supported by a Flood Risk Assessment (Technical Appendix F, ES Volume II) and Figure 11.1 (ES Volume III).

11.1.4 Potential impacts upon the hydrogeology underlying the Metrolink Trafford Park Line are addressed in Chapter 10: Ground Conditions.

11.2 Legislation and Planning Policy Context

Legislative Background

11.2.1 The water environment in the UK is regulated by a number of acts of legislation, including the Water Resources Act 1991 (Ref. 11-1) and the Land Drainage Act 1991 (Ref. 11-2). Recent European legislation implemented includes the Water Framework Directive (WFD) (2000/60/EC) (Ref. 11-3) which requires all member states to achieve good ecological status of watercourses by 2015. This legislation puts emphasis on the ecological quality and value of water as the principal parameter against which water bodies should be measured. Additionally, the Groundwater Directive (2006/118/EC) (Ref. 11-4), a supplement to the WFD, is of importance for the protection of groundwater resources.

11.2.2 A list of relevant water related legislation is provided in Table 11.1.

Table 11.1 Water Related Legislation, Policy and Guidance	
Directive/ Legislation/ Guidance	**Description**
Groundwater Directive 80/68/EEC	To protect groundwater against pollution by 'List 1 and 2' Dangerous Substances.
Environmental Protection Act 1990	Integrated Pollution Control (IPC) system for emissions to air, land and water.
Water Resources Act 1991	Protection of the quantity and quality of water resources and aquatic habitats. Parts have been amended by the Water Act 2003.
Habitats Directive 92/44/EEC	To conserve the natural habitats and to conserve wild fauna and flora with the main aim to promote the maintenance of biodiversity taking account of social, economic, cultural and regional requirements. In relation to abstractions and discharges, can require changes to these through the Review of Consents (RoC) process if they are impacting on designated European Sites.
Environment Act 1995	Sets out the role and responsibility of the Environment Agency.
Environmental Permitting (England and Wales) Regulations 2010 (as amended)	Incorporated the Pollution Prevention and Control system within wider umbrella of controls regarding discharges to land, water and air.
Water Framework Directive (WFD) 2000/60/EC (Implemented through The Water Environment (Water Framework Directive)(England and Wales) Regulations 2003)	The WFD was passed into UK law in 2003. The overall requirement of the directive is that all river basins must achieve 'good ecological status' by 2015, or by 2027 if there are grounds for derogation. The WFD, for the first time, combines water quantity and water quality issues together. An integrated approach to the management of all freshwater bodies, groundwater, estuaries and coastal waters at the river basin level has been adopted. It effectively supersedes all water related legislation which drives the existing licensing and consenting framework in the UK. The Environment Agency is the body responsible for the implementation of the WFD in the UK. The Environment Agency have been supported by UKTAG, an advisory body which has proposed water quality, ecology, water abstraction and river flow standards to be adopted in order to ensure that water bodies in the UK (including groundwater) meet the required status. These have recently been finalised and issued within the River Basin Management Plans (RBMP).

Table 11.1 Water Related Legislation, Policy and Guidance	
Directive/ Legislation/ Guidance	**Description**
Bathing Water Directive (76/160/EEC and 2006/7/EC)	Aims to protect public health and the environment from faecal pollution of bathing waters. The Directive sets a number of microbiological and physico-chemical standards that bathing waters must either comply with ('mandatory' standards) or endeavour to meet ('guideline' standards).
Water Act 2003	Implements changes to the water abstraction management system and to regulatory arrangements to make water use more sustainable.
Flood and Water Management Act 2010	The Act takes forward a number of recommendations from the Pitt Review into the 2007 floods and places new responsibilities on the Environment Agency, local authorities and property developers (among others) to manage the risk of flooding.

Planning Policy Context

National Planning Policy Framework (2012)

11.2.3 The National Planning Policy Framework (NPPF) (Ref. 11-5) came into force in March 2012 and outlines the government's economic, environmental and social planning policies for England. The NPPF sets out the government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations. The NPPF supersedes and replaces a number of planning policy documents that are applicable to the water environment including Planning Policy Statement 25 (PPS25) Development and Flood Risk (Ref. 11-6) and PPS23 Planning and Pollution Control (Ref. 11-7). The NPPF sets out twelve planning principles as guidance for local councils for the creation of their local plan; the following principles are directly applicable to the water environment:

- Meeting the challenge of climate change, flooding and coastal change (paragraphs 93 – 108) – support the transition to a low carbon future in a changing climate taking full account of (inter alia) flood risk and coastal change; and
- Conserving and enhancing the natural environment (paragraphs 109 – 125) – development should minimise pollution and other adverse impacts on the local and natural environment and should plan positively for the creation,

protection, enhancement and management of networks of biodiversity and green infrastructure.

11.2.4 The NPPF states that local plans are the key to delivering sustainable development that reflects the vision and aspirations of local communities. Local plans must be supported by a Strategic Flood Risk Assessment (SFRA) and develop policies to manage flood risk, taking account of advice from the Environment Agency. Local plans should apply a sequential, risk-based approach to the location of development to avoid flood risk to people and property where possible, and manage any residual risk, taking account of the impacts of climate change, by:

- Applying the Sequential Test (a tool to direct new development first to sites at the lowest probability of flooding (e.g. flood zone 1));
- If necessary, applying the Exception Test (provides a method of managing flood risk while still allowing necessary development to occur);
- Safeguarding land from development that is required for current and future flood management;
- Using opportunities offered by new development to reduce the causes and impacts of flooding; and
- Where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to facilitate the relocation of development, including housing, to more sustainable locations.

11.2.5 Local planning authorities should only consider development in flood risk areas appropriate where, informed by a site-specific flood risk assessment following the Sequential Test and if required the Exception Test, it can be demonstrated that:

- Within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location;
- Development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed; and it gives priority to the use of sustainable drainage systems; and
- Residual risks that remain after applying the sequential approach can be safely managed.

Technical Guidance to the NPPF (2012)

11.2.6 The NPPF Technical Guidance (Ref. 11-8) provides additional information for local planning authorities on development in areas at risk of flooding to ensure the effective implementation of the policies in the NPPF. This guidance retains key elements of PPS25 (Ref. 11-6) and is supported by the National Planning Practice Guidance (NPPG) (Ref. 11-9).

11.2.7 With respect to water resources and flood risk, local planning authorities should ensure that they:

- Prevent both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of land, air, water or noise pollution;
- Ensure several Sustainable Drainage System (SuDS) techniques, covering the whole range of sustainable approaches to surface water drainage management, are incorporated into new developments; and
- Ensure new development is planned to avoid increased vulnerability to impacts arising from climate change.

National Planning Practice Guidance (2014)

11.2.8 The NPPG (Ref. 11-9) was launched in March 2014 and provides a web-based resource in support of the NPPF (Ref. 11-5). Following public consultation on a 'beta' version ending on 9th October 2013, the NPPG has been amended to include greater emphasis on the importance of bringing brownfield land into use and issuing more robust guidance with regards to flood risk.

11.2.9 The NPPG supersedes and effectively cancels the PPS25 Practice Guide (Ref. 11-6), as detailed in the Ministerial Statement 'Making the planning system work more efficiently and effectively' (Ref. 11-10). Section 7 of the NPPG provides guidance and advises on how local planning authorities and developers should take account of the risks associated with flooding and coastal change in plan-making and the application process.

11.2.10 In summary, the guidance echoes the requirements of the NPPF Technical Guidance (Ref. 11-8) and states the main steps for local planning authorities and developers are to:

- Assess flood risk:
    - Local planning authorities should undertake a Strategic Flood Risk Assessment (SFRA) to support and inform the Local Plan; and

- Developers should undertake a site-specific flood risk assessment to accompany applications for planning permission for sites of 1 hectare or more.

- Avoid flood risk:
  - In plan-making, local planning authorities should apply a sequential approach to site selection to ensure that development is, as far as reasonably possible, located where the risk of flooding is lowest; and
  - In decision-taking, local planning authorities should also apply the sequential approach through the application of the Sequential Test and, if needed, the exception Test to steer development to areas with the lowest probability of flooding.

- Mitigate flood risk:
  - Where development needs to be in locations where there is a risk of flooding as alternative sites are not available, local planning authorities and developers should ensure that development is appropriately flood resilient and resistant, safe for its users for the development's lifetime, and will not increase flood risk overall; and
  - Local planning authorities and developers should seek flood risk management opportunities and to reduce the impacts of flooding through the use of SuDS.

11.2.11 The remainder of Section 7 of the NPPG effectively provides guidance on how these main steps can be addressed and achieved by both local planning authorities and developers.

Regional Planning Policy

11.2.12 The Regional Strategy (Ref. 11-11) which comprised of the North West of England Plan Regional Spatial Strategy (Ref. 11-12) and Northwest Regional Economic Strategy (Ref. 11-13) were revoked by the Government on 20th May 2013. Therefore, policies contained within the Regional Strategy are no longer considered relevant to the Metrolink Trafford Park Line.

11.2.13 In some cases planning inspectors have continued to use the evidence base which informed the preparation of the Regional Strategies; however, the evidence base is unlikely to be of significance in terms of its impact on planning policy for the Metrolink Trafford Park Line as the policies contained within the Regional Strategy are no longer considered relevant to the Metrolink Trafford Park Line.

Local Planning Policy

11.2.14 The Metrolink Trafford Park Line lies within the administrative boundary of Trafford Metropolitan Borough Council (TMBC) in Greater Manchester. The

statutory Development Plan for TMBC includes the adopted Core Strategy Local Plan (2012) (Ref. 11-14) and the 'saved' policies within the Revised Trafford Unitary Development Plan (UDP) (2006) (Ref. 11-15).

Trafford Metropolitan Borough Council Core Strategy

11.2.15 The Core Strategy (Ref. 11-14) was adopted by TMBC in January 2012 and replaces in part a number of policies in the Revised Trafford UDP (2006) (Ref. 11-15). The document provides the overarching planning policy framework for Trafford and sets the vision, spatial strategy and strategic policies for development in the Borough up to 2026.

11.2.16 Relevant Borough wide policies of relevance to water resources and flood risk include:

- Policy L5.1: Climate Change - New development should mitigate and reduce its impact on climate change factors, such as pollution and flooding and maximise its sustainability through improved environmental performance of buildings, lower carbon emissions and renewable or decentralised energy generation;
- Policy L5.13: Pollution - Development that has potential to cause adverse pollution (of air, light, water, ground), noise or vibration will not be permitted unless it can be demonstrated that adequate mitigation measures can be put in place;
- Policy L5.16: Water - The Council will seek to control development in areas at risk of flooding, having regard to the vulnerability of the proposed use and the level of risk in the specific location. This will involve a sequential approach to determining the suitability of land for development and application of the exception test, as outlined in national planning policy, where necessary;
- Policy L5.17: Water - Developers will be required to demonstrate, where necessary by an appropriate Flood Risk Assessment (FRA) at the planning application stage, that account has been taken of flood risk from all sources (including rivers, canals, sewers, surface water run-off and groundwater) as identified in the Council's Strategic Flood Risk Assessment and/ or shown on the Key Diagram, and that the proposed development incorporates flood mitigation and management measures appropriate to the use and location;
- Policy L5.18: Water - Developers will be required to improve water efficiency and reduce surface water run-off through the use of appropriate measures such as rain water harvesting, water recycling and other SuDS appropriate to

the various parts of the Borough, as mapped in the Council's Strategic Flood Risk Assessment;

- Policy R3.1: Green Infrastructure - The Council working with local communities, developers and partners, will develop an integrated network of high quality and multi-functional green infrastructure (GI) that will maximise the potential climate change benefits of the network and deliver, where appropriate, the opportunities and requirements set out in Policy L5, including enhanced flood risk management through water storage or run-off protection, integrating mitigation measures such as SuDS into the design, controlling temperatures through shade and other cooling effects, and reducing air and water pollution.

The Revised Trafford Unitary Development Plan

11.2.17 The Revised Trafford UDP (Ref. 11-15) was adopted in 2006 and includes a number of saved policies and proposals which specify how land is to be used and developed in the Trafford area over a 15 to 20 year period.

11.2.18 Relevant borough wide policies of relevance to water resources and flood risk include:

- Part I Policy ENV1: Flood Risk - The Council will minimise flood risk by taking a precautionary approach to all new development in or affecting areas liable to flooding;
- Part II Proposal ENV13: River Valley Floodplains - The Council will only permit land-filling, land-raising or other development in flood plains, as shown on the Proposals Map, in wholly exceptional circumstances and where all the following criteria are satisfied:
    - It will not increase the risk of flooding, by reducing flood storage capacity, increasing flows within the floodplain or via the additional discharge of surface water;
    - It will not itself be at risk from flooding;
    - It will provide adequate access to watercourses for maintenance purposes;
    - It will allow for the protection of existing or proposed flood defences;
    - It will not necessitate additional public expenditure on flood defence works.

Other Relevant Policy, Standards and Guidance

Manchester City, Salford City and Trafford Councils Strategic Flood Risk Assessment

11.2.19 The Strategic Flood Risk Assessment (SFRA) (Ref. 11-16) was prepared to assist TMBC in spatial planning decisions that are required to inform the LDP. Additional modelling was undertaken to supplement existing information on flood risk to identify the level of flood risk in the borough. The SFRA reported that there is a residual flood risk from a breach and/ or overtopping of the canal embankments and failure of a local reservoir.

EA Pollution Prevention Guidance Notes

11.2.20 The EA Pollution Prevention Guidance Notes (PPG) provide advice on statutory responsibilities and good environmental practice in relation to water pollution prevention. The Guidance Notes of particular relevance to the Metrolink Trafford Park Line include:

- PPG 1: General Guide to the Prevention of Pollution (Ref. 11-17) provides an introduction to pollution prevention and the pollution prevention guidance notes;
- PPG 2: Above Ground Oil Storage Tanks (Ref. 11-18) provides guidance to those responsible for the storage of oil on construction sites. The document provides guidance on location, bunding, protection and operation of oil stored in addition to maintenance and brief guidance on dealing with spills;
- PPG 3: Use and Design of Oil Separators in Surface Water Drainage Systems (Ref. 11-19) provides guidance on when oil separators are appropriate and what size and type of separator are required;
- PPG 6: Working at Construction or Demolition Sites (Ref. 11-20) is a document that mirrors much of PPG 5 (Works and maintenance in or near water) but with particular emphasis on the situations likely to occur at demolition and construction sites;
- PPG 7: Refuelling Activities (Ref. 11-21) provides information on the correct delivery, storage and dispensing of fuel to help reduce the risk of pollution; and
- PPG 21: Pollution Incident Response Planning (Ref. 11-22) assists those developing site-specific pollution incident response plans to prevent and mitigate damage to the environment caused by accidents such as spillages and fires.

Construction Industry Research and Information Association (CIRIA) Guidance

11.2.21 CIRIA guidance documents that are of relevance to the Metrolink Trafford Park Line include the following:

- Guidance C532 – Control of Water Pollution from Construction Sites (Ref. 11-23) brings together the EA guidance, but goes into greater detail with regard to sources of water on construction sites, pollutants and pathways. In addition, it provides guidance on planning for the type and location of suitable control measures;
- Guidance C697 – The SuDS Manual (Ref. 11-24) provides best practice guidance on the planning, design, construction, operation and maintenance of SuDS to facilitate their best effective implementation within developments.

11.3 Assessment Methodology and Effect Significance Criteria

11.3.1 This section of this ES chapter presents the following:

- Identification of the information sources that have been consulted throughout the preparation of this chapter;
- Details of the consultation undertaken with respect to water resources and flood risk;
- The methodology behind the assessment of water resources and flood risk effects, including the criteria for the determination of the importance of water resources and the magnitude of change from the existing or 'baseline' condition;
- An explanation as to how the identification and assessment of potential water resources and flood risk effects has been reached; and
- The significance criteria and terminology for the assessment of residual effects to water resources, flood risk and drainage.

11.3.2 The following sources of information that define the Metrolink Trafford Park Line have been reviewed and form the basis of the assessment of potential effects on water resources and flood risk:

- Figures 1.1 and 1.2 (Volume III of this ES) which illustrate the Metrolink Trafford Park Line proposals;
- Preliminary Surface Water Drainage Strategy Technical Note (MMD-327551-TN-011-A) (Ref. 11-25).

11.3.3 Additional data have been collected from the following information sources:

- Ordnance Survey (OS) Explorer EX277, 1:25,000 (2012) (Ref. 11-26);

- British Geological Survey (BGS) Map, Sheet E85, Solid and Drift Edition (2011) (Ref. 11-27);
- Environment Agency website (Ref. 11-28);
- United Utilities (UU) Asset Location Search (2014) (Ref. 11-29);
- Mott Macdonald (2013) Preliminary Drainage Design (Ref. 11-30);
- EnviroCheck Report 47970408_1_1 (2013) (Ref. 11-31);
- Manchester City, Salford City and Trafford Councils Strategic Flood Risk Assessment (SFRA) (Ref. 11-16);
- Greater Manchester Surface Water Management Plan (SWMP) (2012) (Ref. 11-32);
- Draft Trafford Local Flood Risk Management Strategy (2014) (Ref. 11-33);
- Trafford Council Preliminary Flood Risk Assessment (2011) (Ref. 11-34); and
- River Basin Management Plan (RBMP) North West River Basin District (2009) (Ref. 11-35);

11.3.4 In addition, the FRA (presented in ES Volume II: Technical Appendix G1) assesses the sources of flood risk in the vicinity of the Metrolink Trafford Park Line using available data on flood zones and modelled flood levels of the Manchester Ship Canal. Other potential sources of flood risk such as surface water runoff, overland flow and groundwater have also been assessed in the FRA.

Assessment Methodology

11.3.5 The methodology used to assess the potential effects upon water resources and flood risk, as a result of the Metrolink Trafford Park Line, comprises the following stages:

- Identification of potential surface water and groundwater resources that may be potential receptors and determination of their importance;
- Preparation of a conceptual site model, identifying potential pollution sources and pathways during the construction works and once the Metrolink Trafford Park Line is completed and operational;
- Determination of the magnitude of change of the potential impacts of the Metrolink Trafford Park Line on these receptors;
- Evaluation of the significance of the effects taking into account the magnitude of impacts and receptor importance;

- Identification of suitable and appropriate mitigation measures during Metrolink Trafford Park Line construction and operation; and
- An assessment of the significance of residual effects (effects following the implementation of defined mitigation measures).

Significance Criteria

11.3.6 There is no standard methodology for assessing the magnitude of impacts and the significance of effects of a proposed development on the water environment. Each project is evaluated according to its individual characteristics. A methodology for assessing the significance of any effect has therefore been developed, based on the requirements of relevant legislation. The methodology applied herein is considered to be appropriate for the types of impact that may result due to the Metrolink Trafford Park Line.

11.3.7 Significance criteria for the assessment of impacts on water resources and flood risk has been based on the methodology given in the Department for Transport's document 'The Water Environment Sub-Objective' Transport Analysis Guidance (TAG) UNIT 3.3.11 (Ref. 11-36), which brings together the New Approach to Transport Appraisal (NATA) (Ref. 11-37) and the Guidance on the Methodology for Multi-Modal Studies (GOMMMS) (Ref. 11-38).

11.3.8 Mustow, Burgess and Walker expanded the GOMMMS methodology in their 'Practical Methodology for Determining the Significance of Impacts on the Water Environment' publication in 2005 (Ref. 11-39) to make the application of the method more standardised and less subjective. This specific methodology has been used in this assessment.

11.3.9 The WebTAG methodology takes into account the importance and magnitude of predicted impacts on the water environment. Importance is based on the value of the feature or resource (Table 11.2), while the magnitude of a potential impact is estimated based on the degree of impact and is independent of the importance of the feature (Table 11.3).

11.3.10 Where other receptors and attributes are identified, professional judgement and available information has been used to determine the importance of water receptors.

11.3.11 The basic approach to assessing the effects of the Metrolink Trafford Park Line on water receptors is to consider how sensitive the receptors may be to changes in surface or groundwater conditions, including flows and water quality. The indicators used in making a professional judgement on the importance of a water

feature under consideration include quality, scale, rarity and compatibility where:

- Quality is a measure of the physical condition of the attribute;
- Scale requires consideration of the geographical scale at which the attribute matters to both policy makers and stakeholders, at all levels;
- Rarity requires consideration of whether the water feature is commonplace or scarce, at the scale at which it matters; and
- Compatibility requires consideration of whether water attributes can be replaced over a given time frame.

Table 11.2 Importance of Water Feature or Resource*

Importance	Criteria	Examples
Very High	Attribute with a high quality and rarity, regional or national scale and limited potential for substitution.	WFD Class "High" European Commission designated Salmonid fishery (Directive 79/659/EEC)
High	Attribute with a high quality and rarity, local scale and limited potential for substitution attribute with a medium quality and rarity, regional or national scale and limited potential for substitution.	WFD Class "Good" Cyprinid or Salmonid fishery
Medium	Attribute with a medium quality and rarity, local scale and limited potential for substitution or attribute with a low quality and rarity, regional or national scale and limited potential for substitution.	WFD Class "Moderate" River or aquifer providing abstraction water for agricultural or industrial use
Low	Attribute with a low quality and rarity, local scale and limited potential for substitution.	WFD Class "Poor" Floodplain with limited existing development

* Modified from WebTAG Unit 3.3.11

11.3.12 Impacts are quantified where practicable and the degree or magnitude of impact is assessed on a qualitative scale using the four-point scale as described in Table 11.3.

Table 11.3 Magnitude of Potential Impacts (modified from WebTAG Unit 3.3.11)		
Magnitude	**Criteria**	**Example**
Major	Results in loss of attribute.	Loss of EC designated Salmonid fishery Change in WFD status of river reach Compromise employment source Loss of flood storage/increased flood risk Pollution of potable source of abstraction
Moderate	Results in impact on integrity of attribute or loss of part of attribute.	Loss in productivity of a fishery Change in WFD status of watercourse Reduction in the economic value of the feature
Minor	Results in minor impact on attribute.	Measurable changes in attribute, but of limited size and/or proportion
Negligible	Results in an impact on attribute but of insufficient magnitude to affect the use/integrity.	Discharges to watercourse but no significant loss in quality, fishery productivity or biodiversity, and no significant impact on the economic value of the feature No increase in flood risk

11.3.13 For an impact on a water feature to exist, it is necessary for a linkage to be identified whereby a source of pollution or impact, a sensitive receptor to that pollution/ impact and a pathway by which the two are linked is demonstrated to exist (Source-Pathway-Receptor model). This model identifies the potential sources or 'causes' of impact as well as the receptors (water resources) that could potentially be affected. The presence of a potential impact source and a potential receptor does not always infer an impact, as there needs to be a clear mechanism or 'pathway' via which the source can have an effect on the receptor. For example, sewer flooding does not necessarily increase the risk of flooding unless the sewer is local to the site and ground levels encourage surcharged water to accumulate.

11.3.14 The first stage in applying the Source-Pathway-Receptor model is to identify the causes or 'sources' of potential impact from a development. Such sources have been identified through a review of the details of the Metrolink Trafford Park Line, including the size and nature of the scheme, potential construction methodologies and timescales. This has been undertaken in the context of local conditions relative to water resources near the scheme site (such as topography, geology, climatic conditions and potential sources of contamination).

11.3.15 The next step in the model is to undertake a review of the potential receptors, that is, the water resources themselves that have the potential to be impacted. The identification of potential water resource receptors has been undertaken through a review of baseline data.

11.3.16 The last stage of the model is therefore to determine if there is a viable exposure pathway or a 'mechanism' linking the impact source to the receptor.

11.3.17 The overall significance of a potential water resource effect is derived by considering both the importance of the feature and the magnitude of the impact, using the matrix as presented in Table 11.4.

Table 11.4 Derivation of Significance of Potential Water Resource Effects*

		Importance of Attribute			
		Very High	**High**	**Medium**	**Low**
Magnitude of Impact	**Major**	Very Substantial	Substantial	Moderate	Low
	Moderate	Substantial	Moderate	Low	Negligible
	Minor	Moderate	Low	Negligible	Negligible
	Negligible	Low	Negligible	Negligible	Negligible

*Adapted from WebTAG Unit 3.3.11

11.3.18 In order to retain consistency across all of the chapters of this ES, standard terminology has been adopted to describe the significance of effects (see Table 11.5).

Table 11.5 Terminology used to Describe Significance of Potential Water Resource Effects

Significance of Effect – Standard Terminology used in this Chapter	**Significance of Effect – WebTAG Terminology (from Table 11.4)**
Major adverse	Substantial or Very Substantial
Moderate adverse	Moderate
Minor adverse	Low
Negligible	Negligible adverse/ beneficial
Minor beneficial	Low
Moderate beneficial	Moderate
Major beneficial	Substantial or Very Substantial

11.3.19 Effects are only considered to be significant if they are of major or moderate significance. In applying this methodology, if a major or moderate adverse effect were to be identified, then mitigation measures would be developed to reduce or mitigate this effect. If beneficial effects are identified, then opportunities for further environmental enhancement would be considered.

Consultation

11.3.20 As stated earlier in this chapter, baseline conditions have been established through a desk study and via consultation with the following bodies:

- Environment Agency;
- United Utilities Limited (UU).
- The Transport and Works Act Order Unit (TWAOU) were consulted on the scope of this ES Chapter as part of the EIA Scoping Request (May 2014) and the EIA Scoping Opinion (June 2014) (refer to Technical Appendix A in Volume II of this ES). TMBC's specific water resources and flood risk recommendations and requirements outlined within this consultation exercise have been taken into account in the preparation of this ES chapter.

11.3.21 The Environment Agency has also been specifically consulted for flood risk information and on their flood risk requirements in May 2014. This information has been utilised to inform the assessment made within this ES chapter and the FRA.

11.3.22 Sewer asset plans have been requested from UU, whilst Transport for Greater Manchester will continue to consult with UU on water supply and wastewater generation during the detailed design phase.

11.3.23 Records of all relevant consultation undertaken can be found within the FRA (available in ES Volume II: Technical Appendix G).

Limitations and Assumptions

11.3.24 The analyses and conclusions presented in this chapter are based on the data available at the time of ES publication. The validity of the assessment is therefore dependent upon the data, which (given the sources and completeness) could not be verified but are considered to be reliable for the purpose of this assessment.

11.4 Baseline Conditions

Site Description

11.4.1 The Metrolink Trafford Park Line would traverse an area south-west of Manchester city centre, between the existing Pomona Metrolink stop (NGR SJ 8165 9655) and the intu Trafford Centre (NGR SJ 7705 9681) (see Figure 1.1 and Figure 1.2, Volume III of this ES).

11.4.2 The predominant land uses along the Metrolink Trafford Park Line route are industrial and commercial business. However, the western end of the route is characterised more by retail and leisure land uses, such as the intu Trafford Centre and the Chill Factor[e] indoor ski centre.

11.4.3 Land to the north of the Metrolink Trafford Park Line comprises the industrial area of Trafford Park and the Manchester Ship Canal, the centre of which forms the Metropolitan Borough boundary between Trafford (to the south) and Salford (to the north). The commercial area of Salford Quays and the residential area of Ordsall lie to the north of the Manchester Ship Canal, whilst Manchester city centre lies to the north east of the Metrolink Trafford Park Line.

11.4.4 Land to the south of the Metrolink Trafford Park Line comprises industrial areas of Trafford Park, the Trafford Centre Rectangle and the M60 Motorway. Further to the south lie the residential areas of Davyhulme and Urmston.

Existing Baseline (2014)

Surface Water/Hydrology

11.4.5 The study area for consideration of water resource impacts comprises the water bodies that are hydrologically connected with the Metrolink Trafford Park Line site, as based upon available data.

11.4.6 As shown in Figure 11.1 (Volume III of this ES), the water bodies that have been identified as being hydrologically connected to the Metrolink Trafford Park Line site include the following:

- Manchester Ship Canal;
- Bridgewater Canal; and
- Various surface water features.

11.4.7 The Manchester Ship Canal runs nearly 39 miles from Manchester city centre to the Mersey Estuary. The canal is located to the north of the Metrolink Trafford Park Line, flowing from east to west before turning south and flowing to the west of the intu Trafford Centre. The Manchester Ship Canal receives flows from

major rivers, including the River Irwell, River Irk and River Medlock as well as runoff from adjacent urban areas.

11.4.8 There are two branches of the Bridgewater Canal within the study area. The first branch runs from the Rochdale Canal in the Castlefield area, flows parallel with the Manchester Ship Canal passing to the south of the existing Pomona Metrolink stop. The canal then generally flows south towards Trafford Park and on towards Stretford.

11.4.9 The second branch, known as the 'Leigh Branch' runs from the south east to northwest and connects to the Leeds and Liverpool Canal near Boothstown. The Leigh Branch passes across the Manchester Ship Canal via the Barton Swing Aqueduct located approximately 0.7 km to the north of the intu Trafford Centre. The Metrolink Trafford Park Line route crosses the 'Leigh Branch' of the Bridgewater Canal at the point at which the A5081 (Park Way) crosses the canal, located just to the southwest of the Parkway Circle.

11.4.10 There are a number of surface water features in proximity to the Metrolink Trafford Park Line, all of which appear to be off-line (i.e. not connected to the Manchester Ship Canal or the Bridgewater Canal). As these water features have no hydraulic connectivity to the Metrolink Trafford Park Line route corridor, the impact of the scheme on these features has been scoped out of this assessment.

Surface Water Quality, Biodiversity and WFD Status

11.4.11 Given their urban catchments, the Manchester Ship Canal or the Bridgewater Canal as detailed above are subject to various existing pressures, including pollution (discharge of storm sewers, point sources pollution incidents, diffuse pollution), morphological modifications (due to urbanisation and flood defence) and changes to flow rates (runoff from hard surfaces, alterations in discharge due to drainage).

11.4.12 The Environment Agency surveys all main watercourses in England and Wales on a regular basis, in order to analyse, monitor and review the status of water bodies against the WFD (2000/20/EC) objectives set out for them. The WFD requires all water bodies to reach at least 'Good Status or Potential' by 2015. However, provided that certain conditions are satisfied, in some cases the achievement of good status may be delayed until 2021 or 2027.

11.4.13 For surface waters, good status is a statement of 'overall status' consisting of a chemical and ecological component. Chemical status measures priority substances which present a significant risk to the water environment and is classified as 'good' or 'fail'. Ecological status is measured on a scale of 'high', 'good', 'moderate', 'poor' and 'bad'. The ecological status takes into account

physico-chemical elements, biological elements, specific pollutants and hydromorphology.

11.4.14 Some water bodies are designated as 'artificial' or 'heavily modified' and are not able to achieve near natural conditions. The classification of these water bodies and the biology they represent are measured against 'ecological potential' rather than status. For these water bodies to reach good potential their chemistry must be good and the structural nature of the body of water, which harms the biology, must be essential for its valid use.

Manchester Ship Canal

11.4.15 The areas in the vicinity of the Manchester Ship Canal fall within the protected area designation of the Freshwater Fish Directive, Nitrates Directive and the Urban Waste Water Treatment Directive.

11.4.16 On a more local level, the Manchester Ship Canal is designated as a Local Nature Reserve (LNR) (Manchester Ship Canal Wildlife Corridor) (refer to Chapter 9: Ecology and Nature Conservation). The Manchester Ship Canal is located adjacent to the Metrolink Trafford Park Line (at its closest point near the existing Pomona Metrolink stop and the proposed Wharfside stop).

11.4.17 Within the North West River Basin Management Plan (Ref. 11-36), the Manchester Ship Canal in the vicinity of the Metrolink Trafford Park Line is referred to as 'Irwell/ Manchester Ship Canal Kearsley to Irlam Locks' (Waterbody ID: GB112069061450) and is classified as a heavily modified waterbody, due to flood protection, navigation and urbanisation. Chemical and ecological potential recognises the importance of heavily impacted watercourses' uses, whilst making sure that ecology is protected as far as possible.

11.4.18 The Manchester Ship Canal in the vicinity of the Metrolink Trafford Park Line is currently of moderate ecological potential and moderate overall potential. In terms of chemical status, no assessment has been undertaken. Table 11.6 shows a breakdown for each of the constituent elements for ecological status. Of note is that biological quality is currently 'high', while supporting chemical elements are all of 'high' quality, with the exception of phosphates (poor quality) and ammonia (bad). The Manchester Ship Canal is expected to reach good ecological potential by 2027.

Table 11.6 Summary of WFD Status of the Manchester Ship Canal (Irwell/ Manchester Ship Canal (Kearsley to Irlam Locks)		
Elements	**Current Status**	**Predicted Status (2015)**
Biological elements – Fish	High	High
Supporting elements – Ammonia	Bad	Moderate
Supporting elements – Dissolved Oxygen	High	High
Supporting elements – pH	High	High
Supporting elements – Phosphate	Poor	Poor
Supporting elements – Temperature	High	High
Supporting Conditions – Quality/ Dynamics of Flow	Good	Good
Overall Ecological Potential	Moderate	Moderate

11.4.19 Based on the above, the Manchester Ship Canal is considered to be a water resource receptor of high importance with respect to water quality, as it has water quality objectives under the WFD.

Bridgewater Canal

11.4.20 Some areas in the vicinity of the Bridgewater Canal fall within the protected area designation of the Nitrates Directive.

11.4.21 On a more local scale, the Metrolink Trafford Park Line crosses the Bridgewater Canal Wildlife Corridor and Site of Biological Importance (SBI) at the point where the A5081 (Park Way) currently crosses the Bridgewater Canal (refer to Chapter 9: Ecology and Nature Conservation), whilst the scheme route runs adjacent to the canal in the vicinity of the existing Pomona stop.

11.4.22 The Bridgewater Canal is defined as being a single entity in the North West River Basin Management Plan (Ref. 11-35) in terms of WFD status and objectives. The canal is referred to as 'Bridgewater Canal' (Waterbody ID: GB71210001) and is classed as an artificial waterbody due to navigation.

The Bridgewater Canal in the vicinity of the Metrolink Trafford Park Line is currently of good ecological potential and good overall potential. Table 11.7 shows a breakdown for each of the constituent elements for ecological status. Of note is that supporting chemical elements are all of 'high' quality.

Table 11.7 Summary of WFD Status of the Bridgewater Canal		
Elements	**Current Status**	**Predicted Status (2015)**
Supporting elements – Ammonia	High	High
Supporting elements – Dissolved Oxygen	-	-
Supporting elements – pH	High	High
Supporting elements – Phosphate	High	High
Supporting elements – Temperature	High	High
Supporting Conditions – Quality/Dynamics of Flow	-	-
Overall Ecological Potential	Good	Good

11.4.23 Based on the above, the Bridgewater Canal is considered to be a water resource receptor of high importance with respect to water quality, as it has water quality objectives under the WFD.

Fisheries

11.4.24 The Manchester Ship Canal is designated under the Freshwater Fisheries Fish Directive and is, therefore, considered to be of high importance.

11.4.25 The Bridgewater Canal, although not designated as a fishery, is known to support local populations of fish and is, therefore, considered to be of medium importance.

Water Supply

11.4.26 There are two surface water abstractions from the Manchester Ship Canal and/ or the Bridgewater Canal in operation within 1 km of the Metrolink Trafford Park Line (Ref. 11-31).

11.4.27 Based on the above information, both canals are considered to be of low importance in relation to water abstractions.

Surface Water Pollution/ Waste Dilution

11.4.28 Several pollution incidents to surface waters since 1990, within one km of the Metrolink Trafford Park Line (Ref. 11-31). The ten most recent events (as based on the datasets provided within (Ref. 11-31) are shown in Table 11.8. Given the historic nature of all the pollution records (most recent being in 1999), these pollution incidents are not anticipated to impact upon prevailing baseline water resource conditions.

Table 11.8 Recent Historic Pollution Incidents to Surface Waters				
Date	**Watercourse Affected**	**Significance Category**	**Pollutant**	**Grid Ref.**
02/08/1995	Manchester Ship Canal	Cat 3 - Minor	Vehicle Washings And De Waxing	378100 396300
01/02/1996	Manchester Ship Canal	Cat 3 - Minor	Chemicals - Pesticides	377800 397700
27/02/1996	Manchester Ship Canal	Cat 3 - Minor	Unknown	377400 397500
01/04/1996	Manchester Ship Canal	Cat 3 - Minor	Detergents/Surfactant	378400 397700
29/04/1996	Manchester Ship Canal	Cat 3 - Minor	Unknown	378600 397100
21/06/1996	Unnamed Watercourse	Cat 3 - Minor	Oil Spill	377800 395500
03/12/1996	Manchester Ship Canal	Cat 3 - Minor	Oils - Petrol	376700 397600
08/08/1997	Manchester Ship Canal	Cat 3 - Minor	Chemicals - Other Organic	378400 396900
08/03/1999	Manchester Ship Canal	Cat 3 - Minor	Oil Sludges	378600 397095
01/06/1999	Manchester Ship Canal	Cat 2 - Significant	Inorganic Chemicals Sulphuric	378400 396400

11.4.29 There is one active discharge license operating within 1 km of the Metrolink Trafford Park Line (Ref. 11-31). UU operates this discharge consent for the discharge of storm overflow from a combined sewer overflow (CSO) located on the Manchester Ship Canal (NGR 376770, 397680).

11.4.30 Based on the above information, the Manchester Ship Canal and the Bridgewater Canal are both considered to be of medium importance with regards to the transportation and dilution of waste products.

Amenity and Recreation

11.4.31 The Manchester Ship Canal corridor suffers from poor accessibility and poor visual amenity. Navigation along the waterway is restricted, with the draught not sufficient in many parts to allow the movement of boats. In addition to a lack of landing stages, waterborne access to the river is extremely limited. The

Manchester Ship Canal is, therefore, considered to be of low importance for amenity and recreation (in accordance with the criteria in Table 11.2).

11.4.32 The Bridgewater Canal is a shared leisure facility, used by fishermen, pedestrians and pleasure craft. The waterway provides a vital link for cruising between the Southern and Northern canal networks and is part of a popular cruising route known as the Cheshire ring of canals. Cyclists are now being encouraged to use improved sections of the canal towpath known as the Bridgewater Way. The Bridgewater Canal is thus considered to be of high importance in relation to recreation and amenity.

Infrastructure

Water Supply Infrastructure

11.4.33 Water supply in the area is provided by UU. During construction, the UU water supply network (distribution mains) would supply potable water from existing water treatment works for use at the Metrolink Trafford Park Line site.

Surface and Foul Water Drainage

11.4.34 The Metrolink Trafford Park Line is expected to mainly be developed on existing impermeable surfaces. A drainage strategy for the Metrolink Trafford Park Line would be developed at detailed design stage. Where appropriate, SuDS, including soakaways, swales and attenuation tanks/ ponds may be used to provide storage.

11.4.35 The local UU drainage network is a pathway for the transport of surface and wastewater and associated pollutants to the Manchester Ship Canal via CSOs.

Flood Risk

Fluvial Flooding

11.4.36 The Manchester Ship Canal, which is the canalised lower section of the River Irwell, is located to the north of the Metrolink Trafford Park Line.

11.4.37 The majority of the Metrolink Trafford Park Line route corridor lies within Flood Zone 1. Flood Zone 1 classifies areas of land that are considered to have a less than 0.1% (1 in 1000) annual exceedance probability (AEP) of fluvial flooding in any given year. Flood Zone 1 is, therefore, applied by the Environment Agency to classify areas that are considered to be at low risk of flooding from fluvial sources.

11.4.38 The FRA (available in ES Volume II: Technical Appendix G) indicates that a small area of the Metrolink Trafford Park Line route corridor is located within Flood Zone 2, namely the route section adjacent to the intu Trafford Centre, and the

route corridor to the east along Trafford Wharf Road and Pomona. Flood Zone 2 classifies areas of land that are considered to have between a 1% (1 in 100) and 0.1% (1 in 1,000) AEP of river flooding in any given year. Areas located in Flood Zone 2 are considered to be at medium risk of flooding from fluvial sources in accordance with the NPPF.

Groundwater Flooding

11.4.39 There are no known reports of groundwater flooding in the Trafford area. However, a number of areas within Trafford appear to suffer from a high water table or standing water, although this does not include the area in the vicinity of the Metrolink Trafford Park Line.

11.4.40 The SFRA (Ref. 11-16) indicates that the Environment Agency has identified the area around Trafford Park and Stretford as being potentially at risk of groundwater rebound. However, the Coal Authority considers mine water levels in Trafford to have fully or almost recovered. Some areas are likely to experience a slight rebound, but the effects of this would be minimal.

11.4.41 The Environment Agency Areas Susceptible to Groundwater Flooding (AStGWF) mapping indicates that the majority of the Metrolink Trafford Park Line lies within an area that is considered to be 25% to 50% susceptible to groundwater flooding. The route corridor located adjacent to the intu Trafford Centre lies within an area that is considered to be equal to or greater than 75% susceptible to groundwater flooding, whilst the area in the vicinity of Village Way and the Trafford Park Road/ Wharfside Way roundabout junction lies within an area that is considered to be 50% to 75% susceptible to groundwater flooding.

11.4.42 As the groundwater levels in the Trafford area have been reported to have stabilised, the risk of groundwater emergence occurring is considered to be low.

Flooding from Overland Flow

11.4.43 The SFRA (Ref. 11-16) identifies that the Metrolink Trafford Park Line is located within the Conurbation Core Critical Drainage Area (CDA). This large CDA includes areas of Manchester, Trafford, Salford, Tameside, Oldham, Rochdale, Bury and Bolton.

11.4.44 With the exception of a small area in the vicinity of the existing Pomona Metrolink stop, the proposed route corridor is not located within a Greater Manchester strategic surface water hotspot.

11.4.45 As a transport related development, the anticipated lifetime of the Metrolink Trafford Park Line is assumed to be 60 years in accordance with the recommendations of Section 7 of the NPPG. To comply with this, the Metrolink

Trafford Park Line drainage system would, therefore need to be designed to accommodate up to a 20% increase in peak rainfall intensity.

11.4.46 The Environment Agency Updated Flood Maps for Surface Water Flooding (uFMfSW) shows that the Metrolink Trafford Park Line is considered to be at 'low' to 'very low' risk of flooding from surface water, with the majority of the route considered to be at 'very low' risk of flooding. The Environment Agency define 'low risk' as an area that has a chance of flooding that is between 0.1% AEP and 1% AEP in any given year, with very low being <0.1% AEP. The local areas immediately adjacent to the Metrolink Trafford Park Line route are also shown as being at low risk of flooding from surface water.

11.4.47 The Metrolink Trafford Park Line is thus considered to be at low risk of flooding from surface water.

Sewer Flooding

11.4.48 Data from the UU Sewerage Incident Register, presented in the SFRA (Ref. 11-16), indicates that two locations in close proximity to the study area have experienced historic sewerage related flooding. The first location being in the vicinity of Wheel Forge Way (approximately 100 m to the west of the Metrolink Trafford Park Line crossing over the Bridgewater Canal), and the second on Elevator Road (approximately 150 m south of the proposed route along Trafford Wharf Road).

11.4.49 Whilst there is reported historic sewer flooding incidents in the vicinity of the Metrolink Trafford Park Line, the SFRA indicates that the risk in the area is low.

11.4.50 Given that the Metrolink Trafford Park Line route corridor is not located within a strategic surface water hotspot, the risk of flooding from sewers is considered to be low.

Flooding from Artificial Sources

11.4.51 The Bridgewater Canal does not generally pose a direct flood risk to the Metrolink Trafford Park Line route corridor as it is a controlled water body with regulated flows. Therefore, the residual risk of the canal flooding is considered to be low. Unlike the Bridgewater Canal, the Manchester Ship Canal receives unregulated flows from major rivers, although water levels in the canal are regulated by a series of control structures. Therefore, there is a residual risk of overtopping or breach due to failure of flow control structures or canal embankments.

11.4.52 Sections of the Metrolink Trafford Park Line that runs parallel with the intu Trafford Centre to the south west and the route corridor to the east in the

vicinity of the existing Pomona Metrolink stop are located within Canal Breach Zones of the Manchester Ship Canal, as identified within the SFRA (Ref. 11-16).

11.4.53 The likelihood of a breach or overtopping occurring from the canals is low due to the management regime of the canals and regular inspection of the sluices and related canal infrastructure and maintenance by the relevant organisation.

Reservoirs

11.4.54 A small area of the Metrolink Trafford Park Line, where the route runs parallel with Trafford Wharf Road, is located in an area at residual risk of flooding from the Entwistle Reservoir, owned by UU. Reservoir flooding is extremely unlikely to happen as all large reservoirs must be inspected regularly and essential safety works are carried out on a regular basis.

11.4.55 The risk of reservoir flooding to the Metrolink Trafford Park Line is, therefore considered, to be low.

Future Baseline (2020 - 2035)

11.4.56 All watercourses are expected to reach 'good' status or potential by 2027 in line with WFD objectives. The North West River Basin Management Plan (Ref. 11-35) sets out measures by which these objectives will be achieved for each of the water bodies described in this assessment. For the purpose of this report, it is assumed that 'good' status would be met and it is against this future baseline that the assessment is undertaken.

11.4.57 Both the Manchester Ship Canal and the Bridgewater Canal would remain heavily modified water bodies due to flood protection, navigation and urbanisation. Therefore, their sensitivity and importance in terms of biodiversity would remain limited in the future baseline scenario (medium and high importance respectively).

11.4.58 Likewise, for the purpose of this assessment, it is assumed that groundwater would reach 'good' status by 2027. As set out in the assessment methodology, groundwater is therefore considered to be of high importance (in terms of water quality/ quantity).

11.4.59 Other attributes or features of surface waters are not likely to change significantly. For example, fisheries are likely to be constrained by the size, use and morphological issues associated with the watercourses (arising from flood protection, urbanisation etc.).

11.4.60 Tables 4 and 5 in the Technical Guidance to the NPPF (Ref. 11-8) indicate that climate change is likely to have an impact on river flows, rainfall intensity and wind speed. Therefore, the risk of flooding from fluvial sources, drainage

infrastructure and overland flow is likely to increase in the future. Precautionary climate sensitivity ranges from the NPPF indicate that by 2035 peak rainfall intensities will increase by 10% and peak river flows by 20%.

Summary of Receptor Importance

11.4.61 Table 11.9 below summarises the importance assigned to the various water resources in the vicinity of the Metrolink Trafford Park Line as discussed in the sections above.

Table 11.9 Summary of Water Resource Receptor Importance

Attribute	Importance (2014)	Importance (2028/ 2042)
Manchester Ship Canal – Water Quality	High	High
Manchester Ship Canal – Fisheries	High	High
Manchester Ship Canal – Water Supply/ Abstractions	Medium	Medium
Manchester Ship Canal – Amenities and Recreation	Low	Low
Bridgewater Canal – Water Quality	High	High
Bridgewater Canal – Fisheries	Medium	Medium
Bridgewater Canal – Water Supply/ Abstractions	Medium	Medium
Bridgewater Canal – Amenities and Recreation	High	High
Flood Risk	Medium	Medium
UU Water Resources	High	High

11.5 Development Design and Impact Avoidance (Mitigation)

11.5.1 As a general measure to protect ground and surface water from a range of potentially polluting activities associated with infrastructure construction, the appointed Metrolink Trafford Park Line construction contractor would need to comply with relevant guidance during the construction phase. This includes the Environment Agency's PPG Notes (Ref. 11-17 to Ref. 11-22); Guidance C532 – Control of Water Pollution from Construction Sites (Ref. 11-23); and Guidance C697 – The SuDS Manual (Ref. 11-24)

11.5.2 Mitigation measures to be applied would be detailed in a Construction Environmental Management Plan (CEMP) and/ or Environmental Management Plan (EMP) which would be prepared and implemented by the selected construction contractor in accordance with applicable Transport for Greater Manchester policies. The CEMP should pay particular attention to where the

proposed construction works run alongside the Manchester Ship Canal and cross the Bridgewater Canal. It is likely that specific method statements would have to be developed for the demolition and construction works in the vicinity of these waterways.

Storage of Materials

11.5.3 The selected construction contractor would locate spoil and other temporary stockpiles on areas of hardstanding with isolated drainage systems in order to collect surface water runoff and prevent discharge to surface and groundwater.

11.5.4 Containment measures would be implemented, including 110% bunding of fuels and oils, whilst all chemicals would be stored in accordance with their Control of Substances Hazardous to Health (COSHH) guidelines. Spill kits would be provided in areas of fuel/ oil storage.

11.5.5 Exposed ground and stockpiles would be protected (e.g. covered) as appropriate and practicable to prevent windblown migration of potential contaminants and washout during rainfall events.

Staff Awareness/ Training

11.5.6 The selected construction contractor would ensure that site personnel are fully aware of the potential effects on water resources associated with the construction works and procedures to be followed in the event of an accidental pollution event occurring. This would be included in the site induction and training programme, with an emphasis on procedures and guidance to reduce the risk of water pollution.

Pollution Plans

11.5.7 Plans to deal with accidental pollution are to be drawn up by the selected construction contractor and agreed with the Environment Agency prior to construction commencing. Any necessary equipment (e.g. spillage kits) would be held on site and made accessible to all site personnel. The Environment Agency would be informed by the selected construction contractor immediately in the unlikely event of a suspected pollution incident.

Disturbance of Existing Drainage Systems and Water Supply Network

11.5.8 In consultation with UU, the selected construction contractor would ensure that all existing utilities are identified and marked prior to the construction works commencing. Signs should be used throughout the site to warn site workers of the presence of utility infrastructure. Any damage to the drainage and water supply network, should it occur, would be immediately repaired by the selected construction contractor.

Flood Risk

11.5.9 The selected construction contractor would locate compounds outside of the Canal Breach Hazard Zones and the Canal Overtopping Zones, wherever possible, to minimise the residual risk of flooding and displacement of flood waters in the unlikely event of a breach occurring.

Discharge/ Disposal of Potentially Contaminated Site Runoff/ Material

11.5.10 Plans for the discharge and/ or disposal of potentially contaminated water would be agreed in advance by the selected construction contractor with the Environment Agency and would be subject to appropriate licences.

11.5.11 All foul water from site compounds (including toilets) would be tankered away to an appropriate disposal facility. Any potentially contaminated surface water would be tested. If the water is of acceptable quality, as agreed with the Environment Agency and statutory undertakers, it would be discharged via the local drainage system. If it is not of a suitable quality, then it would not be discharged, and procedures as agreed with the Environment Agency would be followed.

11.5.12 If any suspected contaminated material is discovered during the works, it would be tested and dealt with appropriately. If material is considered to be contaminated, it would be disposed of to a licensed facility.

Bridgewater Canal Crossing

11.5.13 In addition to standard protection measures as detailed above, it is considered that additional mitigation measures are required for the proposed new Bridgewater Canal crossing (even though effects upon the canal are not predicted to be no more than of low significance).

11.5.14 A detailed method statement would be prepared by the selected construction contractor and agreed with Bridgewater Canal Trust, the Peel Group and the Environment Agency prior to commencing any works on the canal crossing. As part of the method statement and subsequent works, the selected construction contractor would ensure that biodiversity resources along the canal are protected (refer to Chapter 9: Ecology and Nature Conservation). Due to the constraints in terms of available space, it is unlikely that the design of the canal crossing could lead to significant beneficial impact, though any opportunities to enhance the local habitat should be taken.

11.5.15 Based on consultation with the Bridgewater Canal Trust (the navigation authority for the canal), the method statement would need to include design measures such as:

- A single span crossing of the canal, towpath and offside land; and
- Minimum finished clearance of 3.60 m above the normal water level.

11.5.16 Further discussions would be undertaken with both the Bridgewater Canal Trust, the Peel Group and the Environment Agency during the detailed design stage to establish any further requirements which may impact the design of the new canal crossing, particularly in relation to bank stability and flood risk.

Manchester Ship Canal

11.5.17 A detailed method statement would be prepared by the selected construction contractor and agreed with the Peel Group, the Environment Agency prior to commencing any works adjacent to the Manchester Ship Canal. As part of the method statement and subsequent works, the selected construction contractor would ensure that biodiversity resources along the canal are protected (refer to Chapter 9: Ecology and Nature Conservation).

Drainage System Design

11.5.18 In addition to the construction phase mitigation measures as highlighted above, the Metrolink Trafford Park Line drainage system would be designed in a manner that prevents flooding and protects water quality.

11.5.19 The Metrolink Trafford Park Line would mainly be developed on existing impermeable surfaces (considered to be Brownfield land).

11.5.20 Where practicable a minimum 50% reduction in runoff rates is to be achieved in accordance with Trafford Council's Local Development Framework, SPDI, Technical Note 3 Climate Change-Mitigation and Adaptation, 2012.

11.5.21 Consideration is to be given to the scale of any attenuation provision, its potential location, any restrictions in placement and the increased costs generated. All or any of which may preclude achieving the above aim in full.

11.5.22 Generally, drainage would be connected to the existing highway drainage, to public surface water sewers or to existing canals near to the route (Manchester Ship Canal/ Bridgewater Canal) wherever possible. Where this is not practicable connections to combined sewers would be considered.

11.5.23 The individual outfall points/capacity restrictions to be applied to that outfall would be agreed with United Utilities, Trafford Council and Peel Holdings, as appropriate.

11.6 Environmental Impacts and Significance of Effects

11.6.1 A number of potential impacts on water quality may occur during the Metrolink Trafford Park Line construction and operational phases as detailed in the sections below.

Construction

11.6.2 Pollution sources arising during the construction of the Metrolink Trafford Park Line that could impact upon surface and groundwater include the following:

- Suspended sediments in site runoff;
- Discharge/ spillage of pollutants held on site (this includes oils/ hydrocarbons, concrete and cement products, paint etc.);
- Disturbance of contaminated land; and
- Disturbance of existing drainage systems and the water supply network.

11.6.3 Other water-related aspects as associated with the Metrolink Trafford Park Line construction phase include:

- Additional water supply requirements; and
- Additional wastewater generation.

11.6.4 Potential water resource impacts and effects during the construction phase are discussed in the sections below.

Suspended Sediments in Site Runoff

11.6.5 Potential sources of suspended sediments during the construction of the Metrolink Trafford Park Line include excavations, exposed ground and stockpiles, grouting, plant and wheel washing and dust and sediment generated during these works. The major pathway for suspended sediments to reach water receptors is through run-off during rainfall events or when areas are being washed down. This may cause sediment-laden water to enter the local drainage network, cause blockages, and potentially reaching the canals via CSOs, as well as infiltrating the ground.

11.6.6 Suspended sediments can result in the suffocation of fish, smothering of plants, reduce levels of light within water bodies and decrease the water quality of surface water abstractions. Any organic matter contained within the sediment can increase the Biochemical Oxygen Demand (BOD) of the water and result in a lowering of dissolved oxygen levels. Suspended sediments are also a major transport mechanism for low-solubility contaminants that can bind to sediment

particles and enter water bodies resulting in adverse effects to the receiving water.

11.6.7 The release of potentially polluted suspended sediments could have a short term, adverse, moderate magnitude impact on flood risk (medium importance), through the deposition and build-up of sediment in the sewer network, resulting in potential blockages and resultant localised flooding. It is anticipated that any impact would be short-term and localised, but could otherwise result in an effect of minor significance.

11.6.8 It is considered that there would be a negligible impact on the water quality of the Manchester Ship Canal and Bridgewater Canal (both of high importance) due to suspended sediments in surface water discharges – this is the case given the dilution factor within the water bodies and given the implementation of the mitigation measures as detailed in the previous section. This would result in an effect of negligible significance.

11.6.9 The discharge of suspended sediments in surface water discharges it is considered to have a negligible impact on the recreation and amenity attribute of the Manchester Ship Canal and Bridgewater Canal (due to the dilution factor within the water bodies and given the implementation of the mitigation measures as detailed in the previous section). A negligible impact is also anticipated on both fisheries and canal water abstractions. The significance of the effect on recreation, amenity and fisheries is thus considered to be negligible.

Spillage of Pollutants

11.6.10 During the Metrolink Trafford Park Line construction phase, there is an elevated risk of leakages or the accidental spillage of building materials and potential pollutants used on site, which could migrate to nearby surface watercourses. Washout facilities (washing of tools, plant and equipment), storage and handling of various liquids and soluble solids (including fuel) can potentially result in watercourse pollution. Inappropriate disposal of waste materials associated with the construction phase of the development also has the potential to enter surface watercourses.

11.6.11 If oils are released into the Manchester Ship Canal or the Bridgewater Canal via surface water run-off, the result could be fatal to fish and other aquatic organisms and lead to the creation of oily surface films on the water and a reduction in the quality of industrial and potable abstractions. Oils also bind to sediments, strata and organisms and can form emulsions that float on the water

surface and upon breakdown the action of microbes can lower the dissolved oxygen content of the water.

11.6.12 It is considered that there would be negligible impact on the water quality of the Manchester Ship Canal and the Bridgewater Canal due to accidental spillages given the low volume of any potential spill and the dilution factor within these water bodies, and given the implementation of the mitigation measures as detailed in the previous section. Therefore, the significance of the effect on canal water quality is considered to be negligible.

11.6.13 Due to the dilution provided within the canal network and the implementation of defined mitigation measures, it is also considered that there would be a minor, localised short term, adverse impact on canal water abstractions and fisheries due to accidental spillages. This would result in a negligible effect on water supply from both canals and a negligible effect on the Bridgewater Canal in terms of fisheries. Due to the high importance classification of the Manchester Ship Canal fisheries, the minor, localised short term, adverse impact would result in an adverse effect of minor significance.

11.6.14 The spillage of pollutants can result in the creation of oily surface films and/ or emulsions that float on the water surface. It is considered that there would be a potential short term, localised adverse minor impact on the recreation and amenity attribute of the canals due to accidental spillages. For the Manchester Ship Canal this would result in an effect of negligible significance. However, for the Bridgewater Canal, as used by fishermen, pedestrians and pleasure craft, such as adverse effect would be short term and of minor significance.

Disturbance of Contaminated Land

11.6.15 It is possible that undiscovered areas of contamination could exist within the Metrolink Trafford Park Line development footprint, with the potential for disturbance and the re-mobilisation of contaminants into surface water (via surface water runoff and/ or the drainage network).

11.6.16 Should any potentially contaminated ground, including isolated 'hotspots' of contamination, be encountered during construction, the contractor would be required to investigate the area and then assess whether there is a need for containment or disposal of the material. The contractor would also be required to assess whether any additional health and safety measures are required. Any such investigations would be required to be undertaken in consultation with the Environment Agency and other appropriate consultees. To further minimise the risks of contaminants being mobilised and contaminating other soils/ water

during the development of the site, construction workers would be briefed as to the possibility of the presence of such materials.

11.6.17 It is considered that there would be a negligible effect on the water quality of both canals due to the disturbance of contaminated land given the low volume of any potential contamination, the dilution factor within these water bodies, and given the implementation of the mitigation measures as detailed in the previous section and those as detailed in Chapter 10: Ground Conditions).

11.6.18 Disturbance of contaminated land could result in a minor, short term, localised impact on canal water abstractions. The significance of the effect would be negligible for water abstractions from both canals. There would also be a negligible effect on the Manchester Ship Canal recreation and amenity attribute. However, the potential effect on the Manchester Ship Canal fisheries would be adverse, short term and of minor significance.

11.6.19 It is anticipated that disturbance of contaminated land could have a negligible effect on the Bridgewater Canal fisheries and an adverse effect of minor significance on the Bridgewater Canal recreation and amenity attributes.

11.6.20 To further reduce the effect on the canals, the contractor would be required to place arisings and temporary stockpiles away from watercourses and drainage systems, whilst surface water would be directed away from stockpiles to prevent erosion.

11.6.21 The risk to surface water and groundwater from run-off from any contaminated stockpiles during construction works would be further reduced by implementing suitable mitigation measures including sealing stockpiles to prevent rainwater infiltration. Alternatively bunding and/ or temporary drainage systems could be put in place, designed in line with current best practice, following appropriate guidelines and obtaining all relevant licences including discharge consents.

Disturbance of Existing Drainage Systems and Water Supply Network

11.6.22 During construction of the Metrolink Trafford Park Line, the UU surface water and combined sewerage network in the vicinity of the route corridor is expected to transport some of the surface water runoff generated on site, with consent from UU.

11.6.23 Disturbance of the existing drainage network on site could increase the likelihood of pollutants being re-released in an uncontrolled manner. Such disturbances could have a potential negligible impact on the Bridgewater Canal and/ or Manchester Ship Canal water quality, resulting in an effect of negligible

significance (due to the dilution factor within the watercourses and the implementation of mitigation measures as defined in the section above).

11.6.24 Damage to the UU water supply network could cause an uncontrolled release of drinking water from the network – this could have an impact of moderate magnitude (short-term) on the local network and could lead to pressure reduction and the interruption to water supply to surrounding buildings, as well as causing localised flooding. Prior to the start of construction activities, the location of UU infrastructure should be identified and clearly marked throughout the site, therefore reducing the likelihood of damage occurring to water supply infrastructure. As a result, effect due to damage of the UU water supply network would be of negligible significance.

Water Demand

11.6.25 Processes during the Metrolink Trafford Park Line construction phase, significant volumes of water may be required for mixing (especially relating to concrete), supply for washing down and potable water for sanitary facilities for site staff. The most intensive use of water, for the mixing of concrete, would be done off-site where possible and therefore would not affect water supply in the vicinity of the development footprint.

11.6.26 It is expected that water supply to the site during the construction phase would be provided by the existing UU network and an application to use an existing water supply for building purposes would be made to UU.

11.6.27 Water demand for construction processes would represent a short-term increase in supply volumes. This could have a temporary, short-term, minor adverse magnitude of impact on water supply infrastructure locally, and therefore an adverse effect of low significance. However, if UU grants the application for water supply for building purposes, then the effect on UU water resources is considered to be negligible.

11.6.28 Water saving measures would be adopted by the selected construction contractor where possible, thereby reducing the impact on the water supply network. Means of reducing water consumption include:

- Selection and specification of equipment to reduce the amount of water required;
- Implementation of staff-based initiatives such as turning off taps, plant and equipment when not in use both on-site and within site offices;
- Use of recycling water systems such as wheel washes, site toilets hand wash; and

- Use of a rainwater harvesting system for equipment and vehicle washing.

Wastewater Generation

11.6.29 Wastewater generation on construction sites includes effluent from sanitary facilities provided on-site, and sediment laden water from washing down and wheel wash facilities. It is expected that foul water generated at the Metrolink Trafford Park Line construction site would be drained via the existing UU sewers in the surrounding area, following treatment if required. If dewatering is required during excavations, then abstracted water may be discharged to the UU network following sediment removal.

11.6.30 Construction activities may thus result in an increase in the volume of wastewater generated. An increase in wastewater volumes can increase pressure on the local sewer network capacity and increase flood risk. It can also lead to a potential increase in the volume of water spilled into the canals, via CSOs in the UU network.

11.6.31 The rate at which the construction site can discharge to the UU sewer network is restricted by the size of the existing sewer connections. If no additional connections to the sewer network are obtained, then the maximum discharge into the sewer network would not exceed the existing situation. If wastewater is generated at a greater volume than it can be discharged to the sewer network, then it would be stored or tankered off-site by the selected construction contractor. Therefore, the impact on flood risk and the Bridgewater Canal and the Manchester Ship Canal (for all attributes) is considered to be negligible. The significance of the effect is thus considered to be negligible.

11.6.32 The use of water efficient fixtures and fittings, and the use of mitigation measures to prevent silty water ingress as detailed in the sections above, can help to reduce the volume of water entering the UU foul sewer network and thus reduce flood risk and impacts on the water quality of the canals by reducing the wastewater volume discharged via CSOs.

Operation

11.6.33 Pollution sources arising from the operational use of the Metrolink Trafford Park Line, which could impact upon water attributes, comprise the following:

- Leaks, spillages, application of fertilisers and pesticides within landscaped areas; and
- Flood risk.

Leaks, Spillages, Application of Fertilisers and Pesticides

11.6.34 Typical sources of pollution due to infrastructure developments include oil leaks and petrol spillages from vehicles, car parks or storage facilities and from the application of fertilisers, pesticides and herbicides to landscaped areas. Pollutants can be mobilised in surface water run-off and enter the surface water drainage network.

11.6.35 The release of chemicals in this way as associated with the Metrolink Trafford Park Line are anticipated to have a negligible effect on the water environment, as the quantities of pollutant are likely to be relatively small and given the dilution within the environment (for example, in surface water run-off, the receiving sewer network, the Bridgewater Canal and the Manchester Ship Canal). In addition, the Metrolink Trafford Park Line drainage system design would include, as necessary, measures to control the unregulated release of potential pollutants, whilst any maintenance works involving the application of fertilisers, pesticides and herbicides to landscaped areas would be undertaken in accordance with the manufacturer's instructions and in a manner that prevents their discharge into surface water.

Flood Risk

11.6.36 The Metrolink Trafford Park Line route would mostly be located on existing impermeable surfaces. The majority of the route corridor would continue to remain impermeable, though some small areas of soft landscaping may be introduced at ground level. It is anticipated that surface water runoff would not be significantly increased as a result of the Metrolink Trafford Park Line.

11.6.37 Surface water runoff generated would need to be discharged into either a soakaway, nearby watercourse or existing drainage network.

11.6.38 Taking into account the proposed drainage strategy, the FRA for the Metrolink Trafford Park Line (as included within ES Volume II: Technical Appendix F) illustrates that the development would not increase flood risk from fluvial, groundwater or overland flow sources. Therefore, flood effects due to the Metrolink Trafford Park Line are considered to be of negligible significance.

Mitigation

11.6.39 A number of measures are already proposed to mitigate potential impacts and effects upon water resources during the construction and operation of the Metrolink Trafford Park Line (notably measures to control runoff rates, water quality etc. during the construction phase and implementation of a scheme drainage design).

11.6.40 The FRA (ES Volume II: Technical Appendix F) indicates that the Metrolink Trafford Park Line would have a negligible effect upon flooding.

11.6.41 Though the hard surfacing of the Metrolink Trafford Park Line would not be vulnerable to floodwater, it is recommended that flood resilient/ resistant construction techniques are considered where vulnerable equipment is used (such as signalling or other electrical equipment and at stops). The potential flood water depths that could be experienced during a breach or overtopping of the canals should be taken into consideration when locating such tram infrastructure and electrical equipment. The utilisation of flood resilient construction techniques would assist with managing the residual risk associated with a potential breach/ overtopping of the canals.

11.7 Residual Effects and Conclusions

11.7.1 Table 11.10 provides a summary of the predicted residual water resource effects of the Metrolink Trafford Park Line.

11.7.2 This assessment indicates that the Metrolink Trafford Park Line would not significantly impact upon either the Manchester Ship Canal or the Bridgwater Canal. It is, therefore, considered that the Metrolink Trafford Park Line would not impact upon the WFD status of these water bodies.

Table 11.10 Summary of Residual Effects

Receptor	Impact	Magnitude of Impact	Mitigation	Residual Effect
Construction Phase				
Sewer Network	Blockage of sewer network due to suspended sediment resulting in flooding	Moderate	Good site practices	Negligible
Manchester Ship Canal and Bridgewater Canal	Impacts due to suspended sediment discharges	Negligible	Good site practices and addition protection measures at the Bridgewater Canal crossing	Negligible

Table 11.10 Summary of Residual Effects				
Receptor	**Impact**	**Magnitude of Impact**	**Mitigation**	**Residual Effect**
Manchester Ship Canal and Bridgewater Canal	Impacts due to accidental spillages	Negligible/ Minor	Good site practices	Negligible
Manchester Ship Canal and Bridgewater Canal	Impacts due to encountering contaminated ground	Negligible/ Minor	Good site practices	Negligible
Manchester Ship Canal and Bridgewater Canal	Impacts due to disturbance of existing drainage systems and water supply network	Negligible	Good site practices	Negligible
UU Water Supply Network	Impacts due to disturbance of existing drainage systems and water supply network	Negligible	Good site practices and appropriate liaison with UU	Negligible
UU Water Supply Network	Water demand from construction activities	Minor/ Negligible	Good site practices and appropriate liaison with UU	Negligible
Manchester Ship Canal and Bridgewater Canal and Flood Risks	Wastewater discharges	Negligible	Good site practices	Negligible
Operational Phase				
Manchester Ship Canal and Bridgewater Canal	Leaks, spillages, application of fertilisers and pesticides within landscaped areas	Negligible	Good site practices	Negligible

Table 11.10 Summary of Residual Effects				
Receptor	**Impact**	**Magnitude of Impact**	**Mitigation**	**Residual Effect**
Area flood risk	Increase in flood risk (fluvial, groundwater or overland flow sources)	Negligible	Appropriate Metrolink Trafford Park Line drainage system design	Negligible

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Transport for Greater Manchester

Chapter 12:

Cultural Heritage

12 CULTURAL HERITAGE

12.1 Introduction

12.1.1 This chapter of the Environmental Statement (ES) reports the findings of an assessment of potential impacts on cultural heritage as a result of the proposed Metrolink Trafford Park Line in Trafford, Greater Manchester.

12.1.2 The assessment considers all designated and non-designated cultural heritage assets within a search area comprising a 250 m Study Area either side of the Metrolink Trafford Park Line.

12.1.3 This chapter is supported by the Figure 12.1 (Heritage Assets), which is provided in Volume III of this ES, and Technical Appendix G (Volume II of this ES).

12.2 Legislation and Planning Policy Context

12.2.1 The following legal frameworks and national planning guidance apply which are discussed in the sections below:

- The Ancient Monuments and Archaeological Areas Act 1979 (Ref. 12-1);
- Planning (Listed Buildings and Conservation Areas) Act 1990 (Ref. 12-2); and
- National Planning Policy Framework (NPPF) 2012 (Ref. 12-3).

Legislative Background

12.2.2 The Ancient Monuments and Archaeological Areas Act 1979 (Ref. 12-1) is the central piece of legislation which protects the archaeological resource. A set of criteria, defined as survival/ condition, period, rarity, fragility/ vulnerability, diversity, documentation, group value and potential, assist in the decision making process as to whether a site is deemed of national importance and best managed by scheduling.

12.2.3 Section 66 of the Planning (Listed Buildings and Conservation Areas) Act 1990 (Ref. 12-2) requires the local authority, when considering whether to grant planning permission for development which affects a listed building or its setting, to have "special regard" to the desirability of preserving the building or its setting, or any features of special architectural or historic interest which it possesses.

12.2.4 For archaeological sites that are not covered by the above Acts, protection is afforded through development control and the NPPF (Ref. 12-3) as discussed in sections 12.2.5 and 12.2.6.

National Planning Policy

12.2.5 The NPPF (Ref. 12-3) was published on 27th March 2012. The NPPF took immediate effect and represents a significant change to the national planning policy landscape. The NPPF is a material consideration in planning decisions and forms a single overarching planning policy for England, replacing all other Planning Policy Statements and Planning Policy Guidelines. It is also the basis for the preparation of local development plans.

12.2.6 The conservation and enhancement of the historic environment is granted an entire section (Section 12) within the NPPF which, in summary, highlights the following issues:

- The Local Plan should set a positive strategy for conservation and enjoyment of the historic environment, recognising that heritage assets are an irreplaceable resource (paragraph 126);
- Substantial harm to or loss of designated heritage assets of the highest significance should be wholly exceptional. Where a development will lead to substantial harm to or total loss of significance of a designated heritage asset, local planning authorities should refuse consent, unless there are substantial public benefits (paragraph 132 and paragraph 133);
- In the case of non-designated heritage assets, a balanced judgment will be required having regard to the scale of any harm or loss and the significance of the heritage asset; and
- Local planning authorities should make gathered information about the significance of the historic environment publicly accessible. They should also require developers to record and advance understanding of the significance of any heritage assets to be lost, proportionate to the value of the asset.

Local Policy

12.2.7 Trafford Unitary Development Plan (UDP) (Ref. 12-4) is a saved plan and is therefore a Local Plan document within the Local Plan framework. Policies relating to the historic environment and thus relevant to this assessment have been replaced with adopted Core Strategy Policies. ENV24 'Buildings of Special Architectural and Historic Interest', and ENV26 'Archaeological Sites' have been replaced with Core Strategy Policy R1 of the Trafford Local Plan Core Strategy (Ref. 12-5).

12.2.8 Policy R1 aims to protect, maintain and enhance the Borough's historic environment. Paragraph R1.6 of the Policy requires developers to demonstrate how their proposals will protect and enhance heritage assets and their settings

including Listed Buildings and buildings on the local list, sites of archaeological significance and sites identified in Trafford's Urban Historic Landscape Characterisation Report. Paragraph R1.8 of the Policy states that in areas of archaeological importance, developers are required to identify the presence or absence of archaeological remains and also the potential for encountering previously unrecorded assets and to establish a framework for the investigation and/ or preservation of assets that may be impacted by development.

Other Relevant Policy, Standards and Guidance

National Planning Policy Guidance

12.2.9 New and online National Planning Policy Guidance (NPPG) was issued by the Department for Communities and Local Government in March 2014 (Ref. 12-6). It provides clarity and guidance for the implementation of policies within the NPPF.

12.2.10 For the historic environment, NPPG provides useful guidance particularly with regards to assessing whether a development will cause substantial harm (policy on substantial harm to designated assets is set out in paragraphs 132 and 133 of the NPPF).

12.2.11 Paragraph: 017 of the NPPG states:

''While the impact of total destruction is obvious, partial destruction is likely to have a considerable impact but, depending on the circumstances, it may still be less than substantial harm or conceivably not harmful at all, for example, when removing later inappropriate additions to historic buildings which harm their significance. Similarly, works that are moderate or minor in scale are likely to cause less than substantial harm or no harm at all. However, even minor works have the potential to cause substantial harm.''

Planning Policy Statement (PPS) 5. Planning for the Historic Environment Historic Environment: Planning Practice Guide

12.2.12 This planning practice guide was issued by English Heritage in 2010 (Ref. 12-7) and was published alongside the now defunct PPS5 to provide further clarity to the shortened planning document. Even though the 2014 NPPG has been issued, the 2010 practice guide is still in use and remains a material consideration in the planning process.

12.2.13 In relation to non-designated assets, paragraph 83 of the guide states that:

"the desirability of conserving them and the contribution their setting may make to their significance is a material consideration, but individually less of a priority than for designated assets or their equivalents".

12.2.14 For designated assets, the document states *"any harmful impact on the significance of designated assets needs to be justified on the grounds set out in HE9.2 (substantial harm or total loss) or HE9.4 (less than substantial harm)"* (paragraph 85). This is clarified in paragraphs 91 to 95, which set out parameters for establishing the definition of substantial harm. Paragraph 91 states: *"where substantial harm to, or total loss of, the asset's significance is proposed a case can be made on the grounds that it is necessary to allow a proposal that offers substantial public benefits."* This suggests that substantial harm is equated to serious harm, or total loss of significance.

Conservation Principles

12.2.15 Conservation Principles Practice and Guidance published by English Heritage in 2008 (Ref. 12-8) maintains that decisions about the day-to-day management of the heritage values of a place or asset must take into account all the values that contribute to its significance. It summarises these values as ranging from evidential through historical and aesthetic to communal values which derive from people's identification with the asset. The guidance directs that if the cultural heritage values of a place or asset are to be identified, its history, fabric and character must first be understood. Emphasis is placed on gaining an understanding of the contribution that setting makes to the value of a heritage asset.

The Setting of Heritage Assets

12.2.16 The guidance published by English Heritage in 2011 (Ref. 12-9) defines setting as *"the surroundings in which a heritage asset is experienced"*. Setting, in this definition, does not have a fixed extent and can change as the asset and its surroundings evolve. Elements of a setting can make positive or negative contributions to the significance of an asset and affect the ways in which it is experienced. The guidance is clear that setting is more extensive than the curtilage of a building and is contributed to by factors other than visual appearance including noise, dust and vibration.

12.2.17 The guidance recommends a five step approach to the assessment of the effect of development on the setting of heritage assets as follows:

- Identify which assets and settings are affected;
- Assess to what degree these settings make a contribution to the significance of the heritage asset;
- Assess the effects of the proposed development;
- Explore ways to minimise harm and maximise enhancement; and

- Document the decision and monitor outcomes.

Seeing The History in the View

12.2.18 Seeing the History in the View was published by English Heritage in 2011 (Ref. 12-10) and explains how the heritage significance of views can be assessed. The guidance was originally developed for use in London, but can be applicable to all urban and rural areas and was referred to, along with the Setting of Heritage Assets guidance, during the site walkover survey undertaken as part of this assessment (see Section 12.4 of this ES chapter).

12.2.19 The guidance recommends that the heritage significance within a view is defined during baseline analysis, and once the significance is understood, the magnitude of change from a proposed development upon a view can be assessed.

12.2.20 In assessing the heritage significance within a view, the significance of each asset along with the components of their setting that contribute to their significance, must be understood.

12.3 Assessment Methodology and Effect Significance Criteria

12.3.1 This section presents the following:

- Identification of the information sources that have been consulted to prepare this cultural heritage chapter;
- Details of impact assessment guidance used to define the methodology applied;
- Details of the consultation activities undertaken with respect to cultural heritage; and
- The methodology used to assess the potential cultural heritage effects, including the criteria used to determine receptor sensitivity and impact magnitudes.

Information Sources

12.3.2 The following sources of information that define the Metrolink Trafford Park Line have been reviewed and form the basis of the cultural heritage impact assessment:

- Data sources relating to statutory and non-statutory designated assets held on the National Heritage for England List (Ref. 12-11);
- Data on designated and non-designated assets, including historic landscape features, held by Greater Manchester Archaeological Advisory Service (GMAAS) Historic Environment Record (HER);

- Review of available documentary and historic map sources held at the Greater Manchester County Record Office;
- Technical development plans and sections of the Metrolink Trafford Park Line;
- A walkover assessment of the route and the identification of heritage assets and their setting; and
- Geotechnical desk-study and review of available geotechnical borehole records.

Methods for Determining Baseline Conditions and Sensitive Receptors

Desk Study

12.3.3 To inform the cultural heritage impact assessment, designated and non-designated assets within a 250 m Study Area along the Metrolink Trafford Park Line have been identified (see Section 12.4). The information gathered to inform the assessment comprises Geographic Information Systems (GIS) datasets maintained by English Heritage and GMAAS. The datasets have been collated and the results processed in ArcView GIS and plotted on Ordnance Survey (OS) base mapping.

12.3.4 Non-archaeological data comprising geotechnical borehole records have also been reviewed in order to assess the potential for buried deposits of archaeological interest within the defined Study Area.

Field Surveys

12.3.5 The cultural heritage impact assessment process was informed by a site walkover survey. The walkover was undertaken 21st May 2014 by a Principal Archaeologist and a Built Heritage Consultant. The weather was dry and bright and there were no constraints to the survey.

12.3.6 The aims of the site walkover survey were: to assess the character and setting of known designated assets within the Study Area; to assess the importance and character of non-designated assets within the Study Area; and to note areas of modern disturbance that would have impacted any buried archaeological remains.

12.3.7 The desk-based assessment and site walkover survey were undertaken in accordance with the guidance published by the Institute for Archaeologists (Ref. 12-12) and their Code of Conduct (Ref. 12-13), along with relevant guidance published by English Heritage (refer to Section 12.2).

12.3.8 The findings from this process are detailed in Technical Appendix G (Volume II of this ES) and are summarised in Section 12.4.

Assessment Methodology

Sensitivity/ Importance of the Receptor

12.3.9 The importance of a heritage asset is referred to as its level of 'significance' in heritage policy. The level of heritage significance of heritage assets is determined by professional judgement, and guided by statutory and non-statutory designations, national and local policies, and archaeological research agendas.

12.3.10 Conservation Principles (Ref. 12-8) states that the importance of a heritage asset is defined by the sum of its evidential, historical, aesthetic and communal values.

12.3.11 Paragraph 132 of the NPPF (Ref. 12-3) recognises that heritage assets with the highest level of heritage significance comprise Scheduled Monuments, registered battlefields, Grade I and II* Listed Buildings, Registered Parks and Gardens and World Heritage Sites.

12.3.12 Taking the criteria set out in Conservation Principles and the NPPF into account, each heritage asset can be assigned a level of heritage significance in accordance with a four-point scale as set out in Table 12.1.

Table 12.1 Factors for Determining the Importance of Heritage Assets

Heritage Significance	Criteria
High	Assets identified in national policy as being of the highest level of significance notably: Scheduled Monuments, Grade I and Grade II* Listed Buildings, Grade I and Grade II* Registered Parks and Gardens, Registered battlefields, and remains of inscribed international significance, such as World Heritage Sites. Non-designated heritage assets of archaeological interest that are demonstrably of equivalent significance to Scheduled Monuments
Medium	Grade II Listed Buildings. Conservation Areas. Grade II Registered Parks. Sites of high archaeological resource value as identified through consultation with local authority archaeologist, or that will contribute to regional research agendas. Historic Townscapes with historic integrity in that the assets that constitute their make-up are clearly legible.

Table 12.1 Factors for Determining the Importance of Heritage Assets	
Heritage Significance	**Criteria**
Low	Non-designated buildings, monuments, sites or landscapes that can be shown to have important qualities in their fabric or historical association. Locally important historic or archaeological sites, sites with a local value for education or cultural appreciation and of medium archaeological resource rating. Parks and gardens of local interest.
Negligible	Assets whose values are compromised by poor preservation or survival or of contextual associations to justify inclusion into a higher grade. The site of a findspot removed from its place and with no surviving contextual associations.

12.3.13 Once a level of heritage significance has been assigned to an asset, the magnitude of impact is measured. Impacts may arise during construction or operation and can be temporary or permanent. Impacts can occur to the physical fabric of an asset or affect its setting.

Magnitude of Impact

12.3.14 The assessment of the magnitude of impact is determined by assessing the level of change to a heritage asset or its setting as a result of the construction or operation of the Metrolink Trafford Park Line. Table 12.2 provides a list of the criteria used to determine the magnitude of impact.

Table 12.2 Criteria Used to Determine the Magnitude of Impact	
Magnitude	**Description of impact**
High	The significance of the asset is totally altered or destroyed. Comprehensive change to setting affecting significance, resulting in changes in our ability to understand and appreciate the resource and its historical context and setting.
Medium	The significance of the asset is affected. Changes such that the setting of the asset is noticeably different, affecting significance resulting in changes in our ability to understand and appreciate the resource and its historical context and setting.

Table 12.2 Criteria Used to Determine the Magnitude of Impact	
Magnitude	**Description of impact**
Low	The significance of the asset is slightly affected. Changes to the setting that have a slight impact on significance resulting in changes in our ability to understand and appreciate the resource and its historical context and setting.
Negligible	Changes to the asset that hardly affect significance. Changes to the setting of an asset that have little effect on significance and no real change in our ability to understand and appreciate the resource and its historical context and setting.

Significance of Effect

12.3.15 The significance of effect is determined by combining the heritage significance of the asset and the magnitude of impact (see Table 12.3). The level of impact takes into account embedded impacts avoidance measures that have been incorporated into the Metrolink Trafford Park Line as part of the design development process to reduce potentially significant effects to heritage assets.

Table 12.3 Significance of Effect Matrix					
Significance of Heritage Asset		**Magnitude of Impact**			
		Negligible	**Low**	**Medium**	**High**
	High	Minor	Moderate	Major	Major
	Medium	Negligible	Minor	Moderate	Major
	Low	Negligible	Negligible	Minor	Moderate
	Negligible	Negligible	Negligible	Negligible	Minor

12.3.16 For the purposes of this EIA, moderate and major effects are considered to be significant.

12.3.17 Additional mitigation can be used to avoid, reduce or, where appropriate, offset significant effects. Measures to mitigate impacts to heritage assets would normally consist of preservation *in situ* where possible, or where this is not feasible, investigation and recording before and/ or during construction.

12.3.18 Re-assessing the level of effect following the implementation of a suitable mitigation strategy allows the residual impact of a proposed development to be determined (see Table 12.4).

Table 12.4 Level of Residual Effect Following Mitigation

Residual effect	Definition
Major Adverse	Negative residual effect that would be an important consideration at a national level.
Moderate Adverse	Negative residual effect that would be an important consideration at a regional or county level.
Minor Adverse	Negative residual effect that would be a relevant consideration in a local context.
Negligible	Residual effect that is nil or imperceptible.
Minor Beneficial	Positive residual effect that would be a relevant consideration in a local context.
Moderate Beneficial	Positive residual effect that would be an important consideration at a regional or county level.
Major Beneficial	Positive residual effect that would be an important consideration at a national level.

Consultation

12.3.19 During the preparation of the baseline and cultural heritage impact assessment, consultation has been undertaken with GMAAS, the Conservation Officer for Trafford Metropolitan Borough Council (TMBC) and with English Heritage. Table 12.5 provides a summary of the consultation process undertaken.

Table 12.5 Consultation Summary			
Consultee	**Date**	**Method**	**Summary of Response**
Scoping report issued to English Heritage and GMAAS	15.05.14	Email	Scoping opinion dated 05.06.14 requests that the EIA considers impacts to the setting of designated assets and non-designated assets as defined in the NPPF with reference to English Heritage guidance. Also advised consultation with GMAAS and TMBC Conservation Officer during production of EIA.
GMAAS	19.05.14	Email	Issued request to GMAAS for HER data. GMAAS responded 22.05.14 with GIS datasets for designated and non-designated assets in the Study Area.
TMBC	25.06.14	Email	Information request issued to TMBC Conservation Officer requesting Local List data, confirmation of extent of listing for Trafford Road Bridge, and whether the proposed works would require Listed Building Consent (LBC). Officer replied 03.07.14 and offered assistance identifying assets on the draft (unpublished) Local List. Extent of bridge's listing was determined during site meeting dated 24.09.14 where it was also confirmed that LBC would not be required (see below).
GMAAS	01.07.14	Email	Issued request to GMAAS regarding knowledge of fieldwork events within Study Area that have not yet been entered onto the HER.
TMBC	12.08.14	Email	TMBC Conservation Officer issued schedule of buildings on the draft Local List that may be impacted indirectly by Metrolink Trafford Park Line.

Table 12.5 Consultation Summary			
Consultee	**Date**	**Method**	**Summary of Response**
TMBC	24.09.14	Meeting	Meeting on site with TMBC Conservation Officer to determine whether LBC would be required for the works adjacent to Trafford Road Bridge. Conservation Officer has confirmed in writing to Transport for Greater Manchester (email dated 02.10.14) that LBC would not be required (Refer to Technical Appendix A3: Other Stakeholder EIA Consultation).

Assumptions and Limitations

12.3.20 There were no limitations encountered during the preparation of the cultural heritage baseline or impact assessment.

12.4 Baseline Description

12.4.1 A full inventory detailing the cultural heritage assets within the Study Area, and the photographic record undertaken during the site walkover survey, is provided in Technical Appendix G (Volume II of this ES). A summary of the baseline conditions is presented in this section and assets referenced in the text are illustrated on Figure 12.1 (Volume III of this ES).

Study Area

12.4.2 The Study Area has been defined as a 250 m corridor either side of the proposed Metrolink Trafford Park Line. The extent of the Study Area was determined following an initial appraisal of the topography and settlement history of the area and is considered sufficient to allow an understanding of the historical context and archaeological potential of the area. The Study Area has also been set in consideration of the likely scale of the Metrolink Trafford Park Line and includes those assets for which there is a potential for development to have an effect on setting.

12.4.3 Within the Study Area there are three designated Listed Buildings recorded on the Heritage List for England, ten non-designated assets recorded on the GMAAS HER list, and sixteen non-designated structures recorded on TMBC's draft Local List as detailed in the sections below (also refer to Technical Appendix G (Volume II of this ES).

12.4.4 There are no World Heritage Sites, Scheduled Monuments, Conservation Areas, Registered battlefields or Registered Parks and Gardens within the Study Area.

Designated Assets in the Study Area

Trafford Park Hotel (Grade II Listed Building)

Description

12.4.5 Trafford Park Hotel is a Grade II Listed Building situated on the corner of Third Avenue and Village Way. It was built in a mixed Renaissance style in 1902 and is a 3-storey building constructed of red brick with terra-cotta dressings and a 20th century concrete tile roof.

Heritage Significance

12.4.6 The significance of the Grade II Listed hotel lies in its association with the development of Trafford Park as the first industrial estate created from 1896. The hotel is demonstrative of the increasing industrialisation and expansion of the Trafford Park Industrial Estate in the late 19th and early 20th century. The hotel is associated with the development of the Village which is set out to the south of the hotel. The Village was a purpose built community for the workers at Trafford Park and is designed in an American-style grid formation with a series of numbered streets running east-west and north-south. The former hotel is currently unoccupied and according to local residents has been empty since 2009.

Assessment of Setting

12.4.7 The immediate setting of Trafford Park Hotel (i.e. the immediate surroundings) is characterised by light industrial/ commercial units. In architectural style it is a noticeably lone building that is incongruous with the prevailing character of the area and its overly enriched architectural features, domestic scale and age creates a further contrast to the surrounding modern industrial developments. However, this isolation adds to its interest as it represents an important historical connection to the earlier origins and aspirations of the area.

12.4.8 The wider setting of the hotel also contributes to its heritage significance. The hotel was built primarily to accommodate visiting businessmen to the commercial areas of Trafford Park Industrial Estate and, while these areas are relevant to the building's commercial past, the modern equivalent buildings provide continuity. A row of late 19th century shops located to the south on Third Street in the Village, is also part of the hotel's wider setting that contribute to its significance. These contemporary elements provide historical context for the hotel and contribute to an understanding of the development of the wider Trafford Park area.

12.4.9 The setting of the hotel is likely to be affected by the Metrolink Trafford Park Line due to its proposed proximity.

Trafford Road Bridge (Grade II Listed Building)

Description

12.4.10 Trafford Park Road Bridge is a Grade II Listed Building and is a former swing bridge over the Manchester Ship Canal. The structure, designed by Sir Edward Leader Williams, dates from approximately 1892. The bridge is constructed of steel and forms part of the A5063 Trafford Road. The deck is carried beneath two cantilevered arched trusses with diagonal bracing struts, crossed towards the centre of the span. The two arched top chords are linked over the road bed by I-section lateral beams.

Heritage Significance

12.4.11 The significance of the bridge is associated with the transportation of goods and services along the Manchester Ship Canal. Historic maps show evidence of rail links facilitating the movement of goods from the docks to warehousing in and around the Trafford Park area. The bridge is significant as a representation of technological achievement within the City of Manchester as a moving swing bridge that could both accommodate road and canal traffic. The bridge was originally manoeuvred by the use of hydraulics housed in a building on the north side of the canal.

Setting

12.4.12 The setting of Trafford Road Bridge is defined primarily by its position above the canal and the environment around the bridge has changed dramatically since it was constructed. A key view of heritage significance that places the bridge within a predominantly industrialised backdrop is seen by vessels approaching the bridge along the Manchester Ship Canal, as well as views of the bridge against the backdrop of Salford and Trafford from crossing traffic.

12.4.13 The current setting of the bridge is very much characterised by the regeneration of the area with dramatic contemporary structures flanking the canal side rather than mills and warehouses. The area beneath the bridge appears to have become an area of anti-social activity with signs of fly-tipping, vandalism and arson; creating an area that contributes a negative atmosphere to the bridge's setting.

12.4.14 The setting of the bridge is likely to be affected by the Metrolink Trafford Park Line due to its proposed proximity.

Assets of Local Heritage Significance in the Study Area

12.4.15 The Study Area contains 16 assets that are listed on TMBC's draft Local List. Assets on the draft Local List are considered to be of local heritage significance.

12.4.16 An initial assessment of the setting of the assets and their potential to be impacted by Metrolink Trafford Park Line has been undertaken and is reported in Technical Appendix G (Volume II of this ES). The assessment concluded that two assets on the draft Local List may be impacted. These assets are illustrated on Figure 12.1 (Volume III of this ES) and are discussed below.

Bridgewater Canal

Description

12.4.17 The section of canal relevant to this assessment runs from near the Manchester Ship Canal to the south-west to the junction at Waters Meet. Navigable throughout its history, it is one of the few canals in Britain not to have been nationalised, and remains privately owned. Commercial traffic continued on the canal until 1974.

Setting

12.4.18 Although commercial traffic is no longer a prominent feature of the canal, its setting is defined by the warehouses and other commercial/ industrial buildings that frame and characterise the areas either side of the canal. The Metrolink Trafford Park Line may be visible from the canal as it crosses Park Way resulting in a minor alteration to its current setting.

Silent Cargoes Public Realm Artwork

Description

12.4.19 Silent Cargoes consists of an assortment of large and small objects associated with the industrial heritage of Trafford Park. Objects include machinery, barrels, bales, boxes, metal pipes, tools, oil drums, chains, trolleys, anvil and horseshoes. The public artwork is arranged along Quayside Walk on the edge of the Manchester Ship Canal and covers an area of approximately 350 m^2.

Setting

12.4.20 The setting of the artwork is defined by its current environment and specifically the relationship with the Manchester Ship Canal and Trafford Park which provides the historical industrial context in which the pieces are understood, individually and collectively. The Illustrative Technical Development Scheme Plans submitted with the TWAO application indicate that the Metrolink Trafford Park Line would be constructed at the current location of Silent Cargoes,

resulting in possible removal or relocation of the asset or a comprehensive change to its setting.

Non-designated Assets in the Study Area

12.4.21 Non-designated assets are listed by their unique identifier number and prefixed by the Greater Manchester HER identified 'MGM'. A table of all heritage assets in the Study Area is presented in Technical Appendix G (Volume II of this ES) and their locations illustrated on Figure 12.1 (Volume III of this ES).

Early Prehistoric

12.4.22 There are only two assets dating to this period within the Study Area. A Bronze Age perforated stone axe-hammer is documented as a findspot in the HER located approximately 150 m south of the Metrolink Trafford Park Line (MGM532). The artefact has long since been removed and would not therefore be impacted, however it is notable that a characteristic of Bronze Age communities is the deliberate deposition of artefacts in wetland environments, and therefore the findspot may be indicative of the presence of deposits with palaeoenvironmental potential.

12.4.23 Stretford Moss (MGM9120) is recorded as being located approximately 210 m north of the Metrolink Trafford Park Line, however this locational point represents a larger area that was once boggy marshland during the 2nd millennium BC and indicates a potential for deposits to be present that may contain important palaeoenvironmental data. There is a potential for deposits associated with Stretford Moss to be impacted by the construction of the Metrolink Trafford Park Line.

Late prehistoric – Roman

12.4.24 The area around Stretford was part of the territory occupied by the Brigantes tribe before and during the Roman occupation, and the A56 Chester Road which runs through the eastern edge of the Study Area follows the line of the Roman road from Chester to Manchester. However, there are no known heritage assets listed on the HER that date to this period within the Study Area.

Early Medieval – Medieval

12.4.25 Two manors controlled this area comprising the southern lands near the River Mersey held by Hamon de Mascy and the northern lands closer to the River Irwell held by Henry de Trafford. By the mid-13th century the de Mascy family were renting the Stretford area to Richard de Trafford and soon after released the rights to the area to the de Trafford family. There are no heritage assets recorded on the HER dating to this period within the Study Area.

Post-medieval – Modern

12.4.26 The majority of assets from this period relate to the site of former dwellings and many are shown on the first edition OS maps (see Technical Appendix G, Volume II of this ES). As such, any surviving sub-surface remains associated with the assets will be contained within that location and are unlikely to extend into the working area of the Metrolink Trafford Park Line. Throstle Nest Paper Mill (MGM8418) is the only non-designated asset within close proximity to the route (refer to Figure 12.1, Volume III of this ES). The mill was located on the south bank of River Irwell to the west of the current Trafford Road Bridge, and materials were transported to and from the mill via the canal. The site of the mill was later occupied by the Co-operative Wholesale Society.

Potential for Previously Unrecorded Heritage Assets

12.4.27 A review of geotechnical data along the Metrolink Trafford Park Line (see Technical Appendix G, Volume II of this ES) has enabled the underlying sedimentary sequence to be characterised. Borehole data suggests there is a potential for peat deposits containing palaeoenvironmental data to be present in the vicinity of Parkway Circle and Village Way, with alluvial deposits present in the vicinity of Manchester Ship Canal. Specific construction activities associated with the Metrolink Trafford Park Line have the potential to impact these deposits.

12.5 Impacts Avoidance Measures

12.5.1 A series of design criteria has been considered during the Metrolink Trafford Park Line design process in order to minimise the potential effects to cultural heritage assets. These criteria sought to avoid direct impact upon historic assets and their setting, and include siting and design considerations relating to signage and cable ducts. Measures include:

- The Metrolink Trafford Park Line design has taken into account the presence of the Trafford Park Hotel (Grade II Listed Building) and the Trafford Park Road Bridge (Grade II Listed Building) and has sought to avoid direct impacts;
- The urban design approach (as detailed in Chapter 8: Landscape and Visual), aims to integrate the Metrolink Trafford Park Line into the prevailing urban landscape, including its heritage assets; and
- The majority of the design is within existing highway boundaries thereby reducing the likelihood of impacts to buried heritage assets.

12.6 Assessment of Impacts and Effects

Clearance and Demolition

12.6.1 Clearance works in advance of Metrolink Trafford Park Line construction would entail vegetation clearance and some demolition works (refer to Section 4.4 in Chapter 4: Development Description). The proposed demolition works would entail the clearance of a number of above ground structures. Such works would not directly affect buried heritage assets or have a direct impact on built heritage assets. Any indirect effects on built heritage assets arising from demolition in the Study Area, such as short-term increases in dust, noise or vibration, would be managed on site in line with Transport for Greater Manchester's Code of Construction Practice (CoCP) and through the Construction Environmental Management Plan (CEMP) which would be prepared by the selected construction contractor prior to the start of construction activities.

Construction

Direct impacts

12.6.2 Direct impacts to heritage assets resulting in a change to the asset's physical form have the potential to occur during activities associated with track and temporary construction compound construction.

12.6.3 The construction of the track bed beneath the Grade II Listed Trafford Road Bridge may require overhead wires to be fixed to the underside of the bridge deck or potentially to the side portal walls of the bridge. These sections of the bridge are not included in the Grade II designation and are not part of the bridge's curtilage listing. It has been confirmed following consultation with TMBC Conservation Officer that the works would not affect the bridge's character or special interest, and Listed Building Consent would not be required (refer to Table 12.5).

12.6.4 The swing bridge is Grade II Listed and is therefore of medium heritage significance in accordance with Table 12.1. The installation of ducting or overhead cables to structures within the bridge's curtilage listing is assessed to represent a low impact as the modification is slight and reversible. The effect is assessed to be minor adverse and thus not significant.

12.6.5 Illustrative Technical Development Scheme Plans (submitted with the TWAO application) indicate that the Metrolink Trafford Park Line would be constructed at the current location of Silent Cargoes, resulting in total alteration of the asset and therefore a high magnitude of impact. The asset reflects the industrial heritage of the local area, is non-designated, and is assessed to be of low

heritage significance in accordance with Table 12.1. The impact is assessed to be high and the effect is assessed to be moderate adverse and is therefore considered to be significant (adverse).

12.6.6 The Metrolink Trafford Park Line would typically entail construction to a depth of approximately 1 m below current ground level to accommodate the formation layers and track slab. The majority of the route has been subject to ground disturbance resulting from former industrial uses. Thus the potential for deposits of archaeological interest to be impacted within the 1 m construction depth (including those containing palaeoenvironmental data), is low. In addition, sub-surface remains associated with former structures of heritage significance including the site of Throstle Paper Mill are unlikely to be present as the site has been redeveloped.

12.6.7 Deposits containing palaeoenvironmental data that survive beneath the 1 m construction depth impact of the track (for example the peat deposits in the vicinity of Parkway Circle), may be impacted by components of the Metrolink Trafford Park Line that require piled foundations. These deposits have the potential to be of regional interest as assessment and analysis would contribute to the ongoing palaeoenvironmental study of the region. These resources are therefore assessed to have a medium heritage significance in accordance with Table 12.1. The magnitude of impact is assessed to be low, as the impact would be restricted to the construction corridor and specifically to the area of impact arising from the continuous flight auger pile and therefore only a small proportion of a wider resource would be affected. The effect is assessed to be minor adverse and thus not significant.

12.6.8 The temporary construction compounds for the Metrolink Trafford Park Line are likely to be located in areas of existing hardstanding. As the construction of temporary compounds would not require the removal of topsoil deposits or the laying of crush material there would be no direct impact to heritage assets. The effect would thus not be significant.

Indirect Impacts

12.6.9 Indirect short-term impacts to heritage assets during Metrolink Trafford Park Line construction may arise as a result of temporary changes to their setting.

12.6.10 The construction of the track beneath Trafford Road Bridge would result in a slight change to the setting of the asset when viewed from vessels using the Manchester Ship Canal. Construction activities would be on the periphery of views of the bridge and would not impede or affect the ability to view the bridge against the industrialised built environment. The impact to this view of heritage

significance is assessed to be low and the short-term effect is assessed to be minor adverse and thus not significant.

12.6.11 The key view of the Trafford Road Bridge against the backdrop of Salford and Trafford by traffic crossing the bridge would not be affected as construction activities would be shielded by the bridge deck. The impact to this key view is assessed to be negligible and the effect is therefore negligible and thus not significant.

Operation

12.6.12 Potential indirect impacts to heritage assets during the operation of the Metrolink Trafford Park Line may occur if there are changes to the setting of the asset.

12.6.13 The operational Metrolink Trafford Park Line would involve Light Rail Vehicles (LRVs) running beneath the bridge deck that leads to the Trafford Road Bridge. The area beneath the bridge currently shows signs of fly-tipping, vandalism (graffiti) and arson, creating an area that contributes a negative atmosphere to the bridge's setting. The redevelopment of this space and the introduction of the Metrolink Trafford Park Line would noticeably alter the character of the area especially in terms of views from the Manchester Ship Canal and pedestrians using Wharf End. LRVs used to cross Trafford Road Bridge and the reintroduction of LRVs is not incongruent with the bridge's historical setting and does not clash with its historic or current context.

12.6.14 The removal of a negative space and the introduction of the Metrolink Trafford Park Line would noticeably alter the physical surroundings of the Grade II Listed bridge. The impact of this is assessed to be medium beneficial. The effect is assessed to be moderate beneficial and is therefore significant (beneficial).

12.6.15 The operational Metrolink Trafford Park Line would also change the setting of Trafford Park Hotel. In its current setting fronting Village Way, the hotel appears relatively isolated in terms of associate relationships with other heritage assets and is a noticeably lone building in terms of architectural style.

12.6.16 LRVs used to run past the hotel during the early 19th century and the reintroduction of LRVs along this route would reconnect the hotel with a historical association that has been severed for nearly 100 years. Village Way is quite inhospitable to pedestrians with very few crossing points and, as a consequence, there is very little pedestrian traffic past the hotel. The location of a tram stop opposite the hotel is likely to improve footfall and increase the building's visibility and accessibility which may result in viable options for its re-use.

12.6.17 The impact of the Metrolink Trafford Park Line on Trafford Park Hotel is assessed to be medium beneficial, as the physical form of the hotel is not affected, but the character of the streetscape outside of the hotel would be noticeably different. The effect is assessed to be moderate beneficial as the impact of the proposed Metrolink Trafford Park Line may improve the economic and social viability of the disused hotel and the wider area around the Village. The effect is therefore significant (beneficial).

12.6.18 The operational Metrolink Trafford Park Line would be visible to users of Bridgewater Canal as they pass below the current A5081 Park Way carriageway. The key views that contribute to the canal's setting are those along the length of the watercourse which take in small and large-scale commercial buildings interspersed with treelines. The Metrolink Trafford Park Line would appear temporarily on the periphery of this view and would not interrupt key lines of sight along the canal. The impact is assessed to be negligible and the effect is therefore negligible and thus not significant.

12.7 Additional Mitigation

12.7.1 There would be one significant adverse effect arising from the construction of Metrolink Trafford Park Line. The Illustrative Technical Development Scheme Plans submitted with the TWAO application indicate that Silent Cargoes public artwork would be directly impacted by the construction of Metrolink Trafford Park Line, resulting in a high magnitude of impact and a moderate adverse effect which is significant. Mitigation comprising the relocation of the asset to an alternative suitable location would avoid the predicted impact, maintain the associative relationship between the artwork and the area's industrial heritage and restore its original setting. Following the implementation of successful mitigation, the effect is assessed to be negligible and thus not significant.

12.7.2 There are no other significant adverse effects arising from the construction or operation of the proposed Metrolink Trafford Park Line and no further additional mitigation measures are required.

12.8 Residual Effects and Conclusions

12.8.1 The cultural heritage impact assessment has concluded there would be two moderate, and therefore significant, beneficial residual effects to heritage assets as a result of the Metrolink Trafford Park Line (as associated with the Trafford Park Hotel and the Trafford Road Bridge). A summary of all residual cultural heritage effects arising from the construction and operation of the proposed Metrolink Trafford Park Line is set out in Table 12.6.

Table 12.6 Summary of Cultural Heritage Residual Effects					
Asset ID	**Stage of Development**	**Description of Effect**	**Residual Effect Significance**	**Nature of Effect (see footnote)**	**Geographic Scale**
Trafford Road Bridge	Construction	Installation of ducting or brackets for cables may have a direct physical impact to structures within the bridge's curtilage listing. The impact is assessed as low and the effect is minor adverse.	Minor Adverse (not significant)	Lt, R	Local
Trafford Road Bridge	Construction	Temporary change to setting of bridge during construction due to increase in activity would change immediate setting of bridge but would not affect key views of heritage significance. The impact is assessed to be low resulting in a minor adverse effect.	Minor Adverse (not significant)	St, InD	National
Silent Cargoes public realm artwork	Construction	Permanent and comprehensive change to the asset and its setting. The impact is assessed to be high resulting in a moderate adverse effect. Mitigation comprising relocation of the asset to maintain associative links and setting would result in a negligible impact. Following mitigation the effect is assessed to be negligible.	Negligible (not significant)	N/A	Local

Table 12.6 Summary of Cultural Heritage Residual Effects					
Asset ID	**Stage of Development**	**Description of Effect**	**Residual Effect Significance**	**Nature of Effect (see footnote)**	**Geographic Scale**
Non-designated buried assets with palaeoenvironmental potential	Construction	Deposits containing palaeoenvironmental data may be impacted by construction of piled foundations. Impact is restricted to immediate footprint of pile and is therefore low, resulting in a minor adverse effect.	Minor Adverse (not significant)	P, D, IR	Local
Trafford Road Bridge	Operation	The setting of Trafford Road Bridge during the operational Metrolink Trafford Park Line would be noticeably altered, especially when viewed by users of the Manchester Ship Canal and visitors to the wharf side. The impact is assessed to be medium to reflect the notable change to the bridge's setting by the introduction of the tramline. The effect is assessed to be Moderate Beneficial as it would enhance the bridge's environs and setting.	Moderate Beneficial (significant)	Lt, InD, R	Regional
Trafford Park Hotel	Operation	The reintroduction of LRVs into the former hotel's setting would enhance its visibility and may encourage viable options for re-use. The impact is assessed as medium and the effect is moderate beneficial.	Moderate Beneficial (significant)	Lt, InD, R	Regional

Table 12.6 Summary of Cultural Heritage Residual Effects					
Asset ID	**Stage of Development**	**Description of Effect**	**Residual Effect Significance**	**Nature of Effect (see footnote)**	**Geographic Scale**
Bridgewater Canal	Operation	The setting of the canal during the operational Metrolink Trafford Park Line would be slightly altered when viewed by users of the canal. Glimpses of the operational LRVs would however be on the periphery of the key views that contribute to the canal's setting.	Negligible (not significant)	Lt, InD, R	Local

St = short term, Mt = medium term, Lt = long term, P = permanent, D = direct, InD = indirect, R = reversible, IR = irreversible, N/A = not applicable

12.9 References

Ref. 12-1 Her Majesty's Government (1979). 'The Ancient Monuments and Archaeological Areas Act 1979'.

Ref. 12-2 Her Majesty's Government (1990). 'Planning (Listed Buildings and Conservation Areas) Act 1990'.

Ref. 12-3 Department for Communities and Local Government (2012). 'National Planning Policy Framework'.

Ref. 12-4 Trafford Metropolitan Borough Council (2006) 'Unitary Development Plan'.

Ref. 12-5 Trafford Metropolitan Borough Council (2012) 'Trafford Local Plan: Core Strategy'.

Ref. 12-6 Department for Communities and Local Government (2014). 'National Planning Policy Guidance'.

Ref. 12-7 English Heritage (2010). 'Planning Policy Statement 5. Planning for the Historic Environment Historic Environment: Planning Practice Guide'.

Ref. 12-8 English Heritage (2008). 'Conservation Principles Practice and Guidance'.

Ref. 12-9 English Heritage (2011). 'The Setting of Heritage Assets'.

Ref. 12-10 English Heritage (2011). 'Seeing the History in the View'.

Ref. 12-11 English Heritage. The National Heritage List for England website. Available from: http://www.english-heritage.org.uk/professional/protection/process/national-heritage-list-for-england/. Accessed 23.09.14

Ref. 12-12 Institute for Archaeologists (2012). 'Standard and Guidance for Historic Environment Desk-based Assessment'.

Ref. 12-13 Institute for Archaeologists (2013). 'Code of Conduct'.

Transport for Greater Manchester

Chapter 13:

Socio-Economics

13 SOCIO-ECONOMICS

13.1. Introduction

13.1.1 This chapter of the Environmental Statement (ES) reports the findings of an assessment of potential Socio-Economic impacts as a result of the proposed Metrolink Trafford Park Line in Trafford, Greater Manchester. It provides an assessment of the potential effects of the Metrolink Trafford Park Line on the economy, employment creation, impacts on local businesses, and impacts on the local population and visitors.

13.1.2 The assessment is based upon desk-based research, data provided by Transport for Greater Manchester, the illustrative Technical Development Scheme Plans submitted with the Transport and Works Act Order (TWAO) application, and site walkovers.

13.1.3 This chapter is supported by Figures 13.1 to 13.7 provided within ES Volume III.

13.2 Legislation and Planning Policy Context

Policy Context

13.2.1 Chapter 5: Planning Policy Context presents an overview of the planning policy relevant to the Metrolink Trafford Park Line. This section discusses the planning policies and guidance specific to the Socio-Economic assessment.

National Policy

National Planning Policy Framework (NPPF) (2012)

13.2.2 The NPPF highlights that the Government is committed to securing economic growth to create jobs and prosperity throughout the country (Ref. 13-1). In order to achieve economic growth, local planning authorities are required to plan proactively to meet the development needs of business and support the development of the economy.

Transport White Paper – Creating Growth, Cutting Carbon: Making Sustainable Transport (2011)

13.2.3 The Sustainable Transport White Paper (Ref. 13-2) sets out the UK Government's vision for a sustainable local transport system that supports the economy and reduces carbon emissions. It explains how the UK Government is placing localism at the heart of the transport agenda and taking measures to empower local authorities when it comes to tackling these issues in their areas.

Eddington Transport Study – Transport's Role in Sustaining the UK's Productivity and Competitiveness (2006)

13.2.4 Sir Rod Eddington was jointly commissioned by the Chancellor of the Exchequer and the Secretary of State for Transport to examine the long-term links between transport and the UK's economic productivity, growth and stability, within the context of the Government's broader commitment to sustainable transport. The Eddington Transport Study (Ref. 13-3) emphasises the importance of having a comprehensive and high-performing transport system that enables sustained economic prosperity. The study suggested the need to improve the performance of the existing transport network in the UK in order to boost the economy.

Sub-Regional Policy

Stronger Together – Greater Manchester Strategy 2013

13.2.5 The Greater Manchester Strategy, Stronger Together (Ref. 13-4) outlines the city region's priorities for transport infrastructure development and the need to continually improve the existing offer. The strategy states the following priority:

"[We] will ensure a more integrated transport network that better connects neighbourhoods with areas of employment and business growth."

13.2.6 The strategy states that further investment in local, national and international transport connectivity will strengthen and widen the city region's labour market:

"[This] is critical to our future success and enables Greater Manchester businesses to reduce costs by moving people and goods more quickly, easily and reliably."

13.2.7 Expanding the Metrolink network is a key component of Greater Manchester's strategy. The strategy states that the Greater Manchester City Deal 'Earn Back' model will supplement the Greater Manchester Transport Fund (GMTF) enabling the implementation of transport developments that offer significant Gross Value Added (GVA) such as the Metrolink Trafford Park Line.

Greater Manchester City Deal

13.2.8 The Greater Manchester City Deal was confirmed with Central Government in March 2012 and enables a range of statutory and financial powers and responsibilities (Ref. 13-5). The City Deal outlines the requirement for greater economic density in order to achieve the level of growth required. The City Deal proposes to undertake transport improvements, focusing on the delivery of sustainable increases in effective labour markets and business to business connectivity.

13.2.9 The City Deal enabled the creation of a Revolving Infrastructure Fund allowing Greater Manchester to 'earn back' a portion of additional tax revenue from GVA

increases generated by local investment in infrastructure, such as the Metrolink Trafford Park Line.

Local Policy

13.2.10 Although a small section of the Socio-Economic Study Area (see paragraph 13.3.4) falls within the local authority area of Salford City Council, the Metrolink Trafford Park Line falls wholly within Trafford Metropolitan Borough Council (TMBC) local authority area and as such only Trafford's local policies have been reviewed.

Trafford Core Strategy (2012)

13.2.11 The Trafford Core Strategy (Ref. 13-6) provides TMBC's spatial policy framework for delivering the development and change needed to realise its vision for the Borough up to 2026.

13.2.12 The strategy contains several policies relevant to the Socio-Economic assessment as outlined below:

- Policy SL1 indicates that Pomona Island can deliver employment land, residential units, new commercial leisure facilities (including a hotel, small scale ancillary retail and bar/restaurant uses), appropriate new community facilities, a substantial new area of open space for informal recreation, and new and improved pedestrian links;
- Policy SL2 outlines the potential of Wharfside to be able to deliver high quality mixed-use development for employment activity, leisure, residential development, and an appropriate scale of supporting retail and community uses;
- Policy SL4 outlines development requirements for the Trafford Centre Rectangle. The Metrolink Trafford Park Line would terminate at the proposed Trafford Centre stop, and the policy requires improvements to the local highway network and better linkages with public transport infrastructure;
- Policy L3 (Regeneration and Reducing Inequalities) seeks improvements within Trafford's Regeneration Areas in accessibility between the Regeneration Areas and also employment areas such as Trafford Park, Carrington, the town centres and the Regional Centre; and
- Policy W1 (Economy) encourages the development of clusters of economic activity. There is a focus on employment uses in the following places (which would be in close proximity to the Metrolink Trafford Park Line): Pomona Island; Trafford Wharfside; Trafford Park Core; and the Trafford Centre Rectangle.

Revised Trafford Unitary Development Plan (2006)

13.2.13 The Revised Trafford Unitary Development Plan (Ref. 13-7) forms part of the framework within which TMBC makes its decisions on planning applications. A number of the policies have been superseded by the Core Strategy (2012), but the following saved policies are relevant:

- Policy E7 (Main Industrial Areas) seeks to permit and encourage development (in accordance with other policies) for business, industry, storage/ distribution (B1, B2 & B8 Use Classes) and similar appropriate uses (e.g. sui generis proposals);
- Proposal TP1 (Trafford Park Core Industrial Area) states that TMBC will permit development for business, industry, storage and distribution (B1, B2 and B8) and similar appropriate uses in accordance with Proposal E7. Within this Core Industrial Area TMBC will not permit the development of other uses;
- Proposal TP2 (Pomona Strategic Area) will permit new and replacement development for office accommodation, leisure and tourism and housing, and also requires developments to be adequately served by sustainable transport network accessible by all of the community;
- Policy TP5 (Wharfside Strategic Area) will permit the development of offices, high technology and light industrial premises, hotel, tourism and leisure facilities and similar appropriate development of a quality that reflects the high urban amenity nature of the area;
- Proposal TP6 (the Village Business Park and Centre) will permit development for small office and light and general industrial firms and, on, or adjacent to the local shopping centre on Third Avenue, small shops, restaurants, bars, take-away food outlets, financial and other service outlets, which serve the business and working community in Trafford Park;
- Policy H10 (Old Trafford Priority Regeneration Area) identifies the need for the Priority Generation Area to be improved, including the regeneration of housing stock, improving safety, appearance and facilities; and
- Policy OSR14 seeks to improve access and promote recreational use of the Bridgewater Canal.

13.2.14 Policy TP5 and Proposal TP6 state that development proposals that may prejudice the provisions of the Metrolink Trafford Park Line or provision of new stops will not be approved.

13.3 Assessment Methodology and Effect Significance Criteria

13.3.1 Whilst there is no dedicated UK legislation that details the content required for a Socio-Economic assessment as part of an ES, this chapter is based upon a range of relevant guidance. This includes those provided by HM Treasury (Ref. 13-8), Department for Business, Innovation and Skills (BIS) (Ref. 13-9), and the Homes & Communities Agency (HCA) (Ref. 13-10). Where relevant standards do not exist, professional experience and expert judgement has been applied.

13.3.2 This section presents the following:

- Identification of the information sources that have been used;
- Details of impact assessment guidance used to define the methodology applied;
- Details of the consultation activities undertaken with respect to Socio-Economics; and
- The methodology used to assess the potential Socio-Economic effects, including the criteria used to determine receptor sensitivity and impact magnitude.

Information Sources

13.3.3 The following sources of information have been reviewed to inform the Socio-Economic baseline and impact assessment:

- Office for National Statistics (ONS) datasets including: Business Register and Employment Survey (BRES) (2012) (Ref. 13-11); Census of Population (2001 and 2011) (Ref. 13-12 and Ref. 13-13); Annual Survey of Hours and Earnings (ASHE) (2013) (Ref. 13-14); and Gross Value Added Sub-Regional Accounts (2011) (Ref. 13-15);
- Department for Communities and Local Government's Index of Multiple Deprivation (2010) (Ref. 13-16);
- Scarborough Tourism Economic Activity Monitor (STEAM) data for Greater Manchester (2012) (Ref. 13-17);
- Business surveys for the Metrolink Trafford Park Line undertaken by AECOM (provided by Transport for Greater Manchester);
- Websites including: TMBC, Transport for Greater Manchester, ONS, Nomis, Visit Manchester and Marketing Manchester; and
- Visits to the Socio-Economic Study Area including the residential areas, employment sites, and leisure, recreation and tourism sites.

Methods for Determining Baseline Conditions and Sensitive Receptors

Socio-Economic Study Area

13.3.4 The Socio-Economic Study Area was defined as based upon indicative permanent land take requirements and construction works footprint for the Metrolink Trafford Park Line provided by Transport for Greater Manchester. The land take and construction works area defined was broadly centred on the Metrolink Trafford Park Line route, but also includes temporary and permanent land take that may be required to construct and operate the tramway. A conservative approach was adopted in order to capture all land potentially affected by the Metrolink Trafford Park Line.

13.3.5 The Socio-Economic Study Area is defined as all land within approximately 200 meters (m) of the defined land take and construction works boundary (see Figure 13.1, ES Volume III) plus a 200 m buffer around each proposed tram stop to assess localised impacts. The abbreviated names of each proposed stop used within this chapter are as follows: Wharfside (WHF), Imperial War Museum (IWM), Village (VLG), Parkway (PKW), EventCity (EVC) and Trafford Centre (TFC).

13.3.6 The study area is primarily focused upon the physical impacts of the Metrolink Trafford Park Line. However, some Socio-Economic benefits of the scheme are anticipated to extend beyond the study area, particularly improved accessibility to employment opportunities for other areas of Greater Manchester by expansion of the Metrolink Network. Benefits extending beyond the Socio-Economic Study Area have been taken into account where relevant.

13.3.7 In instances where secondary data are relied upon, the Socio-Economic Study Area has been defined using Lower Super Output Areas (LSOAs). LSOAs are a geographical area hierarchy used by ONS (Ref. 13-18). They are generated to be as consistent in population size as possible with the minimum population being 1,000 and the average 1,500.

13.3.8 There are nine LSOAs which cover the Socio-Economic Study Area. The extent of the LSOAs extends beyond the defined Socio-Economic Study Area (described above) and is therefore referred to in this chapter as the Wider Socio-Economic Study Area. A map of the Wider Socio-Economic Study Area is shown in Figure 13.2
(ES Volume III).

13.3.9 Where data are not available at the LSOA level, data for the Trafford and Salford local authority areas have been used. Alongside this, data for Greater Manchester, the North West region and England have been used as comparators.

Desk Study

13.3.10 Baseline data for the Socio-Economic Study Area were collected for economic infrastructure (e.g. places of employment and businesses) and recreation and social infrastructure (e.g. public open spaces, facilities and services). The Socio-Economic baseline was developed from a range of sources (as set out in paragraph 13.3.3).

Field Surveys

13.3.11 The Socio-Economic baseline and impact assessment have also been informed by site visits. Visits were made to the Socio-Economic Study Area including the residential areas, employment sites, and leisure, recreation and tourism sites. Observations were made of key site characteristics and features surrounding the areas, location of the Metrolink Trafford Park Line and tram stops, and the proximity to Socio-Economic resources.

13.3.12 In addition, reference has been made to the results of a business survey for the Metrolink Trafford Park Line (AECOM, June 2014). The survey was conducted with 148 businesses within the Transport for Greater Manchester Survey Prioritisation Zones. The surveyors asked questions on the characteristics of the respondent businesses, their employment, available parking and the transport habits of employees and customers/ visitors and loading/ unloading logistics.

13.3.13 The findings from the business survey are described in Section 13.4 (Baseline) and have been used to inform the assessment of potential Socio-Economic impacts and effects.

Assessment Methodology

13.3.14 The Socio-Economic assessment is made by triangulating findings from a range of sources including: the Metrolink Trafford Park Line business survey; assessments made by other disciplines; the use of Geographical Information Systems (GIS); analysis of existing research on the Socio-Economic impacts of other sections of the Metrolink network and elsewhere; and professional judgement (based on precedents from elsewhere).

13.3.15 The assessment has been carried out using a number of recognised data sources (as outlined in paragraph 13.3.3) and relevant guidance (as outlined in Section13.3.1).

13.3.16 The overall framework for the Socio-Economic impact assessment is to determine:

- The sensitivity of receptors;
- The magnitude of impacts; and

- The consequent significance of effects.

13.3.17 The approach to determine the significance of a Socio-Economic effect follows eight steps:

1. Identifying the extent and type of the impact on the resource;
2. Identifying the consequent ability of the resource to continue to function, for example, whether the business can still operate in the same manner;
3. Identifying the range of effects on the receptors as a result of the change in functionality of the identified resource;
4. For each effect in step three identify the magnitude of the impact on the receptors;
5. For each effect in step three identify the sensitivity of the receptors to the change;
6. Taking account of magnitude and sensitivity identify whether the effect should be described as significant;
7. Consider and propose mitigation where appropriate and estimate any residual effects; and
8. Consider situations in which the assessed combinations of effects on separate receptors could have a cumulative effect.

13.3.18 For the purposes of this Socio-Economic assessment, receptors are defined as individuals, organisations or groups who are users or beneficiaries of Socio-Economic resources which may be affected by the Metrolink Trafford Park Line. A resource could be one business or a group of businesses.

Sensitivity/ Importance of Receptors

13.3.19 The sensitivity of receptors is assessed as high, medium, low or negligible based on the definitions below. In considering the sensitivity, the following types of questions are assessed:

- Could the receptors use a similar facility within the study area?
- What is the nature of users? Are they local/ regional/ national/ international? Are users concentrated in potentially more sensitive groups?
- How many people are likely to experience the impact (and what proportion of the relevant community is this)?

13.3.20 The criteria for assessing levels of sensitivity are defined in Table 13.1:

Table 13.1 Criteria for Assessing Receptor Sensitivity	
Level of Sensitivity	**Description**
High	There are limited/ no comparable and accessible alternatives that exist within the relevant catchment area; and/ or Receptors have limited ability to absorb the change; and/ or Receptors are generally travelling from greater distances (nationally) to use the facility; and/ or There are higher numbers utilising the facility.
Medium	There are limited comparable and accessible alternatives within the relevant catchment area; and/ or Receptors have limited ability to absorb the change; and/ or Receptors are generally travelling from relatively far distances (regionally) to use the facility; and/ or There are moderate numbers utilising the facility.
Low	Receptors are able to relatively easily absorb the change; and/ or There are some comparable and accessible alternatives that exist within the relevant catchment area; and/ or Receptors are mainly travelling from nearby (local/ within the study area) to use the facility; and/ or There are low numbers utilising the facility.
Negligible	Receptors are able to relatively easily absorb the change; and/ or There are many comparable and accessible alternatives that exist within the relevant catchment area; and/ or Receptors are travelling from nearby (local/ within the study area) to use the facility; and/ or There are low numbers utilising the facility.

Magnitude of Impact

13.3.21 Impact magnitude is assessed as high, medium, low or negligible as per the definitions set out in Table 13.2 below. For each grading a list of characteristics is provided by which to determine the magnitude of the impact. In considering the magnitude the following types of questions are assessed:

- How will the impact affect the functioning of the resource? To what degree can it absorb the change? What is the severity/ intensity of the impact on people's lives and activities?

- What is the temporal scope of the impact? For how long does the impact occur? How regularly does the impact/ occur? Is the impact/ temporary or permanent?

13.3.22 Levels of Socio-Economic impact magnitude are defined in Table 13.2:

Table 13.2 Assessing Impact Magnitude

Magnitude	Description
High	A very adverse/ beneficial impact on the function of the resource and/ or the well-being of receptors and/ or constitute a long-term change to baseline conditions (i.e. it would be likely to continue and effectively be permanent and irreversible).
Medium	A moderate adverse/ beneficial impact on the function of the resource and/ or the well-being of receptors and/ or constitute a medium term change to baseline conditions.
Low	A minor adverse/ beneficial impact on the function of the resource and/ or the well-being of receptors constitutes a short term change to baseline conditions.
Negligible	A slight or no adverse/ beneficial impact on the function of the resource and/ or constitutes a very short term/ temporary change to baseline conditions.

Significance of Effect

13.3.23 Significance is the product of impact magnitude and the sensitivity of receptors and has been assessed as per Table 13.3. Significant effects are those identified as being moderate or major (adverse or beneficial). Effects identified as being negligible or minor are not considered to be significant.

Table 13.3 Significance of Effect Matrix

Sensitivity of Receptor		Magnitude of Impact			
		Negligible	**Low**	**Medium**	**High**
	High	Minor	Moderate	Major	Major
	Medium	Negligible	Minor	Moderate	Major
	Low	Negligible	Negligible	Minor	Moderate
	Negligible	Negligible	Negligible	Negligible	Minor

Consultation

13.3.24 As detailed in paragraph 13.3.12, a business survey for the Metrolink Trafford Park Line was conducted by AECOM in June 2014. The survey was conducted with 148 businesses within the Transport for Greater Manchester Survey Prioritisation Zones. The surveyors asked questions about the characteristics of the respondent businesses, their employment, available parking and the transport habits of employees and customers/ visitors and loading/ unloading logistics.

13.3.25 As detailed in Chapter 2: EIA Assessment Methodology, an EIA Scoping Report was submitted to the Secretary of State (SoS) for Transport. Whilst a range of comments were received from various statutory/ non-statutory consultees, no comments of relevance to the proposed scope of the Socio-Economic impact assessment were received.

Assumptions and Limitations

13.3.26 The assessment is based on the available data at the time of writing (and as detailed herein).

13.3.27 In the absence of scheme detailed design information, the Socio-Economic Study Area (see paragraph 13.3.5) has been based upon indicative permanent land take requirements and construction works footprint for the Metrolink Trafford Park Line as provided by Transport for Greater Manchester. The study area is primarily focused upon the physical impacts of the Metrolink Trafford Park Line, though some Socio-Economic benefits of the scheme are anticipated to extend beyond the study area and this has been taken into account where relevant. As detailed above, a conservative approach has been adopted in order to capture all land potentially affected by the Metrolink Trafford Park Line. However, actual land take requirements and construction works would be subject to review during the scheme's detailed design stage.

13.3.28 Likewise, the assessment is based on an indicative construction methodology and programme. The methods and programme would be subject to confirmation following the appointment of an appropriate construction contractor. It is assumed that utilities diversion works could take up to 12 months to complete, whilst site clearance, preparation and civils works would follow on between 2017 and 2019 (refer to Chapter 4: Development Description).

13.3.29 The Socio-Economic baseline is partly informed by secondary data, which although the most recently available data have been used, it usually suffers a time lag. Wherever possible the validity of the data has been confirmed through site visits and reviews of relevant websites.

13.3.30 The Metrolink Trafford Park Line business survey was carried out along the proposed route and covered a large sample of the total business population in the Socio-Economic Study Area (37%). Overall, this is considered to be representative, although there is a chance that more extreme situations of individual businesses may not have been picked up (if these exist).

13.4 Baseline Description

13.4.1 The following section describes the Socio-Economic baseline in terms of: the Socio-Economic Study Area definition, the Socio-Economic context (population, economic, land use, leisure and tourism and congestion), and the specific resources and receptors.

Socio-Economic Context

13.4.2 This section sets out the Socio-Economic baseline in terms of population, economics, land use, leisure and tourism and congestion within the Socio-Economic Study Area.

Population

13.4.3 Whilst the Metrolink Trafford Park Line would service Greater Manchester there are just over 15,100 people living in the Wider Socio-Economic Study Area (Ref. 13-13) (refer to Figure 13.2 within ES Volume III) with a working age (16 to 64 years old) population of 11,069 or 73.2%. This is higher than Greater Manchester (65.6%), the North West (64.6%) and England (64.8%). Further information on the population age structure is presented in Table 13.4.

Table 13.4 Population Age Structure

Age (years old)	Wider Socio-Economic Study Area		Greater Manchester	North West	England
	No.	%	%	%	%
0 to 15	2,662	17.6	19.9	18.8	18.9
16 to 64	11,069	73.2	65.6	64.6	64.8
65+	1,385	9.2	14.5	16.6	16.3
Total	15,116	100.0	100.0	100.0	100.0

Source: ONS 2014 'Census 2011' (Ref. 13-13)

13.4.4 The Wider Socio-Economic Study Area has a higher proportion of non-white (25.2%) residents than across Greater Manchester (16.2%), the North West (9.8%) and England (14.6%). The largest non-white group in the Wider Socio-

Economic Study Area is Asian/ Asian British (13.1%). More details of population ethnicity are set out in Table 13.5.

Table 13.5 Ethnicity of Local Population (%)

Ethnicity	Wider Socio-Economic Study Area	Greater Manchester	North West	England
White	74.8	83.8	90.2	85.4
Mixed/ multiple ethnic groups	4.2	2.3	1.6	2.3
Asian/ Asian British	13.1	10.1	6.2	7.8
Black/ African/ Caribbean/ Black British	6.2	2.8	1.4	3.5
Other ethnic group	1.8	1.0	0.6	1.0

Source: ONS 2014 'Census 2011' (Ref. 13-13)

13.4.5 One of the nine LSOAs comprising the Wider Socio-Economic Study Area is within the 20% most deprived areas in England, whilst all but two are in the 50% most deprived areas (Ref. 13-16).

Economy

13.4.6 In 2011, Greater Manchester generated £48.2 billion of Gross Value Added (GVA), which is almost two-fifths (38.9%) of the total for the North West (Ref. 13-15). GVA data for the Socio-Economic Study Area is not available.

13.4.7 Approximately 70,000 people are employed in the Wider Socio-Economic Study Area, compared to a total of 1,187,100 people who are employed in Greater Manchester (Ref. 13-11).

13.4.8 Employment broken down by industry for the Wider Socio-Economic Study Area is presented in Table 13.6. This includes businesses outside the construction footprint (main Study Area) and as such the profile of these businesses differs to those who were surveyed and as described in paragraph 13.4.28.

Table 13.6 Employment by Industrial Sector (%)				
Sector	**Wider Socio-Economic Study Area**	**Greater Manchester**	**North West**	**England**
Manufacturing, construction, utilities, transportation and storage	17.1	18.7	20.0	18.6
Wholesale and retail trade, accommodation and food services	23.6	22.8	23.5	23.0
Technical and professional services	20.9	17.8	14.8	17.6
Administrative and support services	14.1	9.4	8.2	8.3
Public sector	20.8	27.4	28.3	26.5
Other sectors	3.5	3.8	5.1	6.0

Source: ONS (2014). 'Business Register and Employment Survey 2012'. (Ref. 13-11)

Labour Market

13.4.9 More than three quarters of the population aged 16 to 74 in the Wider Socio-Economic Study Area are economically active (75.8%), compared to 67.8% in Greater Manchester, 67.8% in the North West and 69.9% in England (Ref. 13-13).

13.4.10 The Wider Socio-Economic Study Area has a greater proportion (32.8%) of residents with National Vocational Qualifications (NVQ) Level 4 (equivalent to degree level) or above than Greater Manchester (24.3%), the North West (24.4%) and England (27.4%) (Ref. 13-13). The Wider Socio-Economic Study Area also has a lower proportion of people with no qualifications (19.3%) than Greater Manchester (25.0%), the North West (24.8%) and England (22.5%).

13.4.11 The skills of the Wider Socio-Economic Study Area and the comparator areas are shown in Table 13.7.

Table 13.7 Local Population Qualifications (%)				
Qualification Level	**Wider Socio-Economic Study Area**	**Greater Manchester**	**North West**	**England**
No formal qualifications	19.3	25.0	24.8	22.5
NVQ1 (fewer than 5 GCSEs at grades A-C or equivalent)	13.2	13.7	13.6	13.3
NVQ2 (5 or more GCSEs at grades A-C or equivalent)	14.7	15.5	15.8	15.2
Apprenticeship	2.4	3.6	3.9	3.6
NVQ3 (2 or more A levels or equivalent)	12.0	12.8	12.9	12.4
NVQ4 (degree level or equivalent) and above	32.8	24.3	24.4	27.4
Other qualifications (includes foreign and some professional qualifications)	5.6	5.1	4.5	5.7

Source: ONS 2014 'Census 2011' (Ref. 13-13)

13.4.12 Average workplace earnings in the Wider Socio-Economic Study Area are £501.80 per week, compared to £465.70 in Greater Manchester, £480.50 in the North West and £520.50 in England (Ref. 13-14). Average resident earnings in the Wider Socio-Economic Study Area are greater at £516.50 per week in 2013, compared to £479.40 in Greater Manchester, £483.20 in the North West and £520.70 in England (Ref. 13-14).

Tourism

13.4.13 Greater Manchester attracts more than 105 million visitors each year, with 10 million of these visitors making more than 11 million overnight stays (Ref. 13-17). Tourism adds £6.6 billion to the Greater Manchester economy supporting 83,900 jobs (Ref. 13-17).

13.4.14 There are a large number of visitor attractions and activities in and near to the Socio-Economic Study Area, which are predominantly clustered in two areas. The intu Trafford Centre, which attracts more than 30 million visitors a year (Ref. 13-20) and neighbouring attractions (including the Chill Factor[e], Sea Life and Legoland Discovery Centre) which are in and near to the western end of the Socio-Economic Study Area. Towards the east there are a range of attractions around MediaCityUK, including the Lowry (which attracts more than 840,000

visitors a year) (Ref. 13-21), the Imperial War Museum North and the sporting venues of Old Trafford Football and cricket stadiums. All visitor attractions located within the Socio-Economic Study Area are set out in Table 13.8 (note that some of the above attractions are outside the Socio-Economic Study Area and therefore not included in the table).

Leisure and Community

13.4.15 Alongside the large visitor attractors, there are other leisure and community based assets in and around the Socio-Economic Study Area. These include sporting facilities such as Trafford Golf Centre, Salford Quays, Helly Hansen Water Sport Centre, Lucozade Power League Trafford, and Daytona Karting. Additionally there are a number of walking trails and cycle routes, such as the Bridgewater Canal; however, many of the cycle routes are designated on-road cycle lanes.

13.4.16 All leisure and community assets within the Socio-Economic Study Area are set out below in Table 13.10 (note that some of the above leisure and community assets are outside the Socio-Economic Study Area and therefore not included in the table).

Land Use

13.4.17 The land use of the Socio-Economic Study Area has recently been assessed by TMBC in the Trafford Local Plan Land Allocations (Ref. 13-22). The Socio-Economic Study Area mostly comprises employment sites of varying uses, with some small allocations for heritage and conservation.

13.4.18 In the east of the Socio-Economic Study Area near the proposed Wharfside and Imperial War Museum stops, land has been designated for mixed use development and contains a variety of business uses as well as the nearby major sports designated areas at Old Trafford Football Stadium and Cricket Ground.

13.4.19 The proposed Village and Parkway stops are located in the centre of the Trafford Park Core Employment Area, which prioritises industrial employment land use. Both proposed stops are in proximity to Other Sites/ Employment Areas, which are earmarked for non-industrial employment uses. The proposed Village stop is located in close proximity to the Village local shopping centre.

13.4.20 The proposed EventCity and Trafford Centre stops are located amongst significant retail, leisure and sporting land uses. The intu Trafford Centre is one of the largest retail centres in Europe. The majority of the land in the west of the Socio-Economic Study Area either has no designation or is part of the Trafford Park Core Employment Area. There is also a major sport designation site (where Trafford Golf Centre, Chill Factor[e] and Lucozade Power League Trafford are

located) and a mixed use designation site in the west of the Socio-Economic Study Area.

Traffic and Access

13.4.21 The Transport Assessment submitted with the TWAO application (Ref. 13-18) has been prepared in accordance with DfT Guidance and covers the potential impacts of the Metrolink Trafford Park Line scheme on all modes and users of the transport networks. In particular it outlines the traffic and access baseline relevant to the Metrolink Trafford Park Line and assesses impacts on traffic, taxis and other highway users, buses, light rail, heavy rail, and active modes such as walking and cycling.

Resources

13.4.22 The following tables set out the resources that fall within the Socio-Economic Study Area. These are highlighted in Figures 13.3 to 13.7 (ES Volume III). Resources are presented for each of the following themes:

- Residential properties – such as houses and flats (Figure 13.7);
- Visitor attractions – such as museums and regional/ national walking/ cycling trails (Figure 13.3);
- Visitor accommodation – such as hotels and bed and breakfasts (Figure 13.4);
- Local community assets – such as parks and local walking/ cycling trails (Figure 13.5); and
- Other businesses – those not covered above (Figure 13.6).

13.4.23 There are a number of resources that could be categorised as either a visitor attraction or a local community asset. Resources have been assigned to just one of these groups for ease of presentation in the figures as referred to above.

Residential Properties

13.4.24 There are two clusters of residential properties in the Socio-Economic Study Area. These are both located in Salford, across the Manchester Ship Canal (see Figure 13.7 in ES Volume III). There are approximately 25 properties in Merchants Quay (predominantly new build houses) with approximately 60 residents living there (based on average population per household) (Ref. 13-23). The modern Abito development, located off Clippers Quay, contains nearly 300 apartments, most of which are one bedroom, with an estimated 430 people living there (Ref. 13-24).

Visitor Attractions

13.4.25 Table 13.8 presents the visitor attraction resources in the Socio-Economic Study Area and, where relevant, which Metrolink Trafford Park Line stop they are nearest to. Figure 13.3 (ES Volume III) illustrates the visitor attractions in the Socio-Economic Study Area as well as those falling just outside to capture the wider tourism context.

Table 13.8 Visitor Attractions

Type	Resource	Nearest Metrolink Trafford Park Line Stop
Retail	Intu Trafford Centre	TFC
Museums and Galleries	Imperial War Museum North	IWM
Conference and Event Centres	Event City	EVC
	Victoria Warehouse	WHF
Entertainment and Sport Attractions	Legoland Discovery Centre Manchester	EVC
	Sea Life Manchester	EVC
	Old Trafford Football Stadium, Manchester United Football Club	WHF
Regional and Nationally Important Trails/ Cycle Routes	National Cycle Network 55	N/A
	Bridgewater Way Cycle Path	N/A

Visitor Accommodation

13.4.26 Table 13.9 presents the visitor accommodation in the Socio-Economic Study Area. Figure 13.4 (ES Volume III) illustrates the visitor accommodation in the Socio-Economic Study Area as well as those falling just outside to capture the wider context.

Table 13.9 Visitor Accommodation

Resource	Nearest Metrolink Trafford Park Line Stop
Premier Inn Manchester Old Trafford	WHF
Premier Inn Manchester Trafford Centre West	TFC
Victoria Warehouse Hotel	WHF

Local Community Assets

13.4.27 Table 13.10 and Figure 13.5 (ES Volume III) present the local community assets in the Socio-Economic Study Area. These include a range of different uses such as sport facilities, charities, community centres, walking trails and cycle routes. There are new, and forthcoming improvements to, cycle routes in the Socio-Economic Study Area including the section of the Stretford to mediacity:UK cycle route alongside Europa Way which is expected to open in 2015 (Ref. 13-25).

Table 13.10 Local Community Assets

Type	Resource	Nearest Metrolink Trafford Park Line Stop
Sport Facilities and Assets	Daytona Karting	IWM
Locally Important Walking Trails/ Cycle Routes	Bridgewater Canal[1]	N/A
	Tenax Road and Centenary Way Cycle Route	N/A
	Trafford Centre Circular Cycle Route	N/A
	Wharfside Way Cycle Route	N/A
Others	Challenge for Change	VLG
	St Antony's Centre for Church and Industry	VLG

Other Businesses

13.4.28 There are nearly 400 'other businesses' (i.e. those not covered above) in the Socio-Economic Study Area. The other businesses in the Socio-Economic Study Area are presented in Figure 13.6 (ES Volume III). Based on the findings from the Metrolink Trafford Park Line business survey, around half (51%) of these businesses operate in industrial related activities such as manufacturing, logistics and construction. Nearly a quarter (22%) of these businesses are professional services in offices. Almost a tenth (9%) of these businesses are retail and 7.5%

[1] Some sections of the Bridgewater Canal are designated as regional and national cycle trails and have therefore been classed as a visitor attraction. For the purposes of this assessment the non-designated sections have been classified as a local community asset for walking. Figures 13.3 and 13.5 in Volume III show the sections designated as a visitor attraction and as a local community asset.

are leisure and restaurants, with many of these businesses clustered around Barton Square which joins the intu Trafford Centre[2].

13.4.29 Two fifths (41%) of businesses employ fewer than 10 people and just over a third (36%) employ between 10 and 49 people. The remaining businesses employ between 50 and 99 people (17%) and over 100 people (8%).

13.4.30 For the purposes of this Socio-Economic impact assessment, businesses have been grouped together where they share similar characteristics; such as proximity to the Metrolink Trafford Park Line or being located on the same business park (i.e. one business resource may contain multiple businesses).

Receptors

13.4.31 13.4.32 presents the Socio-Economic receptors (and their level of sensitivity) within the Socio-Economic Study Area. Sensitivity relates to the type of impact experienced. These have been split by two broad types:

- Land take – part or whole of the land for a resource is taken. For example, a property is demolished or the car park of a business is lost / reduced; and
- Amenity – this relates to any other impacts such as increased traffic congestion, construction noise, pollution and visual amenity.

13.4.32 The sensitivity criteria set out in 13.4.32 below is used as a guideline for the assessment, but variations may exist where there are unique circumstances.

Table 13.11 Receptors and Associated Sensitivity

Receptor	Impact/ Effect	Sensitivity
Local residents	Residential property (including gardens) lost in part or whole to land take/ Displacement of home owners/ tenants, inconvenience and loss of their assets.	• HIGH Possible variations: • Residents only live for short periods of time in the properties (e.g. student accommodation) will experience less/limited disruption and so it may be appropriate to reduce sensitivity.

[2] Note that businesses in the intu Trafford Centre that are not within Barton Square are not included in this analysis. Instead these businesses have been treated collectively as a single resource under Visitor Attractions.

Table 13.11 Receptors and Associated Sensitivity		
Receptor	**Impact/ Effect**	**Sensitivity**
	Amenity value of residential property is changed/ Receptors enjoyment of resource is changed for example by improved accessibility (beneficial) or increased noise (adverse).	• HIGH
Existing employees and owners of businesses and organisations	Businesses (including community) lost to land take/ change in employment and skills mix, including any differential equality and health effects.	Given that impacts involve at least relocation of activities and that most affected receptors are likely to face a range of challenges in finding suitable alternative premises, with risks to the on-going running of their concerns and employment, sensitivity is usually assumed to be: • MEDIUM Possible variations: • Where a business/ organisation faces specific issues relating to new site requirements it may be appropriate to alter the sensitivity rating. • Where there are high relative differential equality and health effects it may be appropriate to alter the sensitivity rating.
	Businesses (including community): Amenity value of infrastructure is changed resulting in an impact on businesses and organisations' operations/ change in employment and skills mix, including any differential equality and health effects.	Sensitivity will vary significantly depending upon a wide range of characteristics of each business/ organisation. This includes where the employee lives, skills profile, and any differential equality and health effects.

Table 13.11 Receptors and Associated Sensitivity		
Receptor	**Impact/ Effect**	**Sensitivity**
Users of community infrastructure, tourism and recreation infrastructure and open/play space	Infrastructure lost to land take in part or in whole/ loss of facilities and benefits for users, workers owners, and groups/ organisations, including any differential equality and health effects.	Below are details of characteristics typically associated with sensitivity. HIGH: • No comparable and accessible alternatives exist within the relevant catchment area. • Highly or regularly used and valued resource. MEDIUM: • Limited comparable and accessible alternatives exist within the relevant catchment area. • Moderately or semi-regularly used and valued resource. LOW: • Some comparable and accessible alternatives exist within the relevant catchment area. • Sparingly or infrequently used and valued resource. NEGLIGIBLE: • Many comparable and accessible alternatives exist within the relevant catchment area. • Sparingly or infrequently used and valued resource. Possible variations: It may be appropriate to vary sensitivity if receptors have limited ability to absorb change.
	Amenity value of infrastructure is changed/ receptors' enjoyment of resource is changed, including any differential equality and health effects.	
Employment generation	Direct, indirect and induced employment benefits/ local employment opportunities.	Sensitivity in this context is taken to cover the benefit that individuals will derive from employment and this is assumed to be significant. Consequently sensitivity is usually assessed to be: • HIGH

13.5 Impacts Avoidance Measures

13.5.1 Extending the existing Metrolink network through Trafford Park would provide a public transport alternative to private cars and buses. The Metrolink Trafford Park Line should improve public accessibility to the existing employment, leisure and tourism opportunities within Trafford Park and could be a catalyst for future development in the local area.

13.5.2 The Metrolink Trafford Park Line is planned to deliver a range of significant Socio-Economic benefits whilst being designed in a manner that aims to minimise potential adverse Socio-Economic impacts. In particular, the design aims to minimise direct adverse impacts upon existing employment, leisure and tourism facilities and property. Where as a consequence of the proposals businesses may be required to relocate, Transport for Greater Manchester would endeavour to assist with the identification of relocation options, within Trafford Park if possible. In other circumstances where land acquisition is unavoidable, Transport for Greater Manchester would deal with each case in accordance with statutory Guidance as appropriate and would seek to minimise the effects on the affected businesses.

13.5.3 In addition, construction of the Metrolink Trafford Park Line would be undertaken in a manner that aims to minimise disruption and nuisance to prevailing land uses. The selected construction contractor would be required to prepare and implement a Construction Environmental Management Plan (CEMP), as well as undertake the works in accordance with Transport for Greater Manchester's Code of Construction Practice (CoCP) (refer to Chapter 4: Development Description).

13.6 Assessment of Impacts and Effects

13.6.1 This section examines the potential Socio-Economic impacts during construction and operation of the Metrolink Trafford Park Line. Wherever possible the assessment sets out:

- The duration of impacts/ effects, for example whether they are temporary or permanent. More weight is given to long-term, permanent changes than to short-term, temporary changes;
- Whether impacts are direct (such as land take/ demolition of business) or indirect/ amenity (such as congestion impacts);
- Whether effects are negligible, minor, moderate, or major;
- Whether effects are adverse or beneficial; and
- Whether effects are significant or not significant.

Assessment of Effects During Demolition and Construction

Socio-Economic Impacts

Residential and Population

13.6.2 No residential properties fall within the Metrolink Trafford Park Line construction footprint and therefore no such properties are anticipated to suffer a loss/ partial loss of land. The effects of land take on local residents are therefore considered to be negligible.

13.6.3 Other potential effects on the local population could result from an influx of construction workers or from people choosing either to move away from the area or choosing not to come to the area due to the Metrolink Trafford Park Line construction activities.

13.6.4 The employment generated from construction of the Metrolink Trafford Park Line is presented in paragraph 13.6.13. The construction sector workforce is flexible and moves fluidly with a number of comparable schemes already under construction in Greater Manchester. For these reasons, there is unlikely to be a large influx of workers to reside in the area and the subsequent impacts on existing residents are anticipated to be negligible.

13.6.5 Construction activities related to new developments can force residents to move away from an area; however, the two residential areas within the Socio-Economic Study Area are located in Salford (across the Manchester Ship Canal), which would provide a buffer from the Metrolink Trafford Park Line. As such, these residential properties are not directly impacted by land take. Other potential amenity effects could arise (e.g. noise impacts – refer to Chapter 6: Noise and Vibration). However, with the implementation of suitable mitigation measures (as detailed with this ES), the effects on local residents resulting from the Metrolink Trafford Park Line construction activities are anticipated to be minimised.

Local Community Assets

13.6.6 There are some signed cycle routes within the Metrolink Trafford Park Line construction footprint. As these cycle routes run parallel to the alignment of the Metrolink Trafford Park Line, it is anticipated that during construction there would be temporary closure or a diversion of these routes; however, other relevant access are anticipated to be provided to cyclists. Further information is available in the Transport Assessment submitted with the TWAO application (Ref. 13-18).

13.6.7 Based on the above, it is assumed that the magnitude of impact on cycle routes is low. The sensitivity of the receptors is considered to be low also due to the

availability of nearby alternatives. Therefore, the overall effect is anticipated to be negligible.

13.6.8 There are no other local community assets affected by direct land take. As such, no significant impacts resulting from direct land take are found on local community assets.

13.6.9 Other potential amenity effects could arise due to construction activities (e.g. noise impacts – refer to Chapter 6: Noise and Vibration). However, with the implementation of suitable mitigation measures (as detailed with this ES), effects on local community assets resulting from Metrolink Trafford Park Line construction are anticipated to be minimised.

Economic Impacts

Employment

13.6.10 There are some businesses within the Metrolink Trafford Park Line Socio-Economic Study Area that may be affected by loss/ partial loss of land. This includes the requirement to demolish a number of business properties on Trafford Wharf Road (Samuel Platts Public House, the Wharfside Business Centre units (1 – 9), and the large factory building on the plot adjacent to the eastern boundary of the Quay West plot) and the Subway franchise on Village Way. Some of these properties are vacant, but five are currently occupied. One business is expected to leave the building before construction commences on the Metrolink Trafford Park Line. Three of the businesses employ approximately 60 people in total. Information on the number of employees at the remaining business is unknown, although based on the business type and size it is expected to be less than 10 full-time equivalent employees.

13.6.11 As noted earlier Transport for Greater Manchester would endeavour to assist relocation of businesses where unavoidable. In other cases where land is being acquired all reasonable efforts would be made to ensure continuity of the operations at those sites. Therefore, employment that might have been lost as a result of the Metrolink Trafford Park Line would more than likely be retained within the Socio-Economic Study Area even if in some cases it may have been displaced.

13.6.12 Based on the above, the magnitude of impact on employment associated with loss/ partial loss of land resulting from construction of the Metrolink Trafford Park Line is anticipated to be low. The sensitivity of the receptors is considered to be medium. Therefore, the effect is anticipated to be minor adverse and not significant.

13.6.13 The Metrolink Trafford Park Line construction would commence in 2016. Based on the assumed cost of the Metrolink Trafford Park Line, regional construction output per employee (Ref. 13-26 and Ref. 13-27), and taking account of additionality factors (leakage, displacement, deadweight and multiplier effects), the number of construction workers on site is estimated to be 2,200 full-time equivalent workers per year. Of this, it is estimated that 88% would be from Greater Manchester. This represents 4% of the existing construction workforce in Greater Manchester (Ref. 13-11).

13.6.14 Based on this, the construction employment generated by the Metrolink Trafford Park Line is anticipated to have a major beneficial effect which is significant.

13.6.15 The overall impact on employment (i.e. employment lost and employment gained) due to construction of the Metrolink Trafford Park Line is anticipated to be major beneficial which is significant.

Other Businesses

13.6.16 As stated above, some businesses fall within the Metrolink Trafford Park Line indicative construction boundary and may be affected by loss/ partial loss of land. Wherever reasonably practical the effects of land acquisition would be mitigated so as to minimise the lasting impact on business operations. In addition the Metrolink Trafford Park Line would provide a new transport mode for employees and clients, providing a beneficial impact.

13.6.17 Based on this, the effects on other businesses from loss/ partial loss of land are anticipated to be negligible.

13.6.18 Other potential amenity effects could arise during construction of the Metrolink Trafford Park Line (e.g. noise impacts – refer to Chapter 6: Noise and Vibration). However, with the implementation of suitable mitigation measures (as detailed with this ES), such effects are anticipated to be minimised.

Land Use Impacts

13.6.19 The Metrolink Trafford Park Line would be routed predominantly along existing roads and transport infrastructure, and therefore the function of existing land uses is not anticipated to change significantly during construction. However, Wharf End Road is anticipated to be permanently closed to traffic and some businesses on Trafford Wharf Road may experience a loss/ partial loss of land which could change the existing land uses.

13.6.20 Based on the above, the construction of the Metrolink Trafford Park Line is anticipated to have a negligible effect on land use.

Visitor and Tourism Impacts

Visitor Attractions

13.6.21 There is a small section of one nationally important cycle route, National Cycle Network 55, within the Metrolink Trafford Park Line construction footprint. As this cycle route runs parallel to the alignment of the Metrolink Trafford Park Line, it is likely that during construction there would be temporary closure or diversion; however, alternative access is anticipated to be provided to cyclists. The Transport Assessment submitted with the TWAO application (Ref. 13-18) provides further information on effects related to cycling.

13.6.22 The magnitude of impact on the National Cycle Network 55 is medium as the number of users of a national cycle route is higher relative to the number of users of local cycle routes. The sensitivity of the receptors is considered to be low due to the availability of nearby alternatives. Therefore, the overall significance of effect is minor adverse and thus not significant.

13.6.23 The car park of a visitor attraction may be reduced in size due to anticipated partial loss of land. Transport for Greater Manchester would negotiate this land acquisition with the land owner, but the indicative construction boundary indicates that the size of land affected is small. Based on this, the magnitude of impact is low and the sensitivity of its users is medium. Therefore, the overall significance of effect on this resource is minor adverse and thus not significant.

13.6.24 Other potential amenity effects could arise during construction of the Metrolink Trafford Park Line (e.g. noise impacts – refer to Chapter 6: Noise and Vibration). However, with the implementation of suitable mitigation measures (as detailed with this ES), such effects are anticipated to be minimised.

13.6.25 Overall the construction of the Metrolink Trafford Park Line is anticipated to have a minor adverse effect on visitor attractions, which is not significant.

Visitor Accommodation

13.6.26 No visitor accommodation is anticipated to suffer a loss or partial loss of land from construction activities and therefore the effect on visitors is considered to be negligible.

13.6.27 Other potential amenity effects could arise during construction of the Metrolink Trafford Park Line (e.g. noise impacts – refer to Chapter 6: Noise and Vibration). However, with the implementation of suitable mitigation measures (as detailed with this ES), such effects are anticipated to be minimised.

Assessment of Effects During Operation

Socio-Economic Impacts

Residential and Population

13.6.28 The operation of the Metrolink Trafford Park Line would generate employment opportunities for local residents and provide greater accessibility to key employment sites in Trafford Park and Greater Manchester. The Metrolink Trafford Park Line is anticipated to run every 12 minutes, with additional provision for special events. It would provide a new form of public transport through Trafford Park, which would improve the accessibility and capacity of public transport in the Socio-Economic Study Area. As the number of operational jobs is small relative to the Greater Manchester labour force (see paragraph 13.6.35), the Metrolink Trafford Park Line is not anticipated to cause an influx of workers moving to the local area for employment opportunities, and so local residents are therefore not anticipated to be disrupted.

13.6.29 Based on this, the effect from operation of the Metrolink Trafford Park Line on the local population is moderate beneficial which is significant.

13.6.30 The effects of the Metrolink Trafford Park Line on traffic (flows, congestion and modal shift) have been modelled for two future scenario years (2020 and 2035) by the scheme transport consultants (SYSTRA). The Metrolink Trafford Park Line is anticipated to encourage modal shift to public transport which would reduce the negative effects associated with congestion. These effects are reported within the Transport Assessment submitted with the TWAO application (Ref. 13-18) and are therefore not considered as part of this assessment.

Local Community Assets

13.6.31 During operation of the Metrolink Trafford Park Line, the cycle route network is anticipated to be enhanced through re-routing and creating new cycle ways, links, road crossings and signalled junctions, which would have long term benefits to users. Usage of cycle routes is not anticipated to be adversely effected by the operation of the Metrolink Trafford Park Line. Further information on cycling is available in the Transport Assessment submitted with the TWAO application (Ref. 13-18).

13.6.32 Based on the above, the effects from Metrolink Trafford Park Line operation on the cycle route network is moderate beneficial which is significant.

13.6.33 Operation of the Metrolink Trafford Park Line would improve accessibility and connectivity to local community assets in the Socio-Economic Study Area and may encourage greater usage. However, it is not anticipated that usage would increase substantially and as such the improved accessibility resulting from the

operation of the Metrolink Trafford Park Line would have a minor beneficial, and thus not significant, effect on local community assets.

13.6.34 Overall the operation of the Metrolink Trafford Park Line would have a minor beneficial effect on local community assets which is not significant.

Economic Impacts

Employment

13.6.35 Based on information provided by Transport for Greater Manchester, and taking account of additionality effects, it is estimated that a total of 67 jobs would be created during the operation of the Metrolink Trafford Park Line. Of these jobs, 88% are anticipated to be in Greater Manchester. This represents a small proportion of the Greater Manchester labour force.

13.6.36 The employment generated by operation of the Metrolink Trafford Park Line would, therefore, have a minor beneficial effect, which is not significant.

13.6.37 The Metrolink Trafford Park Line would connect Trafford Park, a key employment site, to the wider Metrolink Network in Greater Manchester and encourage modal shift from cars to public transport. Consequently this would greatly enhance accessibility to Trafford Park and improve employment opportunities for people living in Greater Manchester dependent upon public transport. The Metrolink Trafford Park Line is anticipated to facilitate increased employment density in Trafford Park which would bring further employment opportunities and economic benefits.

13.6.38 Based on this, the effect on employment opportunities would be moderate beneficial and thus significant.

13.6.39 There is the possibility that the Metrolink Trafford Park Line may displace some employment activities from Manchester city centre, such as retail jobs, from increased accessibility to competitors such as the intu Trafford Centre. However, both the intu Trafford Centre and Manchester city centre are well established employment sites with complementary offers, and therefore displacement of employment activities is anticipated to be minimal.

13.6.40 Based on the above, the effect of employment displacement is anticipated to be negligible.

13.6.41 Overall the operation of the Metrolink Trafford Park Line would have a moderate beneficial effect on employment and employment opportunities, which is significant.

Other Businesses

13.6.42 Operation of the Metrolink Trafford Park Line would provide enhanced accessibility to the Greater Manchester Metrolink Network for staff, customers and clients of the other businesses. Public transport opportunities would be significantly expanded by the Metrolink Trafford Park Line, and the proposed stops are located close to key business hubs within Trafford Park, one of Greater Manchester's most important employment sites. The Metrolink Trafford Park Line is anticipated to encourage a modal shift in commuting which would benefit other businesses by appealing to members of the Greater Manchester labour market who use the Metrolink Network.

13.6.43 Based on the above, the enhanced accessibility provided by operation of the Metrolink Trafford Park Line would have a moderate beneficial effect on other businesses, which is considered to be significant.

13.6.44 The Park and Ride facility would provide flexible transport options and greater access to other stops on the Metrolink network and Manchester city centre. The Transport Assessment submitted with the TWAO application (Ref. 13-18) provides details of the impact of the Park and Ride facility.

13.6.45 Operation of the Metrolink Trafford Park Line may have other effects such as developing alternative site access routes in some cases for other businesses and their staff, customers and clients. The Transport Assessment submitted with the TWAO application (Ref. 13-18) provides details of the impact of operation of the Metrolink Trafford Park Line on access routes.

Land Use Impacts

13.6.46 Land use impacts arising from construction of the Metrolink Trafford Park Line are stated in Section 13.6.19. During operation the Metrolink Trafford Park Line is anticipated to facilitate changes in land use in Trafford Park, especially the quayside area, and it is expected to encourage development in a similar manner to Salford Quays as an extension of mediacity:UK. The role of Metrolink Trafford Park Line in facilitating land use changes and economic growth is reflected in the TMBC Core Strategy (Ref. 13-6) and Greater Manchester Strategy (Ref. 13-4).

13.6.47 The TMBC Core Strategy envisages that further intensification of land uses are anticipated to occur throughout Trafford Park as a consequence of connectivity and improvement in retention of skilled employees brought about by the Metrolink Trafford Park Line scheme.

13.6.48 Based on the above, the operation of the Metrolink Trafford Park Line would have a moderate beneficial effect on land use which is significant.

Visitor and Tourism Impacts

Visitor Attractions

13.6.49 Operation of the Metrolink Trafford Park Line would improve accessibility to visitor attractions and increase the capacity of public transport. This could result in increased visitor numbers combined with mode shift towards public transport.

13.6.50 Based on the above, the Metrolink Trafford Park Line would have a moderate beneficial effect on the amenity of visitor attractions which is significant.

Visitor Accommodation

13.6.51 Operation of the Metrolink Trafford Park Line would improve accessibility to visitor accommodation. Whilst two of the visitor accommodation receptors in the Socio-Economic Study Area are nearby existing Metrolink stops, one has poor accessibility by public transport and would benefit significantly from the Metrolink Trafford Park Line.

13.6.52 Based on the above, the Metrolink Trafford Park Line would have a moderate beneficial effect on the amenity of visitor accommodation which is significant.

Wider Tourism Impacts

13.6.53 The Metrolink Trafford Park Line would have impacts on wider tourism in Greater Manchester. Whilst some tourism activity (such as retail tourism, museums and events) in the rest of Greater Manchester may be displaced by visitors choosing to visit attractions in the Socio-Economic Study Area instead of other attractions elsewhere, this is likely to be minimal - as the attractions in the Socio-Economic Study Area are already well established. The overall tourism offer in Greater Manchester would be strengthened as a result of improved public transport connectivity by the Metrolink Network to key visitor attractions both within and beyond the Socio-Economic Study Area, allowing greater mobility for visitors.

13.6.54 Based on the above, the Metrolink Trafford Park Line would have a minor beneficial effect on wider tourism which is not significant.

13.7 Additional Mitigation

13.7.1 As based upon the evaluation as presented above, mitigation would be required in relation to some individual businesses and the loss/ partial loss of land. As stated in paragraph 13.5.2, Transport for Greater Manchester would pursue appropriate mitigation measures to address relocation and land acquisition effects.

13.8 Residual Effects and Conclusions

13.8.1 The Metrolink Trafford Park Line would have a number of significant beneficial Socio-Economic effects both within and beyond the extent of the Socio-Economic Study Area, and is anticipated to have no significant adverse Socio-Economic effects. These are summarised in Table 13.12.

13.8.2 The operation of the Metrolink Trafford Park Line would service other areas of Greater Manchester and therefore Socio-Economic benefits would extend beyond the study area. The Metrolink Trafford Park Line would have a major beneficial effect on employment during construction and a moderate beneficial effect on employment during operation. Visitor attractions and visitor accommodation within the study area and wider tourism in Greater Manchester are all anticipated to benefit from the operation of the Metrolink Trafford Park Line.

13.8.3 As stated throughout the chapter, construction of the Metrolink Trafford Park Line has the potential to cause a number of indirect Socio-Economic impacts (e.g. noise impacts – refer to Chapter 6: Noise and Vibration); however, with the implementation of suitable mitigation measures, such effects are anticipated to be minimised. As detailed in Section 13.5, the selected construction contractor would be required to prepare and implement a CEMP, as well as undertake the works in accordance with Transport for Greater Manchester's CoCP.

Table 13.12 Summary of Residual Effects

Stage of Development	Description of Effect	Residual Effect Significance	Nature of Effect3	Geographic Scale
Residential and Population				
Demolition and construction	Overall construction effects on residential properties and local population	Negligible, not significant	N/A	Local
Demolition and construction	Residential property loss of land from construction	Negligible, not significant	N/A	Local

3 St = short term, Mt = medium term, Lt = long term, P = permanent, D = direct, InD = indirect, R = reversible, IR = irreversible, N/A = not applicable

Table 13.12 Summary of Residual Effects				
Stage of Development	**Description of Effect**	**Residual Effect Significance**	**Nature of Effect3**	**Geographic Scale**
Demolition and construction	Local population effects from construction workforce influx/ amenity	Negligible, not significant	N/A	Local
Demolition and construction	Local population relocating due to construction activity amenity effects	Not significant	N/A	Local
Operation	Operation effects of the Metrolink Trafford Park Line on residential properties and local population	Moderate Beneficial, significant	Lt, D	Local
Local Community Assets				
Demolition and construction	Overall construction effects on local community assets	Negligible, not significant	N/A	Local
Demolition and construction	Effects from loss/ partial loss of land on local cycle routes (local community assets)	Negligible, not significant	N/A	Local
Demolition and construction	Effects from loss/ partial loss of land on all other local community assets	Negligible, not significant	N/A	Local
Operation	Overall operation effects on local community assets	Minor Beneficial, not significant	Lt, D	Local
Operation	Effects from operation of the Metrolink Trafford Park Line on cycle routes	Moderate Beneficial, significant	Lt, InD	Local
Operation	Amenity effects from operation of the Metrolink Trafford Park Line on local community assets	Minor Beneficial, not significant	Lt, InD	Local
Employment				
Demolition and construction	Overall construction effects on employment	Major Beneficial, significant	St, D	Regional

Table 13.12 Summary of Residual Effects				
Stage of Development	**Description of Effect**	**Residual Effect Significance**	**Nature of Effect3**	**Geographic Scale**
Demolition and construction	Effects on employment from loss/ partial loss of land	Minor Adverse, not significant	P, D	Local
Demolition and construction	Employment generated by constructing the Metrolink Trafford Park Line	Major Beneficial, significant	St, D	Regional
Operation	Overall effect from operation of the Metrolink Trafford Park Line on employment	Moderate Beneficial, significant	Lt, D	Regional
Operation	Employment generated by operation of the Metrolink Trafford Park Line	Minor Beneficial, not significant	Lt, D	Regional
Operation	Accessibility to Trafford Park employment site effects from operation of the Metrolink Trafford Park Line	Moderate Beneficial, significant	Lt, D	Regional
Operation	Displacement effects on existing employment activities from operation of the Metrolink Trafford Park Line	Negligible, not significant	N/A	Regional
Other Businesses				
Demolition and construction	Other businesses effects from loss/ partial loss of land	Negligible, not significant	N/A	Local
Operation	Accessibility effects for other businesses from operation of the Metrolink Trafford Park Line	Moderate Beneficial, significant	Lt, InD	Regional
Land Use				
Demolition and construction	Land use changes arising from construction of the Metrolink Trafford Park Line	Negligible, not significant	N/A	Local
Operation	Land use changes arising from operation of the Metrolink Trafford Park Line	Moderate Beneficial, significant	N/A	Local

Table 13.12 Summary of Residual Effects				
Stage of Development	**Description of Effect**	**Residual Effect Significance**	**Nature of Effect3**	**Geographic Scale**
Visitor Attractions				
Demolition and construction	Overall construction effects on visitor attractions	Minor Adverse, not significant	St, D	Local
Demolition and construction	Visitor attraction loss of land/ disruption from construction to National Cycle Network 55	Minor Adverse, not significant	St, D	Regional
Demolition and construction	Visitor attraction loss of land/ disruption from construction to Imperial War Museum North	Minor Adverse, not significant	P, D	Local
Operation	Accessibility effects on visitor attractions from operation of the Metrolink Trafford Park Line	Moderate Beneficial, significant	Lt, D	Regional
Visitor Accommodation				
Demolition and construction	Visitor accommodation loss/ partial loss of land from construction	Negligible, not significant	N/A	Local
Operation	Accessibility effects on visitor accommodation from operation of the Metrolink Trafford Park Line	Moderate Beneficial, significant	Lt, D	Regional
Wider Tourism Impacts				
Operation	Effects from operation of the Metrolink Trafford Park Line on wider tourism	Minor Beneficial, not significant	Lt, InD	Regional

13.9 References

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Transport for Greater Manchester

Chapter 14:

Carbon Assessment

14 CARBON ASSESSMENT

14.1 Introduction

14.1.1 This chapter of the Environmental Statement (ES) reports the findings of an assessment of potential greenhouse gas (GHG) emissions as a result of the proposed Metrolink Trafford Park Line, Greater Manchester.

14.2 Legislation and Planning Policy Context

Legislative Background

14.2.1 Currently there is no legal requirement to undertake a carbon, or GHG, assessment as part of an EIA; however, in accordance with the proposed amendment to the EIA Directive (Ref. 14-1), Member States will need to specifically address carbon within the EIA process from May 2017 at the latest, namely in the following terms:

"A description of the factors ... likely to be significantly affected by the project: population, human health ... climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.

The impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions)"

14.2.2 In the absence of current legislation, this chapter has been prepared in line with the anticipated EIA Directive requirements as detailed above.

14.2.3 Carbon footprinting and assessment within EIA is an emerging discipline and there is currently no prescribed format that it should follow. In addition, there are no guidelines regarding the assessment of the significance of GHG emissions.

Planning Policy Context

14.2.4 Despite the absence of current legislation in the area of carbon assessments for EIAs, rising national and international awareness of GHG emissions has prompted the integration of control processes into planning policy. These policies and processes usually cover both climate change mitigation and adaptation. The planning policy documents detailed below relate to relevant planning responses from the areas affected by the Metrolink Trafford Park Line that could directly or indirectly influence the carbon footprint of the scheme's construction and operation.

National Policy

National Planning Policy Framework (2012)

14.2.5 The National Planning Policy Framework (NPPF) (Ref. 14-2) describes how the challenge of climate change can be met. Chapter 10 of the NPPF highlights that planning plays a key role in mitigation against climate change. The policy also states that local planning authorities should:

- Adopt proactive strategies to mitigate and adapt to climate change taking full account of flood risk, coastal change, and water supply and demand considerations;
- Support the move to a low carbon future by supporting energy efficient improvements to existing buildings and set out requirements consistent with zero carbon building policy; and
- Help to increase the use and supply of renewable and low carbon energy.

National Planning Practice Guidance (2014)

14.2.6 The National Planning Practice Guidance (NPPG) (Ref. 14-3) consolidates a large number of practice guidance documents. The guidance includes a section on climate change, which advises how planning can identify suitable mitigation and adaptation measures in plan-making and the application process to address the potential impacts of climate change.

The Climate Change Act (2008)

14.2.7 The Climate Change Act (Ref. 14-4) sets up a framework for the UK to achieve its long-term goals of reducing GHG emissions by 34% over the 1990 baseline by 2020 and by at least 80% by 2050; and to ensure steps are taken towards adapting to the impact of climate change. The Climate Change Act introduces a system of carbon budgeting and sets out a procedure for assessing the risks of the impact of climate change for the UK, and a requirement on the Government to develop an adaptation programme.

14.2.8 The Climate Change Act (2008) covers the following six GHGs, namely: carbon dioxide CO_2; methane (CH_4); nitrous oxide (N_2O); hydrofluorocarbons (HFC); perfluorocarbons (PFC); and sulphur hexafluoride (SF_6).

14.2.9 The Climate Change Act gives the Government the power to ask certain organisations to produce reports on: the current and future predicted impacts of climate change on their organisation; and, their proposals for adapting to climate

change. This includes transport bodies, energy and water utilities, and environmental agencies.

The Carbon Plan (2011)

14.2.10 The Carbon Plan (Ref. 14-5) sets out the Government's plans for achieving the emissions reductions committed to in the Climate Change Act 2008, on a pathway consistent with meeting the 2050 target. This publication brings together the Government's strategy to curb GHG emissions and deliver the UK's climate change targets, as well as an updated version of actions and milestones for the next five years. The plan makes specific reference to supporting people to make lower carbon travel choices, such as walking, cycling or public transport.

Local Policy

Greater Manchester Climate Strategy 2011-2020 (2011)

14.2.11 The Greater Manchester Climate Strategy (Ref. 14-6) sets out Greater Manchester's plan to build a low carbon economy by 2020, reducing carbon emissions by 48% and reacting to the changing climate, while creating future jobs and new industries in the 'green' sector. The document co-ordinates the carbon reduction plans already crafted by the ten Greater Manchester local authorities and provides an effective, integrated approach to tackling climate change. The plan outlines four headline visions for Greater Manchester by 2020, namely:

- A rapid transition to a low carbon economy;
- Collective carbon emissions reduced by 48%;
- Be prepared for, and actively adapting to, a rapidly changing climate; and
- 'Carbon literacy' will have become embedded into the culture of organisations, lifestyles and behaviours.

The Third Greater Manchester Local Transport Plan 2011/12 – 2015/16 (2011)

14.2.12 The Third Greater Manchester Local Transport Plan (LTP3) (Ref. 14-7) sets out the major transport priorities for all ten districts within Greater Manchester and includes plans to encourage more sustainable travel. The core objectives of relevance to the Metrolink Trafford Park Line, as defined in this document, are as follows:

- To ensure that carbon emissions from transport are reduced in line with UK Government targets in order to minimise the impact of climate change; and

- To ensure that the design and maintenance of the transport network and provision of services supports sustainable neighbourhoods and public spaces and provides equality of transport opportunities.

Trafford Core Strategy (2012)

14.2.13 The Trafford Core Strategy Local Plan (Ref. 14-8) provides the overarching planning policy framework for Trafford and sets the vision, spatial strategy and strategic policies for development in the Borough up to 2026. The Core Strategy was formally adopted in January 2012 and replaces in part a number of policies in the Revised Trafford Unitary Development Plan (UDP) (Ref. 14-9).

14.2.14 The Core Strategy Local Plan, Policy L5 (Climate Change) states new development should mitigate and reduce its impact on climate change factors and maximise its sustainability through improved environmental performance of buildings, lower carbon emissions and renewable or decentralised energy generation. In addition, the local plan emphasises the importance of sustainable travel.

Other Relevant Policy, Standards and Guidance

World Resources Institute (WRI) GHG Protocol's Corporate Accounting and Reporting Standards (2013)

14.2.15 The GHG Protocol (Ref. 14-10) provides standards and guidance for companies and other organisations preparing a GHG emissions inventory. It covers the accounting and reporting of the six GHGs covered by the Kyoto Protocol, namely: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6) and the more recently added nitrogen trifluoride (NF_3).

14.2.16 The Corporate Accounting and Reporting Standard has been designed for use by public and private sector bodies alike, with the following objectives in mind:

- To help companies prepare a GHG inventory that represents a true and fair account of their emissions, through the use of standardised approaches and principles;
- To simplify and reduce the costs of compiling a GHG inventory;
- To provide business with information that can be used to build an effective strategy to manage and reduce GHG emissions; and
- To increase consistency and transparency in GHG accounting and reporting among various companies and GHG programmes.

14.2.17 In addition to the technical guidance, the GHG Protocol provides a suite of carbon footprinting tools and inventories that can be used by organisations to aid the quantification of their footprint.

Transport Analysis Guidance: WebTAG

14.2.18 The Transport Analysis Guidance: WebTAG (Ref. 14-11) from the Department for Transport (DfT) contains guidance on the assessment of transport schemes. The guidance includes, or provides links to, advice on how to:

- Set objectives and identify problems;
- Develop potential solutions;
- Create a transport model for the appraisal of alternative solutions; and
- Conduct an appraisal which meets the Department's requirements, including relevant emission factors.

14.2.19 Projects or studies that require government approval are expected to make use of this guidance in a manner appropriate for that project or study. For projects or studies that do not require government approval, WebTAG should serve as a best practice guide.

14.3 Assessment Methodology and Effect Significance Criteria

14.3.1 This section of this ES chapter presents the following:

- A summary of the data sources used to prepare this chapter;
- Details of impact assessment guidance used to define the methodology applied; and
- The methodology used to assess potential GHG effects.

Information Sources

14.3.2 The following sources of information that define the Metrolink Trafford Park Line have been reviewed and form the basis of the impact assessment. All data received was subject to a quality assessment and 'sense checking' exercise, which involved a systematic check for completeness and data anomalies. The review was based on a broad understanding of likely proportions of different construction materials for similar construction schemes, and anticipated factors of scale for modal shift.

Construction

- Estimates of concrete and steel material volumes/ sources/ transport modes and transportation distances; and
- Estimates of waste material volumes, types and distances to disposal.

Operation and Maintenance

- Estimates of tram operation energy consumption.

Modal Shift Data

14.3.3 Modal shift, the shifting of passengers from one transport mode to another, generally occurs when one mode of transport has a comparative advantage over another (e.g. lower cost, ease of accessibility or shorter journey times). In the context of the Metrolink Trafford Park Line, modal shift refers to the transfer of passengers from road to tram. As road transport generally has a higher carbon footprint per passenger km than trams, it is necessary to consider what impact the projected modal shift brought about as a result of the Metrolink Trafford Park Line would have in reducing carbon emissions from road transport.

14.3.4 Road transport modelling, which included estimates of induced travel and changes in travel patterns, has been carried out for the Metrolink Trafford Park Line and is reported within the Transport Assessment (TA) submitted with the Transport and Works Act Order (TWAO) application (Ref. 14-12). The transport model accounts for anticipated future upgrades to existing public transport and highway schemes, induced travel and additional trips from future committed developments.

14.3.5 The calculation of the GHG emissions associated with the operation of the Metrolink Trafford Park Line is based on the shift in road transport travel patterns wholly within Greater Manchester. The transport modelling data presented in the TA (Ref. 14-12) was used to estimate the modal shift associated with the Do Minimum (the Metrolink Trafford Park Line is not built and no alternatives are proposed) and Do Something scenarios (with the Metrolink Trafford Park Line). Subtracting data for the Do Minimum scenario from the Do Something scenario provides an estimate of the change in road transport travel patterns as a result of the Metrolink Trafford Park Line.

14.3.6 Estimated carbon emissions for modal shift were then calculated based upon the forecast annualised change in vehicle kilometres for 2020 and 2035 according to the baseline Do Minimum scenario and the Do Something scenario. Table 14.1 contains details of this data, the gaps and the related assumptions.

Methodology for Determining Baseline Conditions

14.3.7 To understand the impact of the Metrolink Trafford Park Line on GHG emissions, it is necessary to establish a GHG emissions baseline. The baseline is a reference case against which to compare the Metrolink Trafford Park Line construction and operation activities.

14.3.8 For the purposes of this assessment, the baseline is the Do Minimum scenario. Therefore, the baseline of the Metrolink Trafford Park Line is zero and all construction and operational phase GHG emissions as a result of the Metrolink Trafford Park Line (the Do Something scenario) are additional.

Assessment Methodology

Carbon Footprinting

14.3.9 The GHG emissions of the Metrolink Trafford Park Line have been estimated and are reported herein in tonnes CO_2e (carbon dioxide equivalent) which standardises the six GHGs referred in 14.2.5 into one index based on CO_2. In reality, the majority of emissions associated with the Metrolink Trafford Park Line would be CO_2 and therefore for the purposes of this chapter, GHG and CO_2 are used interchangeably.

14.3.10 The GHG emission estimates for the Metrolink Trafford Park Line are presented as a carbon footprint. The carbon footprint has been created by combining the units of quantity of construction materials and transport distances, for example, with the appropriate GHG emission factors, and then subtracting any benefits of emission reductions due to modal shift.

14.3.11 The carbon footprint has been calculated based on construction starting in 2016 and full Metrolink Trafford Park Line operation commencing in 2020. The assessment is based on 60 years of scheme operation (the standard economic appraisal period for transport schemes in the UK).

14.3.12 The carbon footprint has been prepared in line with the WRI GHG Protocol (Ref. 14-10) and split into the following emission scopes:

- **Scope 1:** All direct GHG emissions;
- **Scope 2:** Indirect GHG emissions (from the use of purchased electricity, heat or steam);

- **Scope 3:** Other indirect emissions (including transport-related activities in vehicles not owned or controlled by Transport for Greater Manchester, outsourced activities, waste disposal etc.).

Carbon Factors

14.3.13 The following data sources have been used to calculate the Metrolink Trafford Park Line carbon footprint:

- Material embedded carbon:
  - SimaPro 7.3.3 Life Cycle Assessment (LCA) software;
  - MPA the Concrete Centre (2012) (Ref. 14-13); and
  - Eurofer (2012) (Ref. 14-14).
- Construction material transport and modal shift:
  - Defra/ DECC (2014) (Ref. 14-15); and
  - Department for Transport (2013) (Ref. 14-17).
- Grid electricity:
  - Department for Transport (2014) (Ref. 14-18).

Footprint Assessment, Benchmarking and Sensitivity Testing

14.3.14 Due to the inherent uncertainties of preparing a carbon footprint at the pre-detailed design stage, a number of assumptions have been applied (see Tables 14.1, 14.2 and 14.5). To recognise the uncertainties associated with the construction phase carbon footprint, this is presented as a range based on the material quantity data available and three emissions scenarios that apply different carbon factors for concrete and steel as detailed below (concrete and steel comprise the vast majority of embedded carbon emissions for construction projects):

- **2013 Baseline:** this scenario is based on known and widely used concrete and steel carbon factors from SimaPro 7.3.3 Life Cycle Assessment software. This scenario represents a worst case, as it assumes there will be no carbon reduction improvements within the concrete and steel industries between now and the start of Metrolink Trafford Park Line construction;
- **Central Case:** this scenario is considered to represent the most likely scenario representing embedded carbon factors anticipated during the Metrolink Trafford Park Line construction phase. For the purposes of this assessment,

carbon factors for 2018 have been selected reflecting the mid-point of anticipated construction activities. The carbon factors are based on anticipated carbon reduction targets for carbon and steel based on industry targets anticipated to be achieved during the period of construction;

- **Low Carbon:** this scenario is based on future concrete and steel carbon factors calculated from anticipated carbon reduction trajectories required to achieve the UK 2050 carbon reduction target as set out in the Climate Change Act 2008.

14.3.15 Estimated GHG emissions from construction materials were calculated by multiplying the embodied GHG emissions factor for each material as per the sources listed in 14.3.13 above by the estimated volumes of the material for each scenario. Resulting emissions for each material were then collated to provide a total construction materials footprint for each scenario.

14.3.16 Estimated emissions from the transportation of materials to the site and waste from the site were calculated by multiplying the volumes of materials transported by appropriate Defra/ DECC GHG emission factors (see 14.3.11). Assumptions used for these calculations are in table 14.1.

14.3.17 The Metrolink Trafford Park Line operational carbon footprint estimate is based on the DfT's WebTAG data sets for electric rail, private cars and light goods vehicles up to 3.5 tonnes. The carbon footprint for modal shift for vehicles over 3.5 tonnes is based on Defra/ DECC carbon factors. DfT WebTAG provides a projection of how the national grid is likely to be decarbonised over the assessment period (for example, taking into account the expansion of renewable energy generation); and the anticipated improvement in vehicle efficiency and rate of uptake of electric cars. Consequently, the Metrolink Trafford Park Line operational footprint is sensitive to a number of unknowns and should be considered as indicative. Should the national grid decarbonise more quickly than is currently predicted, this could result in a lower operational carbon footprint than estimated herein.

14.3.18 As stated above, carbon footprinting and assessment is an emerging discipline within EIA and there is no guidance on the assessment of significance. The assessment of the significance of the construction carbon footprint has been undertaken by presenting it in the wider context of Manchester's GHG emissions. The Metrolink Trafford Park Line operational carbon footprint, presented as grams CO_2e per passenger km (gCO_2e/p-km), is given here in the context of other transport modes.

Assumptions and Limitations

14.3.19 The Metrolink Trafford Park Line is not at a detailed design stage and as a consequence there is limited construction and operation data on which to estimate the scheme's carbon footprint. The numerical data used to prepare the carbon footprint is based on assumptions around the current design and as such is subject to change as the design progresses (i.e. the carbon footprint presented is not definitive. The carbon footprint ranges are presented to allow an understanding of the order of magnitude of the impact of the Metrolink Trafford Park Line and reflect some of the inherent uncertainty at this early stage of the design. While the carbon footprint has been estimated using the latest available data, such data and the long timescale over which the Metrolink Trafford Park Line is assessed (the assessment period extends to 2079), means that a number of assumptions have had to be made. The most significant of these include uncertainties over the rate of decarbonisation of the national grid, the ability of cement and steel industries to decarbonise their production processes, the degree of modal shift due to the Metrolink Trafford Park Line and changing future travel patterns.

14.3.20 Table 14.1 provides details of the data that has been used to estimate the Metrolink Trafford Park Line carbon footprint at this current early design stage and assumptions that have been applied. Additional carbon factors and assumptions used in this assessment can be found in Technical Appendix H (ES Volume II).

Table 14.1 Carbon Footprint Data Used and Assumptions Made

Section	Data Used in Calculations*	Additional Assumptions
Construction Phase: Construction materials and material transport	Steel volume range: 2,000 – 2,500 tonnes. Includes: Track, Pomona structure, canal bridge crossing and retaining walls. Excludes: Overhead poles, cables, overhead line, substations, signs & poles, reinforcing, piles, signalling, street lighting, public art, drainage, stop canopies.	Construction material transport roundtrip distance is assumed to be 50 km by average laden heavy goods vehicle (HGV) (diesel) (including WTT) (Defra/ DECC). 2.5% of all construction material is assumed to be waste and landfilled. Defra/DECC landfill carbon factors applied. There will be carbon emissions

Table 14.1 Carbon Footprint Data Used and Assumptions Made		
Section	**Data Used in Calculations***	**Additional Assumptions**
	Concrete volume range: 13,000 – 15,000 m^3 Includes: Embedded track structure, Pomona structure, canal bridge crossing and retaining walls.	associated with materials not included in this assessment. These will be accounted for at a subsequent stage when detailed information is available. However, concrete and steel are anticipated to contribute the vast majority of construction material and material transport emissions.
Operational Phase: Trams electricity consumption	2,478,500 kWh per annum assuming an approximate 12 minute service throughout the current running hours of the rest of the network.	DfT WebTAG electric rail carbon factors applied.
Operational Phase: Trams load factor	Approximately 1,000 passengers per hour per direction (maximum capacity). Daily operation from 06.00 - 23.00, 364 days per year.	50% passenger load factor. 3 km average distance travelled per passenger (on the Metrolink Trafford Park Line).
Operational Phase: Modal shift	Transport modelling data disaggregated (vehicle km) by <3.5 tonne and >3.5 tonne vehicles. Do Something – Do Minimum (2020): -1,786,153 v-km (<3.5 tonne); -100,025 v-km (>3.5 tonne). Do Something – Do Minimum (2035): -2,948,546 (<3.5 tonne); -150,376 v-km (>3.5 tonne).	DfT WebTAG carbon factors applied for <3.5 tonne vehicle data. Defra/ DECC carbon factors applied for >3.5 tonne vehicle data (average laden HGV (diesel) including WTT).

*Data provided by Transport for Greater Manchester and SYSTRA

14.3.21 In addition to the data and assumptions as presented in Table 14.1, there are a number of potential GHG emissions sources that have not been captured in the carbon footprint estimation given the absence of data (see Table 14.2).

Table 14.2 GHG Emission Sources Excluded and Associated Assumptions		
Section	**Data Omission**	**Assumptions**
Construction Phase: On-site plant and related transport activities	The follow information was provided however it was not possible to estimate emissions: 6 tonne excavator, 6 - 20 tonne lorries for disposal of material, general site vehicles (vans, minibuses, box vans etc.), road-railers, cranes, hi-ab cranes. Other vehicles could also include wagons, flatbeds, tarmac vehicles. Any construction cess tanks would need to be emptied regularly and transported for disposal. All vehicles are likely to run on diesel.	There will be carbon emissions associated with on-site plant and related activities. These will be calculated at a subsequent stage when detailed information is available.
Construction Phase: On-site electricity use for temporary offices	The follow information was provided however it was not possible to estimate emissions : One large generator per site office.	Carbon footprint not calculated due to lack of data. Omission is considered unlikely to be significant.
Construction Phase: Construction materials and material transport	Concrete volume range: 13,000 – 15,000 m^3 Excludes: Piles, kerbs, edgings, paving, sub-bases for highways and paving, drainage.	The carbon footprint is not calculated due to lack of data. These will be calculated at a subsequent stage when detailed information is available.

Table 14.2 GHG Emission Sources Excluded and Associated Assumptions		
Section	**Data Omission**	**Assumptions**
Construction: Non-concrete and steel material quantities	Quantity of construction materials other than concrete and steel.	Embedded carbon of concrete and steel contribute the vast proportion of construction related emissions. Other construction materials would also contribute to the carbon footprint. However, even with a 50% increase in the central case scenario construction carbon footprint, the net project footprint (construction footprint plus the operation footprint) would still be carbon negative.
Construction: Excavation and waste	Volumes of material excavated/ generated and exported from the site, where it is removed to, methods of transportation and methods of disposal (e.g. landfill/ reuse).	This omission is considered unlikely to be significant. There may be opportunities to reuse excavated materials within the Metrolink Trafford Park Line construction phase and minimise the import of new material and its associated carbon footprint.
Construction: Land use change	Existing and post construction land use type.	Land use type can result in GHG emissions. Due to the relatively small land use take for the Metrolink Trafford Park Line, this omission is considered unlikely to be significant.
Construction: worker commuting	Construction worker commuting transport distance and mode.	This omission is considered unlikely to be significant.
Operation: Ancillary infrastructure	Energy requirements for the operation of ancillary infrastructure e.g. stop lighting.	There will be carbon emissions associated with the operation of ancillary infrastructure. These will be calculated at a subsequent stage when detailed information is available.

Table 14.2 GHG Emission Sources Excluded and Associated Assumptions		
Section	**Data Omission**	**Assumptions**
Operation: Maintenance operations	Energy for maintenance (e.g. vehicles/ equipment).	Emissions associated with routine maintenance activities are considered unlikely to be significant. Should the tram rails or a platform need to be replaced during the 60 year operation period, the associated maintenance emissions may constitute a significant emission source.
Operation: Maintenance operations	Material type and quantity and energy consumption for the manufacture of trams to service the Metrolink Trafford Park Line.	This omission is considered unlikely to be significant.

14.4 Metrolink Trafford Park Line Carbon Footprint

14.4.1 This section provides an estimate of the Metrolink Trafford Park Line carbon footprint. As detailed design data is not yet available, the carbon footprint estimate is based on the range of provisional design data and using experience from the operation of the existing Metrolink network. As such, the footprint estimates should be seen as indicative of the likely magnitude of project emissions; and are subject to the limitations and assumptions as included in Tables 14.1 and Table 14.2.

Construction

14.4.2 The construction of any infrastructure project will result in GHG emissions. While mitigation measures (such as using materials with lower embedded carbon and ensuring efficient material transport planning) can help to reduce GHG emissions associated with the construction phase, construction works will almost always result in a net GHG emission increase. However, some transport schemes, unlike the vast majority of other infrastructure schemes, do provide an opportunity to offset these GHG emissions, as a result of modal shift from more carbon intensive forms of transport (e.g. a transportation shift from road transportation to the tram network).

14.4.3 The calculations for the construction carbon footprint contain three different estimates, which are based on the upper and lower estimated volumes of concrete and steel provided by Transport for Greater Manchester (given in Table 14.1). The middle estimate represents the half-way point between these volumes.

14.4.4 The construction carbon footprint for the Metrolink Trafford Park Line (based on the middle estimate of construction material quantities) is estimated as being between approximately 5,320 and 7,230 tCO_2e with a central case estimate of approximately 5,730 tCO_2e (see Table 14.3). All construction carbon emissions are Scope 3 (see paragraph 14.3.10).

Table 14.3 Estimated Construction Material Embodied and Transport Emissions by Scenario (tCO_2e) (Scope 3)*

	2013 Baseline	Central Case	Low Carbon
Concrete (embodied)	3,680	2,510	2,390
Steel (embodied)	3,280	2,940	2,660
Transportation of all materials to site	270	270	270
Waste landfill emissions, including material transportation from site	3	3	3
Total †	**7,230**	**5,730**	**5,320**

* Based on the middle estimate of material quantities

† Summed values differ due to rounding

14.4.5 Figure 14.1 presents details of the Metrolink Trafford Park Line construction phase carbon footprint estimate, based on the different embedded carbon factor scenarios and construction material quantity ranges for concrete and steel. The full estimated range of the Metrolink Trafford Park Line construction phase carbon footprint is between approximately 4,800 to 7,900 tCO_2e. It is noted that Table 14.3 presents the carbon footprint based on the middle estimate of construction material quantities only.

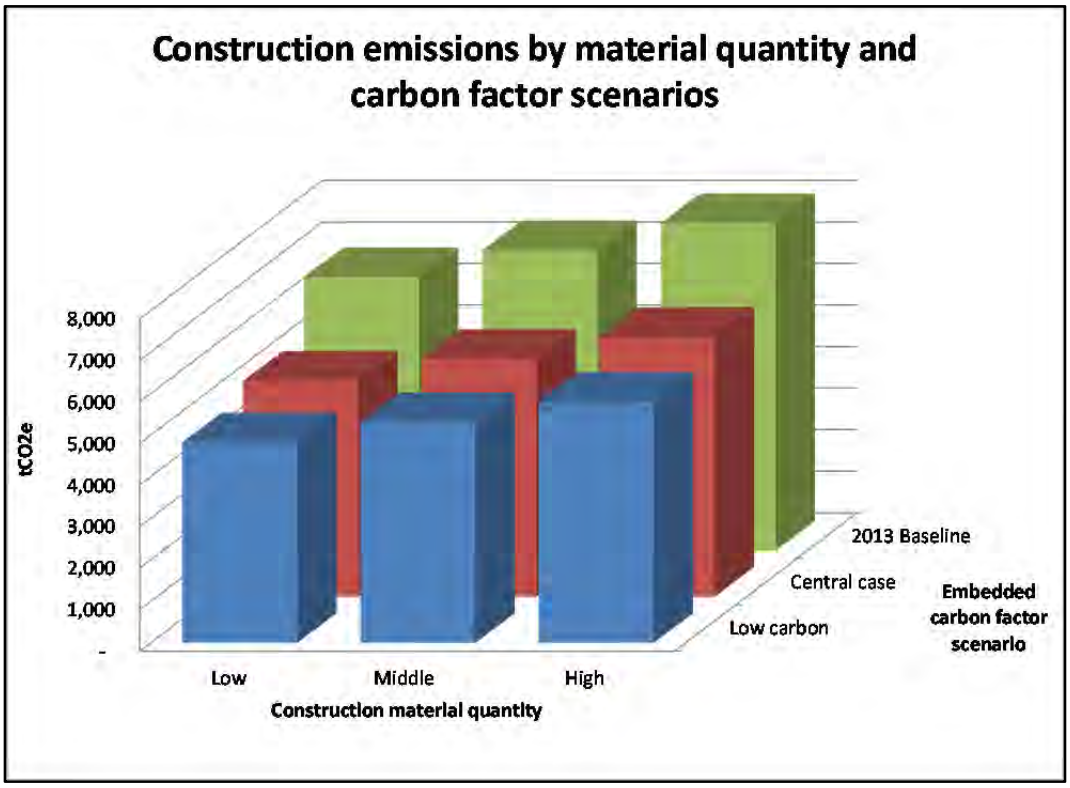


Figure 14.1: Estimates of Carbon Emissions during Construction

Operation

14.4.6 The Metrolink Trafford Park Line operational phase carbon footprint is associated with electricity consumption and is estimated to be approximately 9,360 tCO_2e over the 60 year assessment period; however, a total carbon saving of approximately 20,300 tCO_2e is calculated to occur as a result of modal shift. The net operational footprint is therefore estimated to be approximately -10,940 tCO_2e. Operational phase emissions are Scope 2 and 3 (see paragraph 14.3.10).

Table 14.4 Estimated Operational Emissions (Scope 2 and 3) (tCO_2e)	
Operation (tram electricity consumption (Scope 2)	9,360
Modal shift (Scope 3)	-20,300
Net operational footprint	-10,940

Net Carbon Footprint

14.4.7 The net carbon footprint for the Metrolink Trafford Park Line, taking into consideration the total emission estimates as associated with scheme construction and operation over the 60 year assessment period, is estimated to be between approximately -6,100 and -3,100 tCO2e (reflecting the full range of material volume estimates and embedded carbon scenarios) with a central estimate of approximately -5,200 tCO_2e (summed values differ due to rounding).

14.4.8 Carbon intensity of the Manchester Metrolink in 2014 is stated to be 41 (gCO_2e/p-km) (Ref.14-16). The Metrolink Trafford Park Line tram is estimated to have a per passenger-km (p-km) carbon footprint of approximately 35 gCO_2e in 2020 reducing to approximately 3 gCO_2e by 2050 as a result of anticipated grid decarbonisation.

Significance of Effect

14.4.9 As a public transport scheme, the construction of the Metrolink Trafford Park Line is very closely aligned with low carbon transport objectives of both the national and local government policy documents (refer to Section 14.2). Public transport is an efficient form of transport in terms of gCO_2e/p-km and helps reconcile the need for supporting economic growth with greater carbon efficiency.

14.4.10 The negative effects of the construction of the Metrolink Trafford Park Line in terms of GHG emissions are relatively minor as compared to the operational GHG benefits due to its low gCO_2e/p-km figure.

14.4.11 While there are no guidelines on the assessment of GHG emission significance, it is helpful to provide context to the magnitude of GHG emissions and its contribution to existing carbon reduction targets.

14.4.12 The Greater Manchester Emissions Inventory (2008 data) (Ref. 14-15) reported total emissions in Greater Manchester from all sources as 12,257,062 tCO_2. The estimated total construction carbon footprint for the Metrolink Trafford Park Line thus represents approximately 0.05% of this value.

14.4.13 Total emissions from rail stations and rail tracks in Greater Manchester are reported as 374,946 tCO_2 (2008). In terms of operational emissions (not including savings from modal shift), the Metrolink Trafford Park Line would represent approximately 0.2% of this figure (i.e. 654 tCO_2e in 2020).

14.4.14 Road transport emissions are reported as 4,005,188 tCO_2, or 33% of Greater Manchester's total CO_2 emissions. The modal shift as a consequence of the Metrolink Trafford Park Line (-290 tCO_2e in 2020) would represent approximately a 0.01% equivalent reduction in road transport GHG emissions. While not a large contribution, it is nevertheless a measurable contribution to the city's target of 48% reduction in all GHG emissions by 2020.

14.4.15 The Metrolink Trafford Park Line is an ultra-low carbon form of transport and compares favourably to other transport modes on a per km basis (refer to Table 14.3).

Table 14.5 Transport Mode Carbon Intensity

Transport Mode	Carbon Intensity (gCO_2e/p-km)	Data Source (all Defra/ DECC factors include well to tank (WTT) fuel conversion factors)
Car (diesel)	143	Defra/ DECC (2014) (Ref. 14-15) and WebTAG (2014)
Car (petrol)	147	Defra/ DECC (2014) and WebTAG (2014)
Car (hybrid)	102	Defra/ DECC (2014) and WebTAG (2014)
Bus (average local bus)	124	Defra/ DECC (2014)
National rail	56	Defra/ DECC (2014)
Light rail and tram	71	Defra/ DECC (2014)
Manchester Metrolink	41	Transport for Greater Manchester (2014) (Ref. 14-16)

14.5 Impact Avoidance and Mitigation Measures

14.5.1 This section presents a number of potential mitigation measures that should be considered at applicable stages during the Metrolink Trafford Park Line detailed design, procurement, construction and operational phases.

14.5.2 Table 14.6 presents a non-exhaustive list of potential mitigation measures that can be considered during the various scheme development phases and includes an indication of the likely carbon mitigation potential of each measure.

Table 14.6 Potential Carbon Mitigation Measures		
Project Stage	**Potential Carbon Mitigation Measure**	**Carbon Mitigation Potential (Low, Medium, High)**
Design	Develop and implement a carbon management plan to set targets, and monitor and manage carbon emissions through all project stages.	High
Design	Use of Building Information Modelling (BIM) to maximise resource efficiencies in the proposed scheme design and delivery. Identification of alternative and substitute materials with lower embedded carbon.	High
Design	Incorporation of renewable energy generation technologies within platform structures and maintenance and operation buildings.	Medium
Procurement	Low carbon material specification and construction requirements, in particular for concrete and steel suppliers.	High
Procurement	Specifying energy efficient tram operation and platform lighting systems.	Medium
Construction	Waste materials may be reused in the construction of the proposed scheme, for example, as aggregate or back-fill material.	Medium
Construction	Sensitivity testing of the embedded material carbon factors identified that potentially significant carbon savings can result from adjustments in construction materials. For example replacement of concrete with fly ash blast furnace slag can deliver significant emissions saving.	High
Construction/ operation	Carbon sequestration through tree planting.	Low
Operation	Proactive promotion and marketing of the Metrolink Trafford Park Line to encourage mode shift and ensuring provision of cycle storage facilities and electric vehicle charging points in close proximity to tram stops.	Medium

Table 14.6 Potential Carbon Mitigation Measures		
Project Stage	**Potential Carbon Mitigation Measure**	**Carbon Mitigation Potential (Low, Medium, High)**
Operation/ maintenance	Procure a renewable/ low carbon power purchase agreement.	Medium

14.6 Residual Effects and Conclusions

14.6.1 There are a number of mitigation opportunities that would further reduce the construction and operational carbon footprint of the Metrolink Trafford Park Line – this includes minimising the embedded carbon of construction materials and maximising the attractiveness of the scheme to potential users who would otherwise have travelled by car. During the various future phases of the scheme development, Transport for Greater Manchester will aim to design out carbon and implement measures to improve resource efficiency.

14.6.2 The construction of the Metrolink Trafford Park Line is estimated to result in a carbon footprint of approximately 5,730 tCO_2e (central case). Such a footprint would contribute a 0.05% increase in Greater Manchester's total GHG emissions.

14.6.3 The annual operational phase GHG emission footprint estimate for 2020 of 654 tCO_2e represents only 0.2% of Manchester's rail emissions. In terms of road transport emissions savings due to modal shift, the Metrolink Trafford Park Line would result in a total GHG emission reduction of 20,300 tCO_2e over the 60 year assessment period. Furthermore, the Metrolink Trafford Park Line represents the most carbon efficient form of transport, with over a 65% reduction in gCO_2e/passenger km in 2020 as compared to current car travel emissions.

14.6.4 The Metrolink Trafford Park Line presents a strong case for low carbon transport within Greater Manchester and would make a measurable contribution to the city's carbon reduction targets.

14.7 References

Ref. 14-1 European Commission (2014). 'Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment'.

Ref. 14-2 Department for Communities and Local Government (2012). 'National Planning Policy Framework'. Department for Communities and Local Government, London.

Ref. 14-3 Department for Communities and Local Government (2014). 'National Planning Practice Guidance'. Department for Communities and Local Government, London.

Ref. 14-4 Her Majesty's Stationery Office (2008). 'Climate Change Act 2008'. Majesty's Stationery Office (HMSO). London.

Ref. 14-5 DECC (2011). 'The Carbon Plan: Delivering our Low Carbon Future'.

Ref. 14-6 Association of Greater Manchester Authorities (2011). 'Greater Manchester Climate Strategy'. Available http://manchesterismyplanet.com/gmccsip. Accessed 8/9/14.

Ref. 14-7 Transport for Greater Manchester (2011). 'Greater Manchester's Third Local Transport Plan 2011/12 – 2015/16'. Transport for Greater Manchester. Manchester.

Ref. 14-8 Trafford Metropolitan Borough Council (TMBC) (2012). 'Core Strategy Development Plan Document (Adopted 2012)'. TMBC, Trafford.

Ref. 14-9 TMBC (2006). 'Revised Trafford Unitary Development Plan (2006). TMBC. Available: http://www.trafford.gov.uk/planning/strategic-planning/unitary-development-plan.aspx. Accessed 18/9/14.

Ref. 14-10 World Resources Institute (2013). 'The Greenhouse Gas Protocol'. Available: http://www.ghgprotocol.org. Accessed 29/08/14.

Ref. 14-11 Department for Transport (2013). 'Transport Analysis Guidance: WebTAG'. Available: https://www.gov.uk/transport-analysis-guidance-webtag. Accessed 5/9/14.

Ref. 14-12 Transport for Greater Manchester (2014).' The Transport for Greater Manchester (Light Rapid Transit System) (Second City Crossing) Order: Transport Assessment'.

Ref. 14-13 MPA the Concrete Centre (2012). 'Concrete Industry Sustainability Performance Report - 5th report: 2011 performance data'. MPA The Concrete Centre. Surrey.

Ref. 14-14 Eurofer, The European Steel Association (2012). 'A Steel Roadmap for a Low Carbon Europe 2050'. Eurofer. Brussels.

Ref. 14-15 Defra/ DECC (2014). 'UK Government Conversion Factors for Company Reporting'. Version 1.1.

Ref. 14-16 Transport for Greater Manchester (2014). 'Climate Change. Available: http://www.tfgm.com/Corporate/environment/Pages/environment_climate.aspx. Accessed 5/9/14.

Ref. 14-17 Department for Transport (2013). 'Transport Analysis Guidance: WebTAG unit 3.3.5'.

Ref. 14-18 Department for Transport (2014). 'WebTAG: TAG data book'.

Ref. 14-19 Transport for Greater Manchester (2012). 'The Greater Manchester Emissions Inventory 2008 Update HFAS Report 1692'.

Transport for Greater Manchester

Chapter 15:

Cumulative Assessment

15 CUMULATIVE ASSESSMENT

15.1 Introduction

15.1.1 This Environmental Statement (ES) chapter considers the potential for cumulative effects to arise during the construction and operation of the proposed Metrolink Trafford Park Line and presents an assessment of the significance of identified effects. Cumulative effects are defined as additional environmental effects that may occur when the predicted effects of the proposed Metrolink Trafford Park Line are considered in conjunction with the predicted effects from other relevant development in the area that do not form part of the environmental baseline assessed within the ES (i.e. future planned developments and activities).

15.1.2 Other relevant developments considered within the cumulative assessment are:

- Reasonably foreseeable in terms of delivery (e.g. have planning consent); and
- Located within sufficient proximity to the proposed Metrolink Trafford Park Line that the environmental effects (adverse and beneficial) of individual developments could be compounded.

15.1.3 This chapter is supported by Figure 15.1 (ES Volume III).

15.2 Legislation, Policy and Guidance

15.2.1 The requirement for cumulative impact assessment is stated in the following directives and UK legislation:

- European Commission Directive 2011/92/EC on the assessments of effects of certain public and private projects on the environment requires the assessment of *"the direct effects and any indirect, secondary, cumulative, short, medium and long-term permanent and temporary, positive and negative effects of the project"* (Ref. 15-1);
- European Directive 2014/52/EU (amendment of 2011/92/EC above) states that criteria for assessment includes *"the cumulation of effects with other existing and/ or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources"* (Ref. 15-2); and
- Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 requires *"A description of the likely significant effects of the*

proposed project on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project" (Ref. 15-3).

15.3 Defining the Scope of the Cumulative Assessment

15.3.1 In order to determine the scope of the cumulative assessment, a list of all of developments matching the below criteria was compiled for a Search Area of 800 metres (m) from the indicative centreline of the proposed Metrolink Trafford Park Line:

- Schemes proposed by way of the submission of a planning application;
- Schemes with a resolution to grant consent;
- Consented schemes;
- Schemes proposed by way of Permitted Development; and
- Schemes under construction.

15.3.2 An initial list of developments was compiled using Trafford Metropolitan Borough Council (TMBC) public access database of planning applications (Ref. 15-4) on the 18th July 2014. This list of developments was then filtered to identify those developments with the potential to cause a potential cumulative effect with the proposed Metrolink Trafford Park Line. A number of criteria were considered during the selection process including:

- The nature and scale of the development;
- Distance from the proposed Metrolink Trafford Park Line;
- Connectivity with the proposed Metrolink Trafford Park Line (e.g. cycle paths, wildlife corridors); and
- Construction programme and year of opening (where available).

15.3.3 The filtering exercise carried out identified nine proposed and consented developments located in the vicinity of the proposed Metrolink Trafford Park Line with potential to generate cumulative effects (refer to Figure 15.1, ES Volume III):

- Land adjacent to west of Trafford Boulevard, Trafford Park (74815/O/2010) (Reference 1 on Figure 15.1);
- Former Kratos Site, Barton Dock Road/ Mercury Way, Trafford Park (H/OUT/70189) (Reference 2a on Figure 15.1);

- Former Kratos Site, Barton Dock Road, Trafford Park (80470/O/2013) (Reference 2b on Figure 15.1);
- Former Kratos Site, Mercury Way, Davyhulme (82046/FULL/2013) (Reference 2c on Figure 15.1);
- Demolition Direct, Tenax Circle, Tenax Road, Trafford Park (H/70807 and 78816/RENEWAL/2012) (Reference 3 on Figure 15.1);
- Vacant land at Mosley Road/ Mellors Road, Stretford (81497/O/2013 and 82696/RM/2014) (Reference 4 on Figure 15.1);
- Mode Wheel Locks, Trafford Wharf Road, Trafford Park (81863/FULL/2013) (Reference 5 on Figure 15.1);
- Monde Trading Estate, Westinghouse Point, Trafford Park (82525/O/2014) (Reference 6 on Figure 15.1); and
- Land known as Trafford Quays, bound by Trafford Way and Trafford Boulevard, Urmston (75931/FULL/2010) (Reference 7 on Figure 15.1).

15.3.4 A description of these developments is provided in Section 15.4 below.

15.3.5 TMBC was provided with an opportunity to comment on the proposed scope of the cumulative assessment in July 2014; however, at the time of ES publication, no response had been received.

15.3.6 The information and the planning status of the cumulative schemes as detailed herein was understood to be correct as of 2nd September 2014.

Crumpsall Turnback

15.3.7 As noted in Chapter 4: Project Description, the proposed Metrolink Trafford Park Line service is currently anticipated to originate/ terminate at Crumpsall on the existing Bury line and use the Metrolink network through Manchester city centre to Pomona.

15.3.8 In order to increase the frequency and improve the reliability of Metrolink services between Crumpsall and Manchester city centre, the potential requirement for a new turnback facility on the existing Metrolink network is currently being considered by Transport for Greater Manchester. The turnback facility would provide an opportunity for light rail vehicles (LRVs) on the Bury line to turn around. One option currently being considered is to locate the turnback at the Crumpsall tram stop.

15.3.9 A turnback proposal would be distinct and separate from the proposed Metrolink Trafford Park Line and would be taken forwarded by means of a Prior Approval

application. A turnback facility does not form part of the Transport and Works Act Order application for the proposed Metrolink Trafford Park Line. Furthermore, the provision of a turnback is not essential to the operation of the proposed Metrolink Trafford Park Line.

15.3.10 As part of the process for defining the scope of the cumulative assessment, it was considered whether the proposals for a new turnback at Crumpsall would need to be included in the assessment (as a 'reasonably foreseeable' future Metrolink development). However, it was determined that a turnback would not require to be included because:

- The Crumpsall stop (should this be the selected option) is located approximately 6.3 kilometres from the Pomona stop (i.e. the closest point to the proposed Metrolink Trafford Park Line), and therefore there is no potential for cumulative effects to arise during the construction works;
- The operation of the proposed Metrolink Trafford Park Line is not contingent upon the provision of a turnback facility; and
- The Environmental Impact Assessment (EIA) for the Metrolink Second City Crossing scheme included consideration of the need for future changes to services through Manchester city centre, and the traffic modelling work undertaken (and allied technical assessments) took future expansion of the Metrolink network into account. It is, therefore, not necessary to consider the environmental impacts as associated with the operation of the proposed Metrolink Trafford Park Line service on existing and consented Metrolink routes.

15.4 Description of Cumulative Developments Considered

15.4.1 Table 15.1 provides a summarised description of the nine developments considered within the cumulative assessment undertaken for the proposed Metrolink Trafford Park Line. The locations and planning red line boundaries of these development sites are shown on Figure 15.1 (ES Volume III).

15.4.2 Information regarding the environmental effects of the individual developments was obtained from publicly available sources (e.g. Environmental Statements, supporting planning application documents etc.), where available.

Table 15.1 Description of Cumulative Developments				
ES Ref.	**Planning Application Title**	**Planning Application Reference Number**	**Description**	**Current Status**
1	Land adjacent to west of Trafford Boulevard Trafford Park Manchester (Jct. 10 M60)	74815/O/2010	Outline planning permission for demolition of existing (vacant) residential dwellings and erection of new BCO Grade A Office building (a maximum of 12,100 m^2 Gross Internal Area and up to 10 storeys in height) together with associated car parking, substation and security lodge. All matters reserved for subsequent consideration.	Approved with conditions (2011)
2a	Former Kratos Site, Barton Dock Road/ Mercury Way, Trafford Park	H/OUT/70189	Outline planning application for demolition of existing buildings and erection of two office buildings (maximum 27,870 m^2) falling within Use Class B1 (business) together with associated car parking and ancillary structures. Consent sought for creation of access from Mercury Way with all other matters reserved.	Approved with conditions (2009)
2b	Former Kratos Site, Barton Dock Road, Trafford Park, M41 7BQ	80470/O/2013	Outline application for redevelopment of site to provide up to 27,870 m^2 (internal) offices (Use Class B1), a 150 bed hotel (Use Class C1) and decked car parking, together with associated highway access and landscaping. Details of access applied for with all other matters reserved (appearance, landscaping, layout and scale).	Registered 2013 (not yet determined)
2c	Former Kratos Site, Mercury Way, Davyhulme, M41 7BZ	82046/FULL/2013	Erection of a six storey, 203 bedroom hotel with associated car parking and landscaping and access from Mercury Way.	Registered 2014 (not yet determined)

Table 15.1 Description of Cumulative Developments				
ES Ref.	**Planning Application Title**	**Planning Application Reference Number**	**Description**	**Current Status**
3	Demolition Direct, Tenax Circle, Tenax Road, Trafford Park, Manchester, M17 1JT	H/70807 78816/RENEWAL/ 2012	Erection of a 3 megawatt (1,163.5 m^2) wood fuelled renewable energy biomass plant and associated industrial storage building and parking. Extension of time application.	Approved with conditions (2009) Registered 2012 (not yet determined)
4	Vacant land at Mosley Road/ Mellors Road, Stretford	81497/O/2013 82696/RM/2014	Outline planning application for redevelopment of a 2.54 hectare site with up to 10,100 m^2 of employment floor space with Use Class B1c (Light industry) B2 (General industrial) and B8 (Storage and Distribution) uses including vehicle parking and landscaping. Retaining site access from Mosley Road. Application for the approval of Reserved Matters (April 2014)	Approved with conditions Registered 2014 (not yet determined)
5	Mode Wheel Locks, Trafford Wharf Road, Trafford Park, M17 1DJ	81863/FULL/2013	Construction of Hydroelectric Plant scheme on central ship lock. Enabling works to include installation of cofferdams, bracing, and dewatering of small ship lock. Installation of intake screen and channel; fish and eel pass; mechanical turbine and screens. Erection of above-ground buildings to house turbine and plant and machinery.	Approved with conditions (2014)

Table 15.1 Description of Cumulative Developments				
ES Ref.	**Planning Application Title**	**Planning Application Reference Number**	**Description**	**Current Status**
6	Monde Trading Estate, Westinghouse Point, Trafford Park, M17 1QP	82525/O/2014	Outline application for demolition of existing industrial building and redevelopment of site to form Petrol Filling Station with associated 370 m^2 kiosk unit and car wash; erection of 795 m^2 of A3 (Use Class Restaurants and Cafés) floor-space, provided within 2no. drive-thru cafe/ restaurant units. Formation of new vehicular access, circulation roads within the site, and areas of car parking (consent sought for access only with all other matters reserved).	Registered 2014 (not yet determined)
7	Land at Trafford Quays, bound by Trafford Way and Trafford Boulevard, Urmston	75931/FULL/2010	Outline planning application for the development of a maximum of 250 homes and 1,000 m^2 of commercial accommodation to be occupied on a flexible basis by use(s) falling within Use Classes A1 (Shops), A2 (Financial and Professional Services), A3 (Restaurants and Cafés), A4 (Drinking Establishments), A5 (Hot Food Take-way) and/ or D1 (Non-Residential Institutions) (clinic, health centre, crèche, day nursery or consulting room only) together with associated access, parking and public realm/ landscaping works.	Registered 2010 (not yet determined)

15.4.3 Of the developments listed above, only the Mode Wheel Locks, Trafford Wharf Road, Trafford Park application (Reference 5 on Figure 15.1) has available information on expected construction phasing. The Mode Wheel Locks development is programmed to begin construction in 2014 and will extend over a period of between 12 and 18 months. Given that construction of the proposed Metrolink Trafford Park Line is not expected to begin until 2016, no cumulative construction effects are expected to occur with respect to the Mode Wheel Lock development.

15.5 Cumulative Impact Assessment Method and Significance Criteria

15.5.1 There is no standard prescriptive method for assessing cumulative effects. Such effects are therefore assessed by professional opinion; although matrices and modelling may be used where appropriate.

15.5.2 Potential cumulative impacts have been quantified where possible (e.g. through review of publically available documents such as Environmental Statements and other supporting planning application documents). Where environmental assessment information regarding the other developments was not available or uncertain, the cumulative assessment was necessarily qualitative.

15.5.3 When considering the effects of the proposed Metrolink Trafford Park Line together with other developments scoped into the cumulative impact assessment, only residual effects were considered (i.e. those effects predicted to remain after the mitigation measures recommended within this ES have been applied).

15.5.4 As with the other technical assessments contained within this ES, cumulative effects are assessed to be either negligible, minor, moderate or major. Only moderate and major effects are considered to be significant. In some instances, the availability of information on the other development schemes has meant that this level of assessment is not possible and effects are simply described as being potentially significant or not significant.

Proposed Metrolink Trafford Park Line Traffic Model

15.5.5 The proposed Metrolink Trafford Park Line traffic model produced by SYSTRA takes account of future planned developments; including those developments included in Table 15.1. As the traffic model has informed the future baseline of several of the technical assessments contained within this ES, the operational impacts reported in these chapters are inherently cumulative. This is the case for the following chapters included within the ES:

- Noise and Vibration (Chapter 6);
- Air Quality (Chapter 7); and
- Carbon Assessment (Chapter 14).

15.5.6 No further consideration of operational cumulative effects is therefore required with regard to the above disciplines.

Limitations

15.5.7 There is currently limited information available regarding the construction of the proposed Metrolink Trafford Park Line and the other developments considered

within the scope of the cumulative assessment. The assessment of potential construction phase cumulative effects is therefore qualitative and based on professional judgement.

15.5.8 The majority of the developments considered within the cumulative assessment have either not been determined, or have been approved with outline planning permission - it has not been possible to determine when construction works for these developments would begin (and therefore if the construction phases of these developments would overlap with the proposed Metrolink Trafford Park Line).

15.6 Assessment of Cumulative Effects

Noise and Vibration

Construction

15.6.1 No cumulative construction effects are expected to occur with respect to the Mode Wheel Lock development (Reference 5) (see Section 15.4.3) given that the construction programmes do not overlap.

15.6.2 The other developments considered within this cumulative assessment have the potential to cause a cumulative noise effects with the proposed Metrolink Trafford Park Line. However, there is currently insufficient construction method or programme information available to allow a detailed cumulative construction noise assessment to be carried out.

15.6.3 Transport for Greater Manchester's scheme-specific Code of Construction Practice (CoCP) requires the consideration of other construction activities adjacent to the proposed Metrolink Trafford Park Line construction works and mitigation would be applied as necessary to minimise cumulative construction noise effects. In addition, it is anticipated that all of these developments would be subject to planning conditions requiring the adequate control of noise at their respective site boundaries.

15.6.4 Given the above, and the sparsity of noise sensitive receptors in the vicinity of the proposed Metrolink Trafford Park Line, it is not anticipated that significant temporary noise effects would occur due to cumulative construction activities.

Operation

15.6.5 No cumulative noise impact assessment is required given that the operational phase noise impact assessment as included within this ES (Chapter 6: Noise and Vibration) takes into account the developments included in Table 15.1 (see Section 15.5.5).

Air Quality

Construction

15.6.6 No cumulative construction effects are expected to occur with respect to the Mode Wheel Lock development (ES Reference 5) given that the construction programmes do not overlap (see Section 15.4.3).

15.6.7 The other developments considered within this cumulative assessment have the potential to cause a cumulative air quality effects with the proposed Metrolink Trafford Park Line. However, there is currently insufficient construction method or programme information available to allow a detailed cumulative construction air quality assessment to be carried out. Transport for Greater Manchester's scheme-specific Code of Construction Practice (CoCP) requires the consideration of other construction activities adjacent to the proposed Metrolink Trafford Park Line construction works and mitigation would be applied as necessary to minimise cumulative construction air quality effects. In addition, it is anticipated that all of these developments would be subject to planning conditions requiring the adequate control of dust at their respective site boundaries. Therefore, even if some of these development sites were developed concurrently with the proposed Metrolink Trafford Park Line, it is anticipated that these could be adequately controlled to avoid significant cumulative temporary air quality effects.

Operation

15.6.8 No cumulative air quality assessment is required for the operational phase given that the operational phase impact assessment as included within this ES (Chapter 7: Air Quality) takes into account the developments included in Table 15.1 (see Section 15.5.5).

Landscape and Visual

15.6.9 This assessment considers both cumulative landscape effects and cumulative visual effects.

15.6.10 Of the nine developments considered within this cumulative assessment, only four have the potential to create potentially significant landscape and visual effects with the proposed Metrolink Trafford Park Line, namely the three developments at the Former Kratos Site (References 2a, 2b and 2c) at the junction of Barton Dock Road and Park Way; and the Monde Trading Estate site (Reference 6), south of Parkway Circle.

15.6.11 The other five sites are excluded from the cumulative landscape and visual assessment as there is no intervisibility between these development sites and

the proposed Metrolink Trafford Park Line and thus the landscape and visual effects of these developments would not significantly impact on or contribute to the impact of the scheme.

Former Kratos Site, Barton Dock Road and Park Way Junction (References 2a, 2b and 2c)

15.6.12 The Former Kratos Site lies on a prominent location at the junction of Barton Dock Road and the elevated Park Way to the east. The site is currently cleared and bordered to the north and west by industrial units. The proposed use of the site is for hotel and office development with associated car parking and ancillary services. The proposed treatment of the site is consistent with emerging trends within the area and would represent a significant landscape benefit within the area, at a gateway site from the M60.

15.6.13 The proposed Metrolink Trafford Park Line would wrap closely around the south and east boundaries of the Former Kratos Site. To the eastern boundary, along the Park Way slip road from Barton Dock Road, the construction of the tram would require the removal of the screening line of trees along the site boundary, opening up views into the industrial area from Park Way. The proposals for the Former Kratos Site development could address the impact caused by the loss of these trees through the provision of a new built and landscape frontage onto Park Way; substantially improving the visual impact of what otherwise would be open views across an industrial roofscape.

15.6.14 The Former Kratos Site development would similarly benefit the visual effects to the southern site boundary, where the proposed Metrolink Trafford Park Line alignment to the north of Barton Dock Road would potentially be framed by the active building and associated landscape frontages, addressing and containing the Barton Dock Road corridor.

15.6.15 The cumulative landscape and visual effects of the Former Kratos Site with the proposed Metrolink Trafford Park Line are therefore assessed as substantial beneficial and therefore significant.

Monde Trading Estate, Westinghouse Point (Reference 6)

15.6.16 The Monde Trading Estate site lies to the south of Parkway Circle roundabout, between Park Way and Westinghouse Road. It is currently occupied by a brick, portal roofed industrial unit surrounded by car parking and a steel palisade fence.

15.6.17 The current planning application is for the demolition of the existing industrial unit and development of a petrol filling station (PFS) with associated car wash

and Use Class A3 (Restaurants and Cafés) floor-space. Part of the site is also identified as the location for the Park and Ride facility for the proposed Metrolink Trafford Park Line Parkway stop.

15.6.18 The Park and Ride facility would have a potential moderate beneficial landscape impact as the potential exists to increase tree cover within the car park and introduce a permeable drainage scheme.

15.6.19 The Monde Trading Estate application would have a moderate neutral landscape impact as the potential for significant tree planting and landscape treatment is reduced and existing trees would need to be removed from the boundary of the site.

15.6.20 From a visual perspective, the Park and Ride facility would have a moderate beneficial impact with the potential to create an open, wooded aspect once trees within the car park and to the boundary have matured. Whereas with considered design, the Monde Trading Estate application proposals would potentially create a slight beneficial visual effect.

15.6.21 The cumulative landscape and visual effects of the Monde Trading Estate development with the proposed Metrolink Trafford Park Line would therefore be slight beneficial, and therefore not significant.

Ecology and Nature Conservation

15.6.22 No significant residual ecological effects are predicted to occur as a result of the proposed Metrolink Trafford Park Line - Chapter 9: Ecology and Nature Conservation indicates that ecological effects due to the proposed Metrolink Trafford Park Line would generally be of negligible significance. As a result, the proposed Metrolink Trafford Park Line does not have the ability to contribute to a cumulative ecological effect in combination with the other developments scoped into the cumulative assessment. Therefore the potential for cumulative ecological effects to occur when considering the developments in Table 15.1 is assessed to be negligible.

Ground Conditions

15.6.23 Chapter 10: Ground Conditions indicates that land contamination effects due to the proposed Metrolink Trafford Park Line would be of negligible significance. As a result, the proposed Metrolink Trafford Park Line does not have the ability to contribute to a cumulative land contamination effect in combination with the other developments scoped into the cumulative assessment.

15.6.24 In addition to the above, due to the need for legal compliance, all of the developments considered within this cumulative assessment (as detailed in Table

15.1) would require the implementation of applicable mitigation measures aimed at avoiding significant land quality and groundwater effects.

15.6.25 Give the above, the potential for cumulative ground condition effects to occur when considering the developments in Table 15.1 is assessed to be negligible (both construction and operation phases).

Water Resources and Flood Risk

15.6.26 Chapter 11: Water Resources and Flood Risk indicates that water resource effects due to the proposed Metrolink Trafford Park Line would be of negligible or low significance. The assessment indicated that the proposed Metrolink Trafford Park Line would not increase the flood risk from fluvial, groundwater or overland flow sources. As a result, the proposed Metrolink Trafford Park Line has a very limited ability to contribute to a cumulative water resource effect in combination with the other developments scoped into the cumulative assessment.

15.6.27 Due to the need for legal compliance, all of the developments considered within this cumulative assessment would be required to implement applicable mitigation measures aimed at avoiding significant effects upon the water environment.

15.6.28 Given the above, the potential for cumulative water resource effects to occur when considering the developments in Table 15.1 is assessed to be negligible (both construction and operation phases).

Cultural Heritage

15.6.29 A cumulative impact to heritage assets can arise where the construction, operation or decommissioning of another proposed development create an increase to an impact arising from the proposed Metrolink Trafford Park Line.

15.6.30 For a cumulative cultural heritage impact to arise as a result of direct physical impacts during construction, another proposed development would have to share a boundary with the infrastructure associated with the proposed Metrolink Trafford Park Line that could potentially impact the same buried archaeological resource during construction.

15.6.31 Cumulative impacts during operation can arise where the above ground built elements of a proposed development, when viewed alongside the proposed Metrolink Trafford Park Line, would interrupt lines of sight between assets which are related, or would contribute to changes in the view from heritage assets, for example an increase in massing that is clearly visible in a view of historical significance.

15.6.32 Four of the developments listed within Table 15.1 (References 1, 3, 4 and 7) do not share a boundary with the proposed Metrolink Trafford Park Line and would not be visible in shared views with the proposed Metrolink Trafford Park Line that also contain heritage assets. As such, these developments are not anticipated to result in cumulative impacts with regard to cultural heritage.

15.6.33 Five of the developments listed within Table 15.1 (References 2a, 2b, 2c, 5 and 6) are therefore considered within the cultural heritage cumulative assessment below.

Former Kratos Site (Reference 2a, 2b and 2c)

15.6.34 The three developments at the Former Kratos Site (Reference 2a, 2b and 2c) at Barton Dock Road/ Mercury Way share a boundary with the proposed Metrolink Trafford Park Line.

15.6.35 There are no potential cumulative impacts associated with designated heritage assets given the absence of any such assets in the near vicinity of the Former Kratos Site. There is, however, a low potential that development at the Former Kratos Site would impact buried heritage assets that are also impacted by the construction of the proposed Metrolink Trafford Park Line. Cumulative impacts could therefore entail additional permanent direct impacts to non-designated archaeological assets. The cumulative impact is assessed to be low, resulting in an effect of minor adverse significance.

Mode Wheel Locks (Reference 5)

15.6.36 The proposed development at Monde Wheel Locks at Trafford Wharf Road would be visible alongside the operational proposed Metrolink Trafford Park Line in views along the canal to the south-east. However, it is anticipated that the operational proposed Metrolink Trafford Park Line would be partially obscured by vegetation growth adjacent to the canal and would not be a prominent or highly visual feature in the landscape.

15.6.37 The Grade II listed Trafford Road Bridge is located approximately 1.5 km east of the Mode Wheel Locks development and views with heritage significance that encompass the canal with the Trafford Road Bridge in the same view would not be affected. The cumulative impact is, therefore, assessed to be negligible resulting in an effect of negligible significance.

Monde Trading Estate, Westinghouse Point (Reference 6)

15.6.38 The development at Monde Trading Estate, Westinghouse Road, shares a boundary with the proposed Metrolink Trafford Park Line on the southern edge of Park Way.

15.6.39 There are no potential cumulative impacts associated with designated heritage assets given the absence of any such assets in the near vicinity of the site. There is, however, a low potential that development of the Monde Trading Estate site would impact buried heritage assets that are also impacted by the construction of the proposed Metrolink Trafford Park Line. Cumulative impacts could therefore entail additional permanent direct impacts to non-designated archaeological assets. The cumulative impact is assessed to be low, resulting in an effect of minor adverse significance.

Socio-Economics

15.6.40 The nine developments considered in this assessment (refer to Table 15.1) include a variety of uses such as retail, professional services, office, light industrial and haulage employment land, two hotel developments, two energy infrastructure developments (References 3 and 5) and up to 250 residential homes (Reference 7).

15.6.41 Using average employment densities, and assuming all of the schemes go ahead, over 4,500 gross jobs would be created. It has not been possible to calculate the employment creation for the two energy infrastructure schemes or the mixed use development at Trafford Quays (Reference 7) and these are not included in the total. The 4,500 jobs would be created in the following sectors; office (4,067), light industrial and haulage jobs (215), hotels (177) and retail/ restaurant (36).

15.6.42 The employment generated by these developments equates to approximately 6% of the existing workforce in the Wider Socio Economic Study Area (as described in Chapter 13: Socio-Economics), and therefore would have a major beneficial effect on employment, which would be significant. This beneficial effect would add to the employment benefits as brought by the proposed Metrolink Trafford Park Line, such that the cumulative effect would be beneficial and significant.

Carbon Assessment

15.6.43 No information regarding the carbon footprint of the developments listed in Table 15.1 was available at the time of writing and therefore it was not possible to undertake a cumulative carbon assessment. However, Chapter 14: Carbon Assessment indicates that the proposed Metrolink Trafford Park Line presents a strong case for low carbon transport within Greater Manchester and would make a measurable contribution to the city's carbon reduction targets. Given that none of the developments detailed in Table 15.1 are transportation projects, it is not anticipated that such developments would contribute to further carbon reductions.

15.7 Conclusions

15.7.1 Table 15.2 provides a summary of the predicted cumulative environmental effects of the proposed Metrolink Trafford Park Line when considered in conjunction with the nine proposed developments listed in Table 15.1.

Table 15.2 Summary of Cumulative Effects

ES Topic Area	Stage of Development	Description of Effect	Effect Significance
Landscape and Visual	Operation	The Former Kratos Site development would create a new built and landscape frontages along its boundaries with Park Way and Barton Dock Road. The addition of these frontages would benefit the visual effects of the proposed Metrolink Trafford Park Line by mitigating the loss of screening trees on Park Way and by framing the views of the proposed Metrolink Trafford Park Line.	Substantial Beneficial
		The Park and Ride facility would have a moderate beneficial cumulative landscape impact with the Monde Trading Estate development due to increased tree cover and introduction of a permeable drainage system.	Moderate Beneficial
		The Park and Ride site would create an open, wooded aspect once trees within the car park and to the boundary have matured. This would improve the visual effect of the Monde Trading Estate development.	Moderate Beneficial
Cultural Heritage	Construction	Potential for additional permanent direct impacts to non-designated archaeological assets at the Former Kratos Site (Reference 2a, 2b and 2c).	Minor Adverse

Table 15.2 Summary of Cumulative Effects			
ES Topic Area	**Stage of Development**	**Description of Effect**	**Effect Significance**
Cultural Heritage	Construction	Potential for additional permanent direct impacts to non-designated archaeological assets at the Monde Trading Estate Site(Reference 6).	Minor Adverse
Socio-Economics	Operation	Generation of employment	Major Beneficial

15.8 References

Ref. 15-1 European Union (2011). 'Council Directive on the Assessment of the Effects of Certain Public and Private Projects on the Environment (2011/92/EU)'. Official Journal No. L 2012.026.0001.0021.

Ref. 15-2 European Union (2014). 'Amending Directive 2011/92/EU on the Assessment of the Effects of Certain Public and Private Projects on the Environment (2014/52/EU)'. Official Journal No. L 2012.026.0001.0021.

Ref. 15-3 HM Government (2006). 'Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006'. HMSO, London.

Ref. 15-4 Trafford Council (2014). 'Public Access Database' website. Available from: http://planning.trafford.gov.uk/Northgate/PlanningExplorerAA/Home.aspx. Accessed: 2nd September 2014.

Transport for Greater Manchester

Chapter 16:

Summary

16 SUMMARY

16.1 Introduction

16.1.1 This chapter of the Environmental Statement (ES) presents a summary of the significant residual environmental effects of the proposed Metrolink Trafford Park Line identified in the preceding Technical Chapters (ES Chapters 6-15).

16.1.2 Residual effects are defined as those effects that remain following implementation of:

- Impact avoidance measures included in the Metrolink Trafford Park Line design and/ or taking account of defined construction phase working practices (such as Transport for Greater Manchester's Code of Construction Practice (CoCP) and Construction Environmental Management Plan (CEMP)); and
- Additional mitigation measures proposed within Chapters 6 – 15 of this ES.

16.2 Summary of Additional Mitigation

16.2.1 A summary of the additional mitigation measures proposed within this ES is provided in Table 16.1 below.

Table 16.1 Summary of Additional Mitigation

Environmental Topic Area	Stage of Development	Additional Mitigation (over and above scheme design and impact avoidance measures)
Noise and Vibration	Construction	Use of localised acoustic screens when works are carried out in close proximity to particularly noise sensitive receptors.
	Operation	Based on the identification of a potential moderate adverse effect at residential properties on the northern side of the Manchester Ship Canal, further consideration of the noise impacts and any mitigation requirements for these properties will be made as the detailed design progresses.
Air Quality	No additional mitigation required.	
Landscape and Visual	Construction	No additional mitigation required.

Table 16.1 Summary of Additional Mitigation		
Environmental Topic Area	**Stage of Development**	**Additional Mitigation (over and above scheme design and impact avoidance measures)**
Landscape and Visual	Operation	To mitigate the loss of tree cover along the route corridor, all tree replacement or new tree planting would be incorporated in an overall landscape scheme and would be carried out in consultation with Trafford Metropolitan Borough Council (TMBC), with the aim of furthering the aspirations of Green Infrastructure initiatives and policy.
		Potential effects from any additional lighting would be minimised by the use of appropriate fittings and luminaires.
Ecology and Nature Conservation	Construction	To mitigate for the loss of the three black poplars located within the Village Circle roundabout, replacement native black poplars would be planted in accordance with Transport for Greater Manchester's Wildlife Habitat and Tree Replacement Policy and in agreement with TMBC.
Ground Conditions	No additional mitigation required.	
Water Resources	Construction	Flood resilient/ resistant construction techniques are considered where vulnerable equipment is used (such as signalling or other electrical equipment).
Cultural Heritage	Operation	Relocation of the 'Silent Cargoes' public artwork to a suitable alternative location.
Socio-Economics	No additional mitigation required.	
Carbon Assessment	Construction	Develop and implement a carbon management plan to set targets, and monitor and manage carbon emissions through all project stages. Low carbon material specification and construction requirements, in particular for concrete and steel suppliers. Waste materials may be reused in the construction of the Metrolink Trafford Park Line, for example, as aggregate or back-fill material. Sensitivity testing of the embedded material carbon factors identified that potentially significant carbon savings can result from adjustments in construction materials. For example replacement of concrete with fly ash blast furnace slag can deliver significant emissions saving. Carbon sequestration through tree planting. Procure a renewable/ low carbon power purchase agreement.

Table 16.1 Summary of Additional Mitigation		
Environmental Topic Area	**Stage of Development**	**Additional Mitigation (over and above scheme design and impact avoidance measures)**
Carbon Assessment	Operation	Develop and implement a carbon management plan to set targets, and monitor and manage carbon emissions through all project stages. Use of Building Information Modelling (BIM) to maximise resource efficiencies in the Metrolink Trafford Park Line design and delivery. Identification of alternative and substitute materials with lower embedded carbon. Incorporation of renewable energy generation technologies within platform structures and maintenance and operation buildings where possible. Proactive promotion and marketing of the scheme to encourage mode shift and ensuring provision of cycle storage facilities where possible and electric vehicle charging points in close proximity to tram stops where possible.
Cumulative Assessment	No additional mitigation required	

16.3 Summary of Significant Residual Effects

16.3.1 The significant residual effects identified within this ES are summarised in Table 16.2. For the purposes of this ES an effect is considered to be 'significant' if it is assessed to be moderate (adverse or beneficial) or major (adverse or beneficial). Minor and neutral effects are referenced within the individual technical chapters of this ES (ES Chapters 6-15).

16.3.2 To provide further clarification on the nature of the effects, each has been identified in Table 16.2 as:

- Short term (St) – effects occurring only over a small period of time, for example an effect that only lasts for the duration of the construction period, or one that lasts for only part of the operational phase;
- Medium term (Mt) – effects occurring for the duration of the development's operation, but which cease when operations cease; or
- Long term (Lt) – effects occurring beyond the operation of the Metrolink Trafford Park Line, for example the permanent change to archaeology; and

- Permanent (P) – a permanent effect;
- Direct (D) – effects which directly affect a receptor;
- Indirect (InD) – effects that have an indirect effect on a receptor;
- Reversible (R) – effects that are not permanent because the effect would no longer occur if the impact was removed, for example visual amenity would be restored if particular structures were removed; or
- Irreversible (IR) – effects that are permanent and cannot be reversed, for example an environmental feature is lost that cannot be replaced.

16.3.3 The geographical scale (Local / District / Regional / National / International) of potential significant effects has also be assigned in Table 16.2.

Table 16.2 Summary of Significant Residual Effects (Construction and Operation)

Environmental Topic Area	Stage of Development	Description of Residual Effect	Significance of Overall Effect	Nature of Effect	Geographic Scale
Noise and Vibration	Demolition and construction	Noise produced by the construction activities on receptors along the Metrolink Trafford Park Line.	Significant adverse	St, R	Local
	Operation	Combination of road and tram operational noise affecting all receptors in the Study Area.	Negligible to Moderate adverse	Lt, P, IR	Local
Air Quality	No significant effects identified.				
Landscape and Visual	Demolition and construction	Effect on landscape as a result of tree losses along the Waterfront Zone and Trafford Park Industrial Zone.	Substantial adverse	Mt, R	Local
	Operation	Visual effect on the central canal corridor to the east of Trafford Road Bridge as a result of the significant loss of mature trees to the canal bank.	Substantial adverse	Mt, R	Local
		Visual effect on the Bridgewater Canal corridor through the increased width of the bridged section and the inclusion of OLE on the skyline.	Substantial adverse	Lt, P, IR	Local

Table 16.2 Summary of Significant Residual Effects (Construction and Operation)					
Environmental Topic Area	**Stage of Development**	**Description of Residual Effect**	**Significance of Overall Effect**	**Nature of Effect**	**Geographic Scale**
Landscape and Visual	Operation	Effect on human interaction as a result of improved pedestrian access.	Substantial beneficial	Mt, R	Local
		Effect on landscape and urban grain as a result of the tram alignment, which would form a linear transport feature following the existing transport corridors.	Moderate beneficial	Mt, R	Local
		Effect on the architectural scale of the landscape character as a result of the design being both sensitive to its surroundings and of a high quality.	Moderate beneficial	Mt, R	Local
		Effects on landscape as a result of the scheme being in-keeping with the character of the existing Leisure and Retail Zone and would also create opportunities for enhanced urban realm.	Moderate beneficial	Lt, R	Local
		Effects on landscape as a result of tree planting along the Waterfront Zone, Trafford Park Industrial Zone and the Leisure and Retail Zone.	Moderate beneficial	Lt, R	Local
Ecology and Nature Conservation	No significant effects identified				
Ground Conditions	Demolition and construction	Risk to site workers, surrounding land uses, ecological sites, geology and groundwater of encountering Unexploded Ordnance (UXO).	Moderate adverse	St, D	Local
Water Resources and Flood Risk	No significant effects identified.				

Table 16.2 Summary of Significant Residual Effects (Construction and Operation)					
Environmental Topic Area	**Stage of Development**	**Description of Residual Effect**	**Significance of Overall Effect**	**Nature of Effect**	**Geographic Scale**
Cultural Heritage	Operation	The setting of Trafford Road Bridge during the operation of Metrolink Trafford Park Line would be noticeably altered, especially when viewed by users of the Manchester Ship Canal and visitors to the wharf side. However, the scheme is expected to enhance the bridge's environs and setting.	Moderate beneficial	Lt, InD, R	Regional
		The reintroduction of trams into the former Trafford Park Hotel's setting would enhance its visibility and may encourage viable options for re-use.	Moderate beneficial	Lt, InD, R	Regional
Socio-Economics	Demolition and Construction	Overall construction effects on employment.	Major beneficial	St, D	Regional
		Employment generated by constructing the scheme.	Major beneficial	St, D	Regional
Socio-Economics	Operation	Operation effects of the scheme on residential properties and local population.	Moderate beneficial	Lt, D	Local
		Effects from operation of the scheme on cycle routes.	Moderate beneficial	Lt, InD	Local
		Overall effect from operation of the scheme on employment.	Moderate beneficial	Lt, D	Regional
		Accessibility to Trafford Park employment site effects from operation of the scheme.	Moderate beneficial	Lt, D	Regional
		Accessibility effects for other businesses from operation of the scheme.	Moderate beneficial	Lt, InD	Regional
		Land use changes arising from operation of the scheme.	Moderate beneficial	N/A	Local

Table 16.2 Summary of Significant Residual Effects (Construction and Operation)					
Environmental Topic Area	**Stage of Development**	**Description of Residual Effect**	**Significance of Overall Effect**	**Nature of Effect**	**Geographic Scale**
Socio-Economics	Operation	Accessibility effects on visitor attractions from operation of the scheme.	Moderate beneficial	Lt, D	Regional
		Accessibility effects on visitor accommodation from operation of the scheme.	Moderate beneficial	Lt, D	Regional
Carbon Assessment	No significant effects identified.				
Cumulative Assessment (Landscape and Visual)	Operation	The Former Kratos Site development would create a new built and landscape frontages along its boundaries with Park Way and Barton Dock Road. The addition of these frontages would benefit the visual effects of the Metrolink Trafford Park Line by mitigating the loss of screening trees on Park Way and by framing the views of the Metrolink Trafford Park Line.	Substantial beneficial	Mt, R	Local
		The Park and Ride facility would have a potential moderate beneficial landscape impact due to increased tree cover and introduction of a permeable drainage system.	Moderate beneficial	Mt, R	Local
Cumulative Assessment (Landscape and Visual)	Operation	The Park and Ride site would create an open, wooded aspect once trees within the car park and to the boundary have matured. This would improve the visual effect of the Monde Trading Estate development.	Moderate beneficial	Mt, R	Local

Table 16.2 Summary of Significant Residual Effects (Construction and Operation)					
Environmental Topic Area	**Stage of Development**	**Description of Residual Effect**	**Significance of Overall Effect**	**Nature of Effect**	**Geographic Scale**
Cumulative Assessment (Socio-Economics)	Operation	Generation of employment	Major beneficial	Mt, R	Regional