CONNECTING LEEDS TRANSPORT STRATEGY

STRATEGIC ENVIRONMENTAL ASSESSMENT

ENVIRONMENTAL REPORT APPENDICES

SEPTEMBER 2021

Leeds
CITY COUNCIL

CONTENTS

Appendix 1: Consultation responses on the scope of the SEA

Responses from the Consultation Bodies:

Historic England scoping consultation comments	Suggested improvements	Response
The summary of key issues and opportunities derived from the baseline information contained in Table 2.2 rightly identifies potential effects on the natural environment but fails to highlight the possible impact on the historic environment. Leeds has the third-highest number of Listed Buildings in Yorkshire and Humber and, in it's city centre, one of the finest collections of Victorian and Edwardian buildings in the country. There will be potential tension, therefore, between proposals in the transport strategy and the conservation of its significant heritage assets. There will also be opportunities to protect and enhance heritage assets through measure that reduce pollution, remove traffic from roads and improve the public realm.	Amend Table 2.2. to include a key issue/opportunity relating to the historic environment.	Table 2.2 has been amended accordingly.
We welcome the inclusion of a specific SEA Objective related to the historic environment. However, we would request that reference made to the setting of heritage assets as contributing to their significance in SEA Objective 9. Whilst this may be implied, it is considered necessary to include a specific reference to the setting of assets to provide greater certainty that it will be considered when assessing proposals in the strategy against this objective.	Amend Objective 9 to read: *9. Conserve and, where appropriate, enhance those elements which contribute to the significance of the area's heritage assets, including their setting.*	Objective 9 has been amended accordingly.
The Report does not set out what decision-making criteria (i.e. questions) will be used to evaluate the likely environmental effect of proposals in the transport strategy against each SEA Objective.	An appropriate set of decision making criteria need to be developed for each SEA Objective, with which the likely impact of the transport strategy's proposals can be considered.	This was not considered necessary. Annex II of the SEA Directive and associated SEA guidance already provide a list of criteria that can be used to judge whether an environmental effect is significant. Reference was also made during the assessment to Historic England's Advice Note 8 on SA and SEA.
We welcome that all designated heritage assets (Conservation Areas, Listed Buildings, Scheduled Monuments, Registered Parks and Gardens and Registered Battlefields) within the area are highlighted. We also welcome the inclusion of information on the number and type of heritage assets identified on the Heritage at Risk Register within the Regional Plan area. However, the number of designated heritage assets in the area, and the number of assets identified as on the Heritage at Risk Register, is based on out-of-date information.	Update the baseline information on heritage assets within the area accordingly.	Noted. Updated information of heritage assets has been included in the environmental baseline.

Natural England scoping consultation comments	Suggested improvements	Response
Section 1.2 of the scoping report states that consideration of impacts to South Pennine Moors Special Protection Area (SPA) will be required as part of the SEA process. We advise the site is also designated as South Pennine Moors Special Area of Conservation (SAC), therefore potential for impacts to designated features of this site will also need to be considered as part of the SEA process.	Amend text to include the South Pennine Moors status as a Special Area of Conservation.	The report has been amended accordingly.
In order to meet the requirements of regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended) a Habitats Regulations Assessment (HRA) will need to be produced by your authority due to the proximity of the Leeds district boundary to the South Pennine Moors European designated sites.	A Habitats Regulations Assessment (HRA) should be undertaken for the Leeds Transport Strategy to identify impacts	A screening process will be undertaken to establish if the Transport Strategy is likely to have significant effects on the South Pennine Moors SPA / SAC, and if required an appropriate assessment will be carried out.
Natural England notes that section 2.7 of the scoping report appendices identifies several sites designated on a national level as Sites of Special Scientific Interest (SSSIs) which are within or are in close proximity to the Leeds district boundary.	Natural England advises that potential impacts to these sites which may arise due to the transport strategy should be given consideration within the final SEA report.	Noted. Potential impacts to SSSI sites both within and in close proximity to the district boundary have been considered in the assessment.
The Governments 25 Year Environment Plan sets out its aspiration for more and better quality green infrastructure in particular focusing on areas where there is not enough accessible green infrastructure, or where the GI is of poor quality. GI would make a valuable contribution to the plan's aspirations for 'supporting sustainable economic growth' and 'improving quality of life', by making better places to live, learn and work; and enhancing resilience to climate change. The Governments 25 Year Environment Plan also proposes expanding the biodiversity net gain approach to natural capital with 'environmental net gain'. The Biodiversity Metric 3.0 is to be used to calculate biodiversity losses and gains for terrestrial habitats. The new revised NPPF has strengthened the wording in relation to this, by "*securing measurable net gains for biodiversity*" (NPPF 174b). Consequently, there will be an increasing emphasis on net gain in future infrastructure developments.	Natural England would wish the strategy to adopt an overarching natural capital approach, which maximises opportunity for true biodiversity net gain and green infrastructure enhancements. To create a more resilient transport network across the region, to deliver the economic, social and environmental strategic goals	The requirement for biodiversity net gain has been recognised in the SEA and has been included as a measure to be incorporated in the detailed design of schemes included in the Transport Strategy.

Consultation from other stakeholders within Leeds City Council:

Topic	Comment received	Response
Light pollution	Impact of lighting from roads, bridleways and footpaths on species other than humans should be considered (specifically bats and insects).	This has been acknowledged in the baseline environment and during the assessment process.
Biodiversity	Consider the impacts of fragmentation on species other than humans: specifically hedgehogs, badgers, roe deer, small mammals (mice/voles/shrews) and also amphibians.	This is already included in the baseline environment but has been strengthened and has been including in the assessment process.
	The forthcoming Environment Bill mandates for a minimum 10% net gain for most developments requiring planning consent, to be calculated using Defra's Biodiversity Metric Version 3.0. This needs to be recognised in the assessment.	Noted. This relates to projects at the point of planning consent and requires details which are not known at the current time. However recommendations are made for all projects to design in minimum biodiversity net gains at the early stages where possible, and to be aware of requirement for off-site provision / biodiversity credits where required.
	Consider extending the requirement for biodiversity net gain to include all highway schemes, not just those requiring planning consent.	Noted. This would have a number of benefits for biodiversity and movement of species, and has been included as one of the recommendations for consideration in the Transport Strategy
	It is good to see the reference to international sites – North Pennine Moors and South Pennine Moors (Phase 2) SPA/SACs. The potential impacts are particulates and nitrogen deposition on habitats but also increasing traffic flow in the direction of these sites may lead to a recreational impact that could add to disturbance of ground nesting birds (designated feature of those European sites). These types of impacts may fall within the Habitats Regulations Assessment (HRA) depending on the project being considered (type of project and proximity to those 2 European Sites).	Noted. Potential impacts on internationally protected sites are localised in nature and will depend on the type and location of potential transport schemes. Recommendations are made for these impacts to be considered when specific projects are drawn up in detail.
	Consideration should be given to diversity of species in the street tree planting initiative to reap most wildlife benefit.	Noted. This has been included in the recommendations for the Transport Strategy.

Topic	Comment received	Response
Water quality	We need to make sure that water run-off rates (quantity) are not the sole consideration of the SUDs triangle – water quality is equally important but gets missed – filtration of surface water run-off through reedbeds removes some particulates and other pollutants whilst also providing biodiversity and more interesting places for people to observe. We should try and make sure this is also addressed clearly in the SEA.	This has already been included in both the baseline environment and is included as a key consideration during scheme design in the assessment.
	Can we do something linked to planning of highways schemes here such as ensuring urban drainage systems / protection of trees etc is designed in at concept stage?	Noted. This has been considered in both the baseline environment and the assessment of significant effects.
Townscape	Clutter from street furniture and signage affects townscape and amenity value of the city centre. Consider also alternatives with a better visual aesthetic (e.g. central reservation barriers constructed of green mesh, as used in Nottingham).	Noted. Exploring the potential to reduce street clutter, particularly where it creates a barrier to the movement of people or has a negative visual impact on the local area has been included in the list of recommendations for the Transport Strategy to consider. Efforts should be made to align the Transport Strategy with the Leeds Our Spaces Strategy to improve the public realm.
	The Government's recently launched National Model Design Code emphasises the need for every new street to include street trees.	Noted. The NMDC had not been published at the time the list of other relevant plans and programmes was compiled. It has now been added, and measures relating to street trees are supported by the Transport Strategy's ambition to plant 5.8 million street trees.
Promoting sustainable modes of travel	More high quality, secure cycle parking is required in Leeds to encourage significant increase in people choosing to cycle.	Noted. This is supported by Transport Strategy and as one of the measures being implemented as part of the Leeds Economic Recovery Framework in response to the Covid-19 pandemic.

Topic	Comment received	Response
Air Quality	Needs to be realistic that we are likely to get NO2 benefits from the measures here, but not necessarily reductions in PM2.5. Much of PM2.5 is generated by tyre degradation so to get PM improvements you need to reduce congestion. Swapping fossil fuelled cars for electric ones doesn't necessarily improve particulates. Shifting people out of cars into public transport therefore needs to be the priority objective.	Noted. These issues have been addressed in the baseline environment and in the assessment of significant effects.
Natural resources and waste	Need to consider the raw material extraction for production of batteries etc, I would be tempted to downgrade this slightly.	Noted. This has been considered in both the baseline environment and the assessment of significant effects.
Landscape and townscape	As a general point there seems to be a lot of focus on new trees from this scheme, but what about protection of existing landscapes?	Noted. Consideration of landscape and townscape impacts has been included in the SEA in addition to the street tree planting initiative, particularly with regard to design principles.
Carbon dioxide emissions	Decarb of transport will require new skills and new green jobs, eg vehicle maintenance.	Noted. This is a valid point but is outside of the scope of the Transport Strategy.
	Public transport needs to be not just easier, but cheaper. That's the key to getting people out of the car!	Noted. This has been considered in both the baseline environment and the assessment of significant effects.

APPENDIX 2: LIST OF OTHER RELEVANT PLANS, PROGRAMMES AND POLICIES

This list does not form a fully comprehensive list of related plans, programmes and policies, but is designed to provide a good idea of the framework within which the study is set. Table 1.1 contains the full list of plan, programmes and policies reviewed for the West Yorkshire Transport Strategy 2016-2036 Integrated Sustainability Appraisal although not all of these will have direct relevance to the Leeds Transport Strategy.

Table 1.2 includes the additional relevant documents identified as part of the review undertaken for the SEA for the Leeds Transport Strategy, including documents that have either been published since the original ISA report in 2016 and those with specific relevance to Leeds.

International
Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) (1979)
Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) (1979)
Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) (1971)
EC A Sustainable Future for Transport – Towards an Integrated, Technology led and User Friendly System (2009)
EC Keep Europe Moving – Sustainable Mobility for our Continent: Mid-Term Review of White Paper (2006)
EU Action Plan on Urban Mobility (2009)
EU 2020 Biodiversity Strategy (2012)
EU 7th Environmental Action Programme (2013)
EU Air Quality Framework Directive (96/62/EC)
EU Biodiversity Action Plan (2006-2010)
EU Directive for the Promotion of Bio-fuels for Transport (2003/30/EC)
EU Directive on Ambient Air Quality and Management (1996/62/ EC)
EU Directive on Assessment and Management of Environmental Noise Directive (2002/29/EC) and associated Regulations (2006)
EU Directive on Assessment of the Effects of Certain Plans and Programmes on the Environment (2001/42/EC)
EU Directive on Environmental Impact Assessment (2014/52/EU) amending Directive (97/11/EC) amending Directive 85/337/EEC
EU Directive on the Conservation of Wild Birds (2009/147/EC)
EU Employment Equality Framework (2000)
EU Environmental Liability Directive (2004/35/EC)
EU Floods Directive (2007/60/EC)
EU Freshwater Fish Directive (78/659/EEC)
EU Groundwater Directive (GWD) (2006/118/EC)
EU Habitats Directive (92/43/EC)
EU National Emissions Ceiling Directive (2001/81/EC)
EU Race Equality Framework (2000/43/EU)
EU Rural Development Policy 2007-2013
EU Second European Climate Change Programme (2005)
EU Strategy on Adaptation to Climate Change (2013)
EU Sustainable Development Strategy (2006)
EU Sustainable Development Strategy (2006) and 2009 Review of EU SDS
EU Thematic Strategy on Air Quality, 2005
EU Waste Framework Directive (2006/12/EC)

EU Water Framework Directive (2000/60/EC)
European Convention on the Protection of the Archaeological Heritage
European Landscape Convention (91/676/EC)
European Spatial Development Perspective (1999)
European Transport Policy for 2010: A Time to Decide (2001)
UN Framework Convention on Climate Change (2008)
UN Johannesburg Declaration on Sustainable Development, 2002
UNECE Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention) (1998)
UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage (1972)
UNFCCC Bali Road Map (2007)
UNFCCC Copenhagen Accord (2009)
UNFCCC Doha Climate Gateway (2012)
UNFCCC Kyoto Protocol on Climate Change (1997)
WHO Age Friendly Cities Guide (2007)
WHO Collaboration Between the Health and Transport Sectors in Promoting Physical Activity (2006)
WHO Guidelines for Community Noise (2000)
WHO Health Effects of Transport-Related Air Pollution (2005)
WHO Transport, Environment and Health (2000)
National
2010 to 2015 government policy: water quality (Updated 8 May 2015)
A Better Place to Play (Environment Agency, 2006)
A Safer Way: Consultation on Making Britain's Roads the Safest in the World (2009)
A Sure Start to Later Life: Ending Inequalities for Older People – A Social Exclusion Unit Final Report (2006)
Adapting to Climate Change in England (DEFRA, 2008)
Air Quality Regulations 2000 and The Air Quality (Amendment) Regulations 2002
Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)
Ancient Monuments and Archaeological Areas Act 1979
Be Active Be Healthy: A Plan for Getting the Nation Moving (2009)
Beyond Copenhagen: The UK Government's International Climate Change Action Plan (2010)
Building a Greener Future Towards Zero Carbon Development – Consultation (Dec 2006)
Building a Low-Carbon Economy – The UK's Contribution to Tackling Climate Change. The First Report of the Committee on Climate Change (Committee on Climate Change, 2008)
Building a Society for all Ages (2009)
Building Sustainable Transport into New Developments (DfT, 2008)
Carbon Pathways Analysis: Informing Development of a Carbon Reduction Strategy for the Transport Sector, Department for Transport (2008)
Carbon Pathways: Informing Development of a Carbon Reduction Strategy for Transport (DfT, 2008)
Child Road Safety Strategy (DfT, 2007)
Clean Neighbourhoods and Environment Act 2005
Climate Change Act 2008
Conserving Biodiversity – The UK Approach (Defra on behalf of the UK Biodiversity Partnership 2007)
Countryside and Rights of Way Act 2000
Delivering a Sustainable Railway, Department for Transport (2007)
Delivering a Sustainable Transport System (DaSTS), Department for Transport (2008)
Delivering a Sustainable Transport System (DaSTS): Consultation on Planning for 2014 and Beyond, Department for Transport (2008)
DfT Sustainable Development Action Plan (2007 and 2008)
Disability Discrimination Act (2005)
Draft Heritage Protection Bill (2008)

Enterprise and Regulatory Reform Act 2013
Environmental Noise (England) Regulations 2006 SI 2238
Equalities Review (2007)
Equality Act (2010)
Equality Framework for Local Government (2009)
Every Child Matters (2003)
Flood and Water Management Act (2010)
Future Water: Government's Water Strategy for England (2008)
Future water: The government's water strategy for England (2011)
Guidance on the Promotion and Creation of Physical Environments to Support Increased Levels of Healthy Lives, Brighter Futures – the Strategy for Children and Young People's Health (2009)
Heritage Protection for the 21st Century: White Paper (DCMS, 2007)
Low Carbon Transport: A Greener Future, A Carbon Reduction Strategy for Transport, Department for Transport (2009)
Making the Connections: Final Report on Transport and Social Exclusion (2003)
Meeting the Energy Challenge: A White Paper on Energy (2007)
National Air Quality Strategy, Department for Environment, Food and Rural Affairs (2007)
National Cycling Strategy, DfT Review
National flood and coastal erosion risk management strategy for England (2011)
National Planning Policy Framework (2012)
National Waste Development Framework
Natural Environment and Rural Communities Act 2006
Noise Action Plans (DEFRA)
Older People: Their Transport Needs and Requirements (DfT, 2001)
Physical Activity (NICE) (2008)
Planning (Listed Buildings and Conservation Areas) Act 1990
Planning for a Sustainable Future (2007)
Planning for a Sustainable Future, Department for Communities and Local Government (2007)
Planning for Economic Development (ODPM, 2004)
Powering Future Vehicles Strategy, Department for Transport (2002)
Protection of Badgers Act (1992)
PSA Delivery Agreement 27 Lead the Global Effort to Avoid Dangerous Climate Change (HM Government, 2007)
PSA Delivery Agreement 28 Secure a Healthy Natural Environment for Today and the Future (HM Government, 2007)
Public Sector Equality Duty (Equality Act 2010)
Race Relations (Amendment) Act (2000)
Road Safety Act 2006
Road Traffic Reduction (National Targets) Act 1998
Road Traffic Reduction Act 1997
Rural Strategy 2004
Securing the Future: The Government's Sustainable Development Strategy (2005)
Securing the Regions' Future (2006)
Stern Review of the Economics of Climate Change (Stern, 2007)
Sustainable Communities: Building for the Future (2003)
Sustainable Distribution: A Strategy (DfT, 1999)
Tackling Health Inequalities: A Programme for Action (2003)
The Conservation of Habitats and Species Regulations (2010)
The Countryside in and Around Towns: A Vision for Connecting Town and Country in the Pursuit of Sustainable Development (The Countryside Agency/Groundwork 2005)
The Future of Transport White Paper – A Network for 2030 (DfT, 2004)

The Government's Statement on the Historic Environment for England 2010
The Low Carbon Transition Plan and Low Carbon Transport 'A Greener Future' (2009)
The Public Health White Paper: Choosing Health – Making Healthy Choices (2004)
The UK Programme on Climate Change, Department for Environment, Food and Rural Affairs (2006)
Towards a Sustainable Transport System: Supporting Economic Growth in a Low Carbon World (TaSTS), Department for Transport (2007)
UK Biodiversity Action Plan 1992-2012 (1994)
UK Climate Change Bill (2008)
UK Post-2010 Biodiversity Framework (July 2012)
Ultra-low Carbon Vehicles in the UK, HM Government (2009)
Walking and Cycling: An Action Plan (2009)
Waste Strategy for England (Defra, 2007)
Wildlife and Countryside Act (as amended) 1981
Working with the Grain of Nature: A Biodiversity Strategy for England 2002
World class places: the Government's strategy for improving quality of place (2009)
Regional
Air Quality Plan for the achievement of EU air quality limit values for nitrogen dioxide (NO2) in West Yorkshire Urban Area (UK0004) (2001)
Joint Local Authority – Yorkshire Forward Position Paper (2008)
North Yorkshire and York Staying Healthy (2008)
Strategic economic Plan, Leeds City Region Enterprise Partnership (2014)
The Humber River Basin District Management Plan (2009)
The Yorkshire and Humber Plan: Regional Spatial Strategy to 2026 (2008)
The Yorkshire and Humber Regional Economic Strategy 2006-2015 and progress update (2007)
West Yorkshire – Noise Action Plan (March 2010)
West Yorkshire Low Emission Strategy (WYLES) Working Draft, 2015-2020
Yorkshire Dales National Park Local Plan (2006)
Local
Air Quality Progress Report for Leeds City Council (Dec 2011)
A Local Area Agreement for Leeds 2006 – 2009
Barnsley Combined Local Plan (consultation draft 2014)
Barnsley Core Strategy (adopted 2011)
Barnsley Development Sites & Places (consultation draft June 2012)
Big Plan for the Bradford district 2008-2011 - our sustainable community strategy
Bradford Air quality action plan: consultation draft (Jul 2009)
Bradford Children and Young People's Plan 2011 – 2014
Bradford Core Strategy (publication draft 2014)
Bradford MDC Low Emission Strategy (Aug 2013)
Bradford Metropolitan District Council Strategic Flood Risk Assessment Level 1 (amended Feb 2014)
Bradford Metropolitan District Council: Sustainability Appraisal of the Core Strategy (Publication Draft Feb 2014)
Calderdale Local Air Quality Management Updating and Screening Assessment (2015)
Calderdale Local Area Agreement 2 2008-2011
Calderdale: Local Plan Sustainability Appraisal Scoping Report (Evidence Base Feb 2015)
Calderdale's Sustainable Community Strategy (Jan 2010)
Craven Local Plan (under development)
Developing Knowledge Communities: Wakefield District Community Strategy (Mar 2007)
Families and Neighbourhoods: Wakefield District Local Area Agreement 2008 2011
Harrogate Core Strategy (adopted Feb 2009)
Harrogate Sites & Policies DPD (under development)
Kirklees Local Air Quality Strategy (Apr 2007)

Kirklees Local Area Agreement (Mar 2009)
Kirklees Sustainable Community Strategy 2009-2012
Leeds Core Strategy (adopted Nov 2014))
Leeds Site Allocations (under development)
Local Air Quality Management Action Plan 2010
Selby Core Strategy (adopted Oct 2013)
Selby Sites and Policies Plan (under development)
The Bradford district local area agreement 2008-2011 - Connecting people and places to economic prosperity
Vision for Leeds 2004 to 2020 (April 2004)
Wakefield Core Strategy (adopted Apr 2009)
Wakefield Core Strategy DPD & Development Policies DPD (adopted Apr 2009)
Wakefield Sites Specific Policies (adopted 2009)
York Local Plan (under development)

Table 1.2: Additional list of plans, policies and programmes identified for the Leeds Transport Strategy

National
Biodiversity 2020: A strategy for England's wildlife and ecosystem services (Defra, 2013)
Future of Mobility: Urban Strategy (Government Office for Science, 2019)
Road Safety Statement 2019: A Lifetime of Road Safety (DfT, 2019)
Environment Agency: EA2025 Creating a Better Place (Environment Agency, 2020)
Environmental Land Management Schemes overview (Defra, 2021)
A Green Future: Our 25 year plan to improve the environment (Defra, 2018)
The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting (Defra, 2018)
Decarbonising Transport: Setting the challenge (DfT, 2021)
Transport Decarbonisation Plan (Draft) (DfT, 2021)
Clean Air Strategy (Defra, 2019)
Clean Growth Strategy (Department for Business, Energy & Industrial Strategy, 2019_
Reducing emissions from road transport: Road to Zero Strategy (OLEV, 2018)
The Road to Zero: Next Steps towards cleaner road transport and delivering our industrial strategy (HM Government, 2018)
Public Health England Strategy 2020-2025 (PHE, 2019)
National Planning Policy Framework, updated 2019 (Ministry of Housing, Communities and Local Government, 2019)
National Design Guide / National Model Design Code (Ministry of Housing, Communities and Local Government, 2021)
Local / Regional
Best Council Plan 2020-2025 (Leeds City Council)
Leeds Inclusive Growth Strategy 2018-2023 (Leeds City Council)
Leeds Climate Emergency Declaration / Strategy (Leeds City Council, 2019)
Leeds Local Air Quality Management Review and Assessment (Annual Progress Reports)
Towards a Leeds Parks and Green Spaces Strategy 2020-2030 (Consultation Document)
Leeds Local Plan: Core Strategy
Leeds Local Plan: Site Allocations Plan DPD (2019)
Leeds Local Plan: Natural Resources and Waste DPD (2013)
Leeds Local Plan: Greening the Built Edge SPD
Leeds Health and Wellbeing Strategy 2016-2021 (Leeds City Council)
Leeds Our Places Strategy 2020
Contaminated Land: An inspection strategy for Leeds (Leeds City Council, 2019)
Local Requirements for Biodiversity and Geological Conservation (Leeds City Council, 2020)
Leeds Safer Roads Action Plan 2017-2018
Humber River Basin Management Plan 2015-2021 (Environment Agency)
Vision Zero: for no one to be killed or seriously injured on our roads by 2040 (Leeds City Council, 2021)
Leeds Health and Wellbeing Strategy (Leeds City Council)
School Streets Scheme (Leeds City Council)

APPENDIX 3: ENVIRONMENTAL BASELINE

3.1 POPULATION OF LEEDS

Demographic forecasts for Leeds indicate headline growth of almost 7% over the 25 year period from 2018 to 2043, from 789,000 to 842,000 (figure 1). As is illustrated in figure 3 the younger age groups, and in particular adults aged 20-29, continue to be the most represented group in all future projections. This may be linked to the large university presence in the City. However there is also a clear trend apparent that the number of older people in groups age 70+ in Leeds is increasing over time which could have implications for future transport requirements and demands.

Young people dominate the demographic and continue to do so in projections up to 2043, but it is also noticeable that the number of older people in the 70+ age categories are increasing over time.

Figure 1: Projected Population growth in Leeds (2019-2043)
(2018-based subnational population projections, Office for National Statistics, 2018)

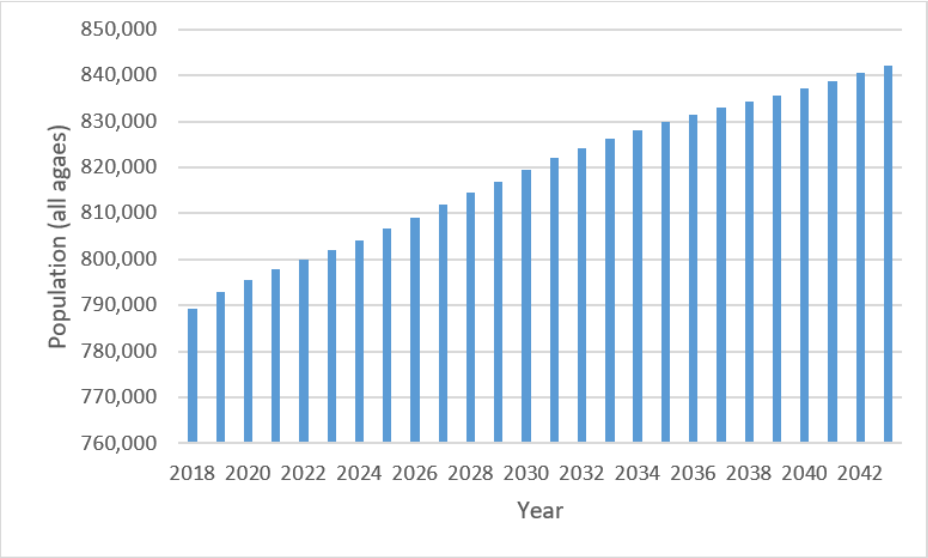
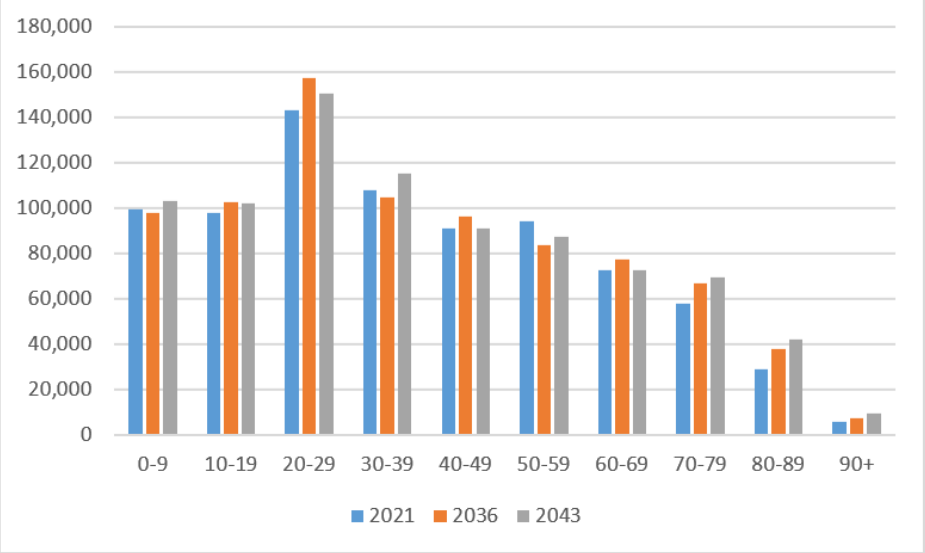


Table 2: Predicted population of Leeds by age group
(2018-based subnational population projections, Office for National Statistics, 2018)



3.2 Carbon emissions

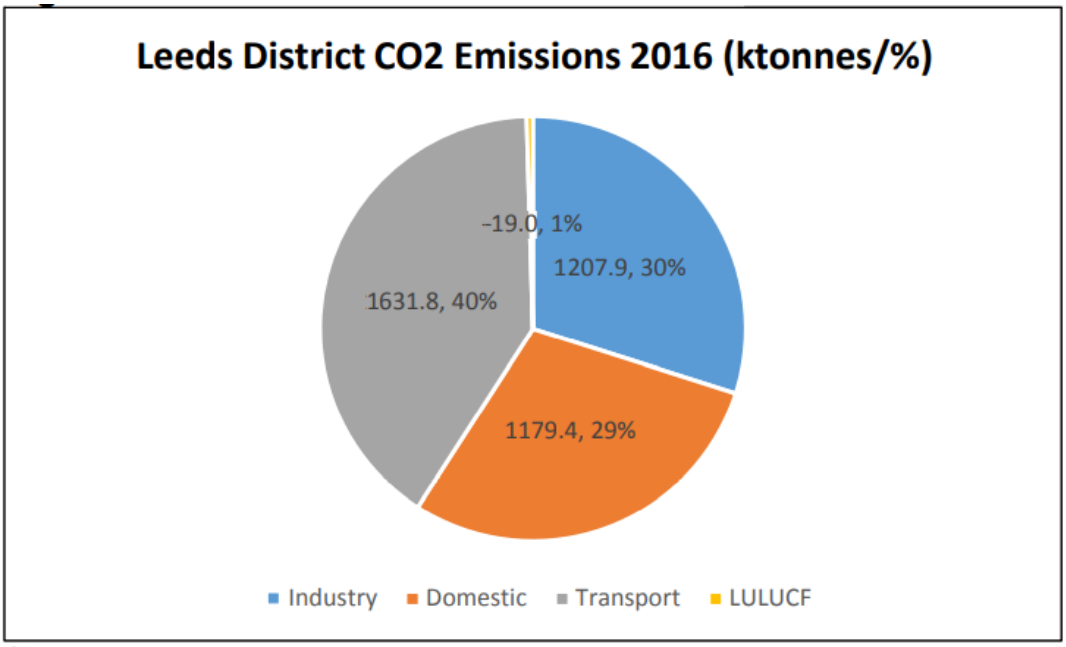
Carbon dioxide (CO_2) is the main greenhouse gas that is widely held to be responsible for recent changes to our climate. CO_2 is emitted by road vehicles through the consumption of carbon-based fuels and as we can see in figure 2.2.1 the transport sector is the dominant source of CO_2 emissions in Leeds. If traffic levels continue to increase, CO_2 emissions are also likely to rise, although this may be mitigated by technical and other measures. Estimates of CO_2 emissions from road traffic in Leeds are taken from the Department for Business, Energy & Industrial Strategy's 2005- 2018 UK local and regional CO_2 emissions data tables (the most recent data available) and are set out below. From this we can see that although transport in the dominant sector in terms of CO_2 emissions there has been a steady decline in emissions over the past 5 years from A-roads and motorways. This downward trend is not apparent for road transport on minor roads, although it is not known why although one possible reason could be that most of the gains in CO_2 emission reductions have been seen in cleaner engine technologies in HGVs and buses which are less represented in the minor road fleet. We can expect to see greater reductions in CO_2 emissions on the minor road network as electric cars become more commonplace under government plans to ban petrol and diesel car sales by 2030.

Estimates of annual CO_2 emissions (Ktonnes)

Year	I. Road Transport (A Roads)	J. Road Transport (Motorways)	K. Road Transport (Minor Roads)	L. Diesel Railways	M. Transport Other	Transport Total
2015	461.1	727.0	434.8	18.7	22.7	1,664.3
2016	467.1	771.2	441.7	18.5	23.4	1,721.9
2017	462.7	762.7	431.0	18.3	23.9	1698.5
2018	445.5	725.0	448.4	16.7	23.9	1659.5

Source: UK local authority and regional carbon dioxide emissions national statistics: 2005-2018

Figure 2.1.1:



Source: UK local authority and regional carbon dioxide emissions national statistics: 2005-2016

3.3: CLIMATE CHANGE

The UK Climate Projections (UKCP) is a climate analysis tool that forms part of the Met Office Hadley Centre Climate Programme and provides the most up-to-date assessment of how the UK climate may change in the future. Key findings for Leeds include:

- Hot summers are expected to become more common (see also figure 2.3.1). By 2050 there is a 50% chance of summers as hot as it was in 2018 (one of the warmest UK summers on record).
- Although there is a trend towards drier summers in the future (figure 2.3.1) the latest projections suggest possible increase in the intensity of heavy summer rainfall events.
- Under a high emissions pathway, the frequency of hot spells rises from an average of once every 4 years to about 4 times per year by 2070. A hot spell is defined as a maximum daytime temperature exceeding 30°C for 2 or more consecutive days.

Figure 3.3.1: UKCP Headline Results for Leeds
(Met Office, 2019)

UKCP Headline Results for Leeds, UK			
Compared to a 1981-2000 baseline, the average change in:	**2030** (2020-2039)	**2050** (2040-2059)	**2080** (2070-2089)
Summer Air Temperature (°C)	+1.0 to +2.0	+1.6 to +3.5	+2.7 to +6.7
Summer Maximum Air Temperature (°C)	+1.1 to +2.4	+1.8 to +4.1	+3.0 to +7.7
Winter Air Temperature (°C)	+0.8 to +1.9	+1.2 to +2.9	+1.8 to +4.9
Winter Minimum Air Temperature (°C)	+0.8 to +1.9	+1.2 to +3.0	+1.8 to +5.0
Annual Mean Air Temperature (°C)	+0.9 to +1.7	+1.3 to +2.7	+2.1 to +5.1
Summer Precipitation Rate**(%)	-5 to -26	-14 to -36	-20 to -52
Winter Precipitation Rate** (%)	+4 to +15	+6 to +20	+11 to +31
Baseline = 1981-2000. Summer = Jun, Jul, Aug. Winter = Dec, Jan, Feb. **Relative change (%) in mm per day			
Please note that as higher-resolution information becomes available following the release of the UKCP Local (2.2km) projections, the values quoted may change. In particular, upper end increases in winter mean precipitation may be revised upwards. However, in general the 2.2km projections reinforce the UKCP results in terms of seasonal-mean changes.			

3.4 AIR QUALITY

Local authorities are required under the Environment Act 1995 to monitor local air quality to determine if the National Air Quality Standards (AQSs) will be exceeded. Where the AQSs are exceeded, local authorities are required to declare these areas as Air Quality Management Areas (AQMAs) and produce an Air Quality Action Plan (AQAP) to put in place measures to improve conditions and work towards achieving the Government's objectives.

Leeds has declared six air quality management areas (AQMA's) in response to exceedances of NO_2 objectives. Long term trends show an ongoing improvement in air quality (figure 2.4.1) and monitoring within these AQMA's shows a declining trend in pollution levels. In 2019 five of our AQMA's have shown annual mean concentrations within the UK objective. However in 2019 there were locations in the city centre, the inner ring road and within the Pool in Wharfedale air quality management area that remain above the annual mean air quality objective for NO_2.

A number of roadside city centre locations have shown exceedances of the annual average for NO_2. It should be noted that these are road side monitoring locations and not relevant receptor locations (representative of human or ecological exposure to a pollutant over a time period that could incur harm). It is anticipated that proposals to close Bishopgate Street and the adjacent City Square to through traffic by 2022/23 will further improve air quality in this location. Development at the Corn Exchange to reduce through traffic and introduce bus and pedestrian priority measures which will also further improve air quality.

Figure 2.4.1: Trends in NO2 annual mean concentrations at Leeds air quality monitoring stations

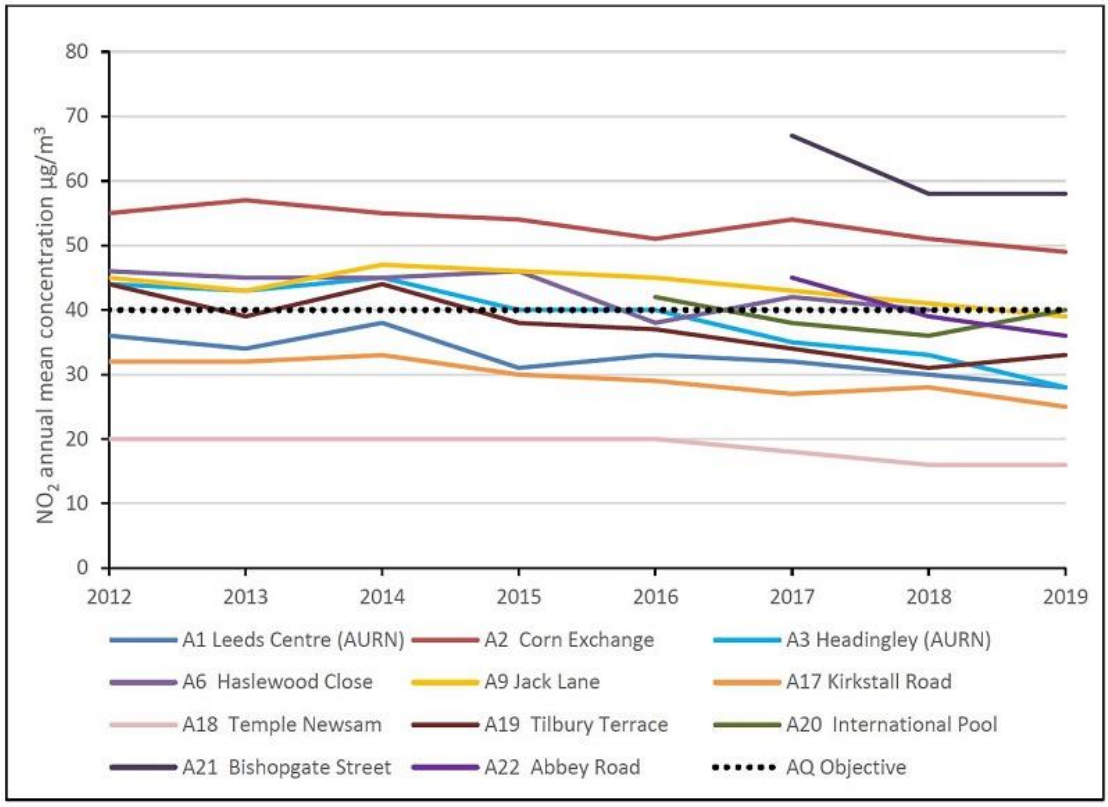
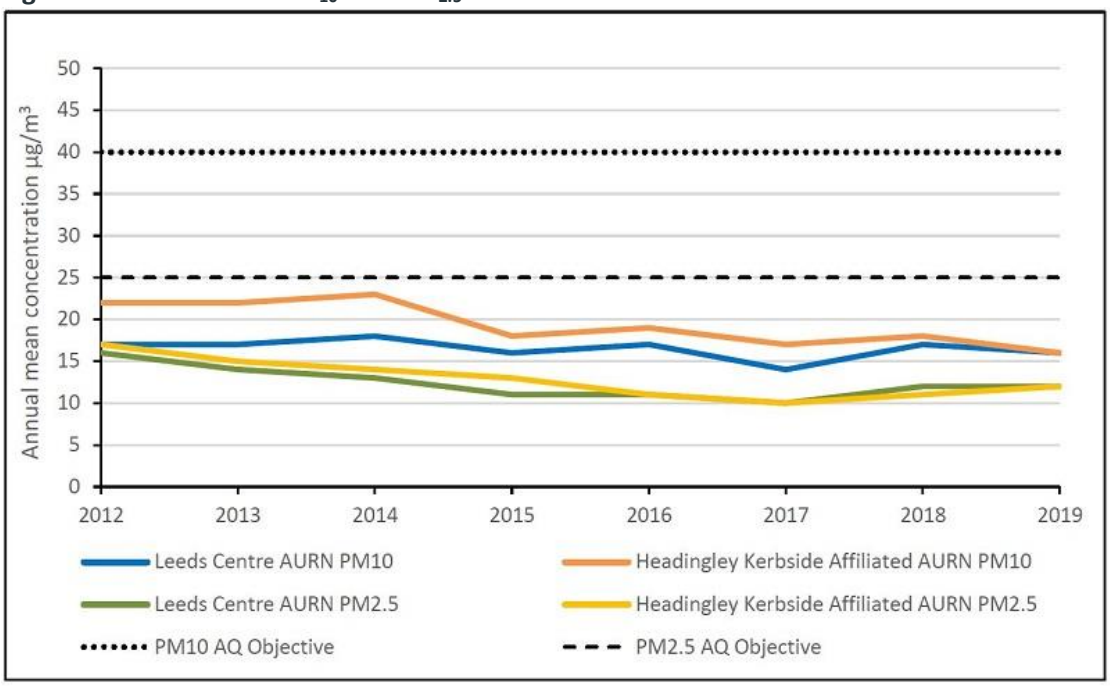


Figure 3.4.2 illustrates that monitored levels of particulate matter, both PM_{10} and $PM_{2.5}$ are well within UK air quality objectives and are close to the more stringent World Health Organisation guideline levels. Leeds City Council has committed to adopt the World Health Organisation air pollution targets of 10 µg/m^3 annual mean for $PM_{2.5}$ and 20 µg/m^3 annual mean for PM_{10} by 2030.

Figure 3.4.1: Trends in PM_{10} and $PM_{2.5}$ Annual Mean Concentrations in Leeds



Leeds Clean Air Zone

The Leeds Clean Air Zone (CAZ) proposals were approved by central government in January 2019 to accelerate compliance with legal air quality limits (40µg/m^3 annual mean on key link roads).
In preparation for the CAZ Leeds City Council implemented a number of measures and initiatives to promote higher uptake of cleaner vehicles in the city and a further review concluded that as a result of the level of fleet upgrade in the city Leeds is predicted to be comfortably below the 40µg/m^3 legal limit on all roads that form part of the government's EU compliance model. Further improvements to air quality were gained by the implementation of a number of highways schemes and by traffic reductions linked to COVID-19, but is not dependent on them. As a result Leeds has achieved legal compliance without the need to introduce a CAZ and is expected to remain compliant now and into the future.

Non-Exhaust Particulate Emissions

Road traffic is responsible for an estimated quarter of ambient particulate matter (PM) in urban areas globally. PM from exhaust emissions has reduced significantly in recent years as a result of stringent regulation and non-exhaust emissions (for example from brake and tyre wear) are expected to become the dominant source of all PM from road traffic as early as 2035. Non-exhaust emissions are currently unregulated.

Research by the Organisation for Economic Co-operation and Development (OECD) (*Non-exhaust particulate emissions from road transport, OECD, 2020)* found that electric vehicles are estimated to emit 5-19% less PM_{10} from non-exhaust sources per kilometre than internal combustion engine vehicles (ICEVs) across vehicle classes. However, EVs do not necessarily emit less of the finer $PM_{2.5}$ than ICEVs.

Lightweight EVs emit an estimated 11-13% less PM2.5 than ICEV equivalents, but heavier weight EVs emit an estimated 3-8% more $PM_{2.5}$ than ICEVs.

The same OECD study found that the total amount of non-exhaust PM ($PM_{2.5}$ and PM_{10}) emitted by passenger vehicles worldwide will rise by 53.5% along with transport demand, from approximately 0.85 Mtonnes today to 1.3 Mtonnes in 2030 in a business-as-usual scenario with low uptake of heavier weight EVs.

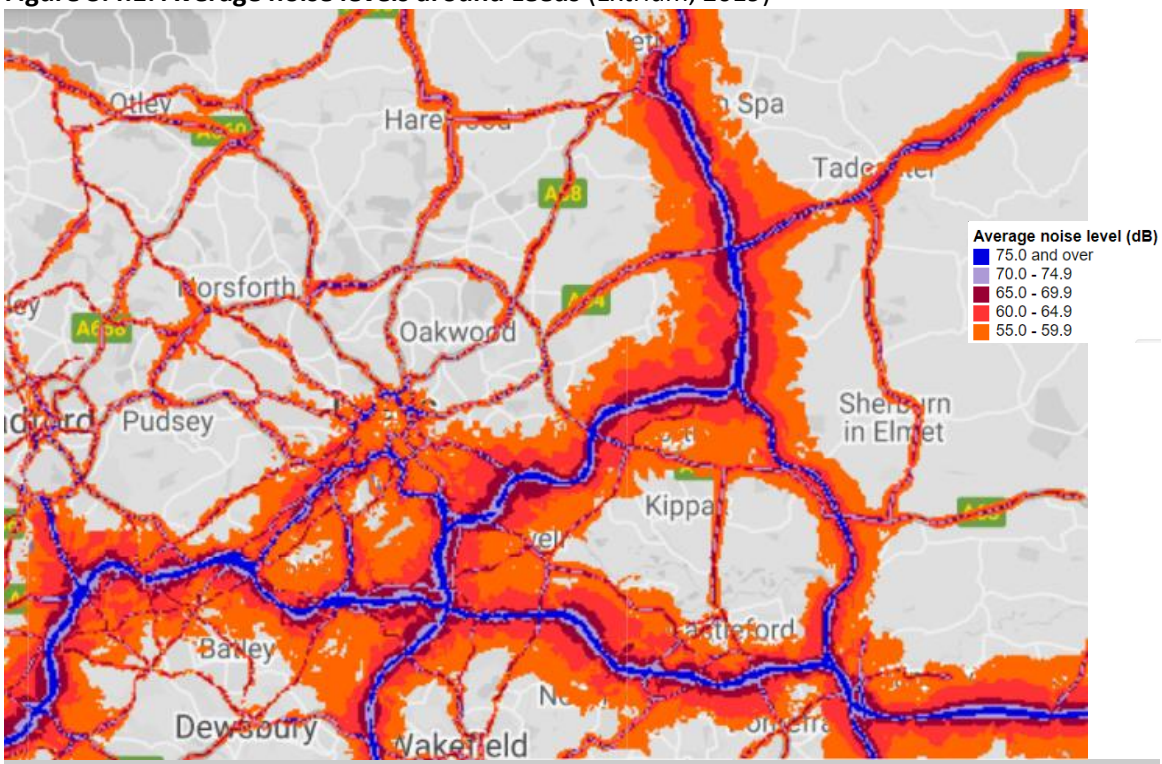
3.5: NOISE

In common with most urban areas in the UK, road traffic is the primary source of environmental noise experienced in West Yorkshire. The World Health Organisation (WHO) recognises noise as one of the top environmental hazards to health and well-being in Europe. It causes sleep disturbance, annoyance and there is growing evidence that long-term exposure to high levels of environmental noise is associated with illnesses like heart attacks and strokes.

Transport related environmental noise is not sensitive to changes to vehicle flows, a 25% decrease in traffic flow will reduce the resultant noise level by 1dB(A), which is unlikely to be perceptible – a 3dB(A) change is often needed to be perceptible to the human ear. However, other environmental effects such as congestion, exhaust emissions and severance can lead to a cumulative deterioration in environmental conditions and a perceived increase in noise nuisance.

The following Figure 3.4.1 indicates the levels of noise calculated in the area, expressed using the "day, evening, night level" (L_{den}) measure. L_{den} is a standard used to express noise level over an entire day, with a penalty imposed on sound levels during evening and night due to the higher nuisance perception during quieter hours. From this it may be seen that many areas Leeds experience high levels of traffic noise, principally associated with the motorway and trunk road networks.

Figure 3.4.1: Average noise levels around Leeds (Extrium, 2019)

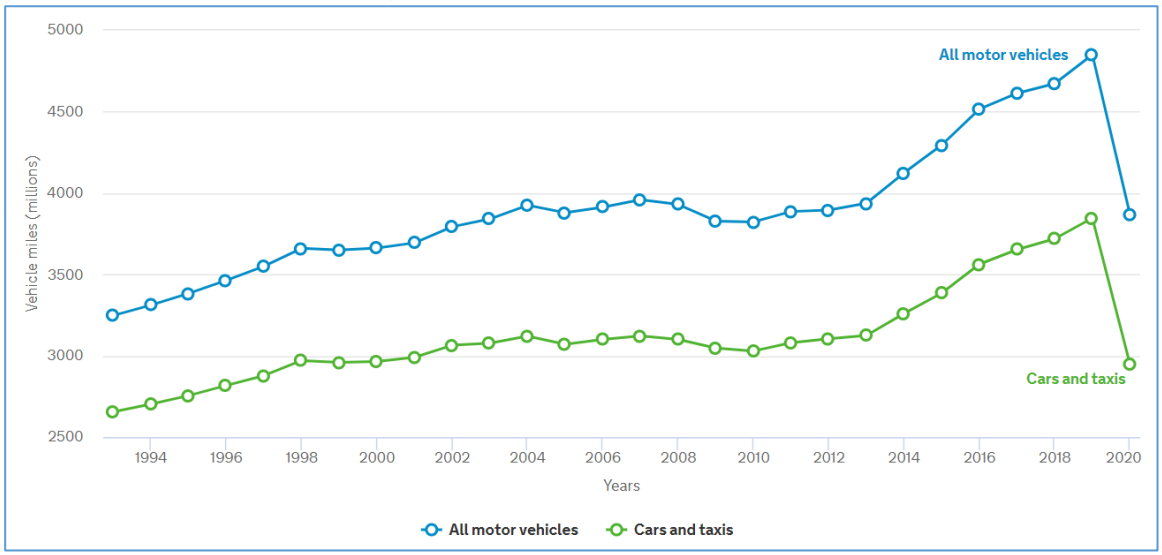


Defra's 'Noise Action Plans: large urban areas, roads and railways' (2019) aims to address the management of noise issues and effects in the West Yorkshire agglomeration under the terms of the Environmental Noise (England) Regulations. The Action Plan has identified the approximate number of dwellings and locations in West Yorkshire. A summary of the results of the noise mapping, including an evaluation of the estimated number of people exposed to road traffic noise are presented in Figure 3.4.2 which shows the number of dwellings (rounded to the nearest thousand) exposed above various noise levels from the strategic mapping of road traffic noise in this agglomeration. From this information we can see that the number of dwellings exposed to high levels of traffic noise is increasing in Leeds. This is may be in part attributed to the fact that more dwellings have been built close to busy roads in recent years but is also likely to be attributed to the fact that levels of road traffic in Leeds is increasing (figure 3.4.3 - n.b. the sharp drop in vehicle miles in 2020 is attributed to the Covid-19 pandemic response).

Figure 3.4.2: Estimated number of people exposed to road traffic noise in West Yorkshire

Noise level	(Lden) (dB)		(Lnight) (dB)		(LA10, 18hr) (dB)	
	2010	**2017**	**2010**	**2017**	**2010**	**2017**
≥ 50	1,148,000		603,000	278,000		
≥ 55	457,000	418,000	103,000	133,000	1,186.000	310,000
≥ 60	89,000	198,000	36,000	61,000	537,000	168,000
≥ 65	30,000	111,000	3,000	10,000	97,000	110,000
≥ 70	2,000	51,000	<500	3,000	41,000	63,000
≥ 75		8,000			3,000	14,000

Figure 3.4.3: Annual traffic by vehicle type in Leeds in vehicle miles (millions)
(DfT Road Traffic Statistics, 2020)



Defra's Noise Action Plan for Roads (2019) lists several possible approaches for highway authorities to control the impact of noise from road traffic, including:
1. control of noise at source (including vehicle emission limit values). This should be considered first;
2. planning controls – through the operation of the national and local transport and land use planning system;
3. installation of mitigation on the road infrastructure (low noise road surfaces, noise barriers;
4. compensation and insulation - in the case of new or improved highways;
5. installation of mitigation at receptors (insulation).
For all these potential measures, the overall costs and benefits should be considered, including any associated benefits such improvements in air quality. Potential dis-benefits, such as visual intrusion from noise barriers, should also be taken into account.

3.6: LIGHT POLLUTION

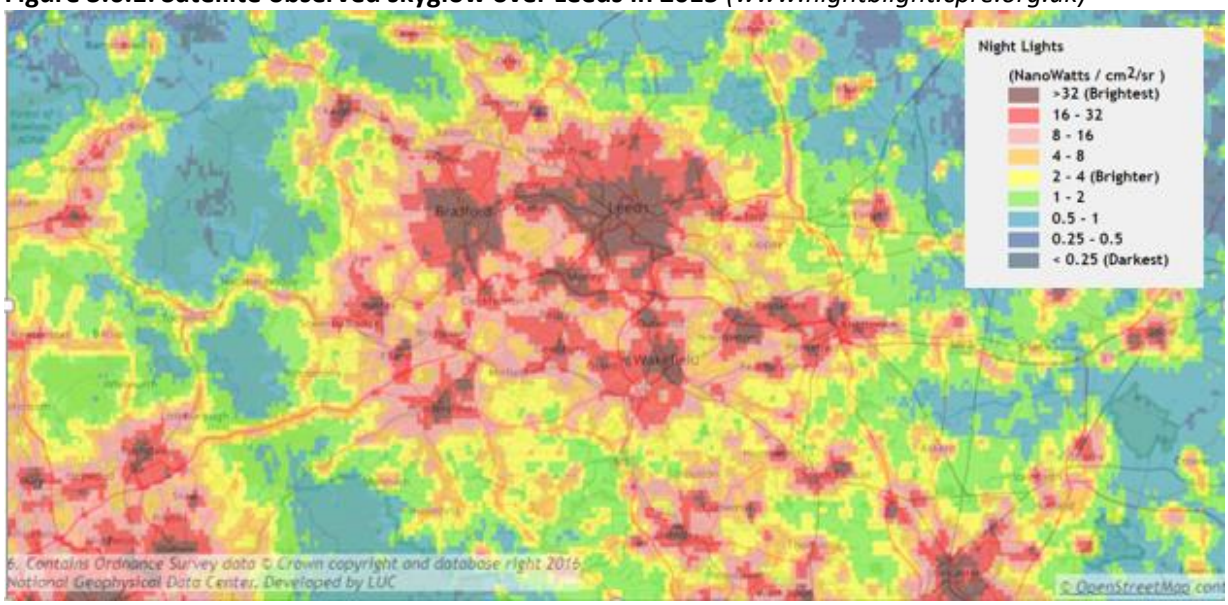
Light pollution is a generic term referring to artificial light which shines where it is neither wanted or needed. According to the CPRE's report 'Night Blight: Mapping England's light pollution and dark skies' (2016) there are 3 broad categories of light pollution:

- Skyglow – the pink or orange glow in the night sky around towns and cities, caused by the scattering of light by airborne dust and water droplets.
- Glare – the uncomfortable brightness of a light source.
- Light intrusion – light spilling beyond the boundary of the property on which a light is located, sometimes shining through windows and curtains.

All of these types of pollution can be associated with street lighting. There is also increasing awareness that light pollution can impact on wildlife by interrupting natural rhythms including migration, reproduction and feeding patterns.

In 2015 West Yorkshire was found to be the brightest county in the UK based on average light levels detected by a satellite survey reported on by the CRPE, as shown in figure 3.6.1. However, research undertaken in 2015 (Skyglow: Light Pollution and the UK's changing Skies, www.hillarys.co.uk/skyglow, 2015) found that satellite observed light pollution (skyglow) in Yorkshire had reduced by 29% between 1992 and 2012, and the research predicts light pollution would continue to reduce over the next decade, with a further decrease of 21% expected by 2025 based on trends from the previous two decades.

Figure 3.6.1: Satellite observed skyglow over Leeds in 2015 *(www.nightblight.cpre.org.uk)*



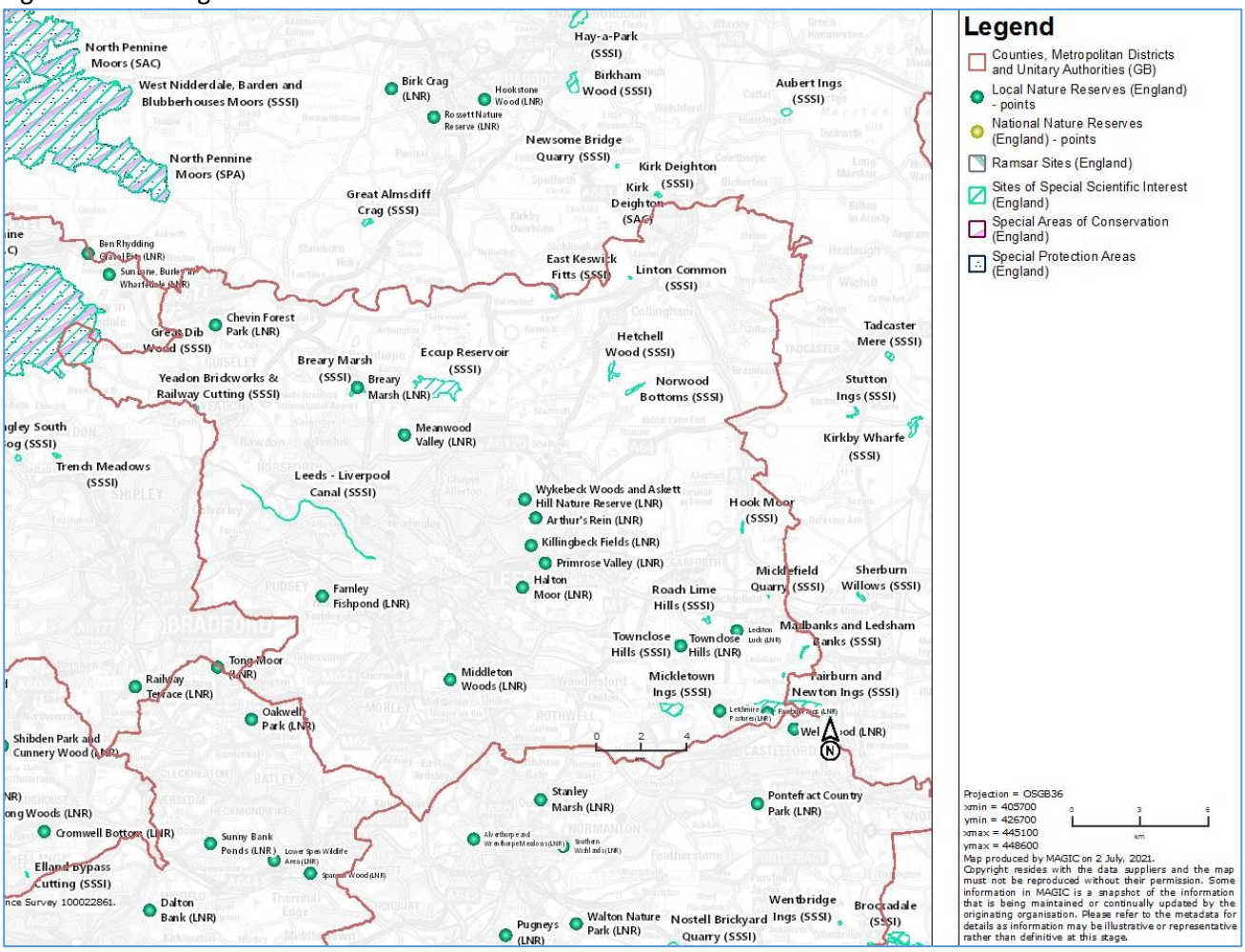
LED street lighting replacement schemes have been undertaken by a number of local authorities, and analysis of these schemes has shown a significant reduction in upward light pollution (CPRE, 2016). Further improvements are possible through dimming schemes, whereby the brightness of street lighting is reduced for periods overnight where it is less needed. In 2019 Leeds City Council embarked on a streetlight replacement scheme, whereby all 92,000 street lamps in the district will be converted to LED lighting over a four-year period.

3.7. BIODIVERSITY, FAUNA AND FLORA

Leeds has 17 nationally important Sites of Special Scientific Interest (SSSI). These are the most important sites in the District and receive statutory protection. The South Pennine Moorlands SSSI has also been designated as part of a larger site of European level of importance – South Pennine Moorlands Phase 2 Special Protection Area (SPA) and Special Area of Conservation (SAC). In addition to SSSIs there are another three local designations:

- Sites of Ecological or Geological Interest (SEGIs) – 43 sites
- Local Nature Reserves (LNRs) – 6 sites
- Leeds Nature Areas (LNAs) – 113 sites

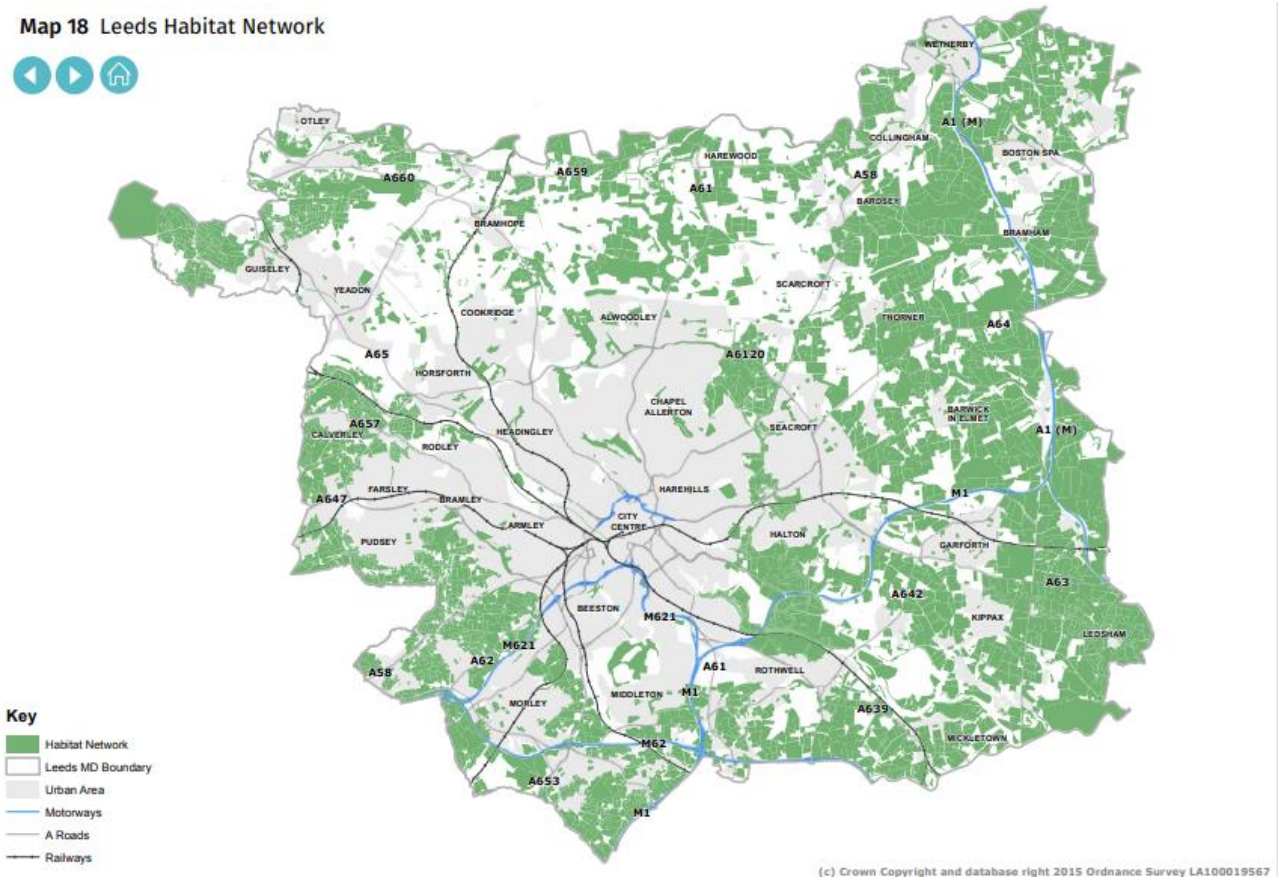
Figure 3.7.1: Designated sites for nature conservation in Leeds.



Recent condition reports for designated sites for nature conservation were not available and therefore it is not possible to day whether there are any trends for improvement or deterioration are apparent although clearly development pressures continue to apply to these sites and other non-designated areas that provide valuable wildlife habitat.

In addition to protection of rare or threatened species or habitats, networks of natural habitats provide a valuable resource. They can link sites of biodiversity importance and provide routes or stepping stones for the migration, dispersal and genetic exchange of species in the wider environment. In recognition of this a Leeds Habitat Network has been identified which combines the results of phase 1 habitat surveys carried out before 2012 and existing national and local ecological and nature conservation designations, and is shown on figure 3.7.2.

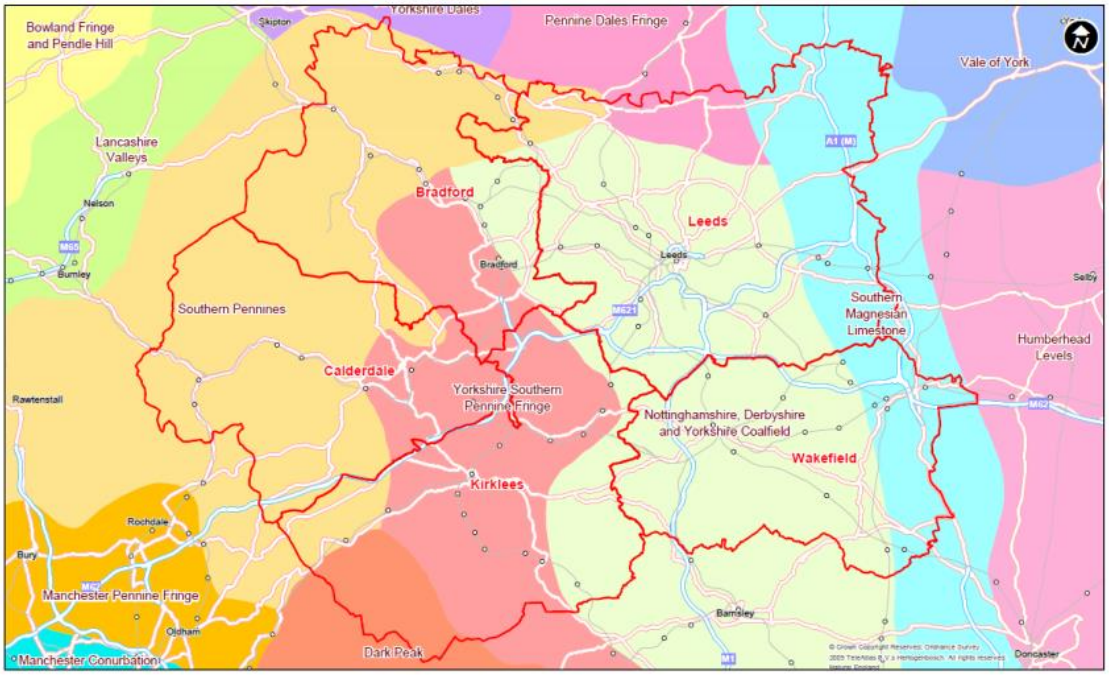
Figure 3.7.1. Leeds Habitat Network



3.8. LANDSCAPE

The landscape character of West Yorkshire, as defined using Natural England's National Character Areas, is illustrated in Figure 3.8.1 on the following page. National Character Areas divide England into 159 distinct natural areas. Each is defined by a unique combination of landscape, biodiversity, geodiversity, history, and cultural and economic activity. Their boundaries follow natural lines in the landscape rather than administrative boundaries.

Figure 3.8.1: National Character Areas in West Yorkshire



The majority of Leeds falls within the Nottinghamshire, Derbyshire and Yorkshire Coalfields character area, characterised by widespread evidence of industrial activity including mine buildings, former spoil tips, and iron and steel plants. The area has a complex mix of built-up areas, industrial land, dereliction and farmed open country. Many areas are affected by urban fringe pressures creating fragmented and downgraded landscapes, however there are substantial areas of intact agricultural land in both arable and pastoral use.

The eastern parts of Leeds is within the Southern Magnesian Limestone area. This is an elevated ridge with smoothly rolling landform, dissected by dry valleys with long views over surrounding lowland. The main non-urban land use is intensively farmed arable land, reflecting the fertility of the area, characterised by large fields bounded by low cut thorn hedges creating a generally large scale, open landscape. There are a large number of country houses and estates with parkland, estate woodlands, plantations and game coverts in this area, as well as woodlands combining with open arable land to create a wooded farmland landscape in some parts. The widespread use of creamy white Magnesian Limestone as a building material often combined with red clay pantile roofing is a unifying visual element in the area.

A smaller area to the north of the district falls within the Pennine Dales Fringe Character Area which has a varied topography of exposed upland moorland fringes and plateaux dropping to lower foothills, separated by major river valleys and incised by numerous minor tributary valleys. It is underlain by Yoredale rocks in the north (limestone, sandstone and mudstone) and Millstone Grit in the south. It is a transitional landscape between upland and lowland. Drystone walls are common in the west while hedges, often thick and tall with frequent hedgerow trees, are more prevalent at lower elevations in the

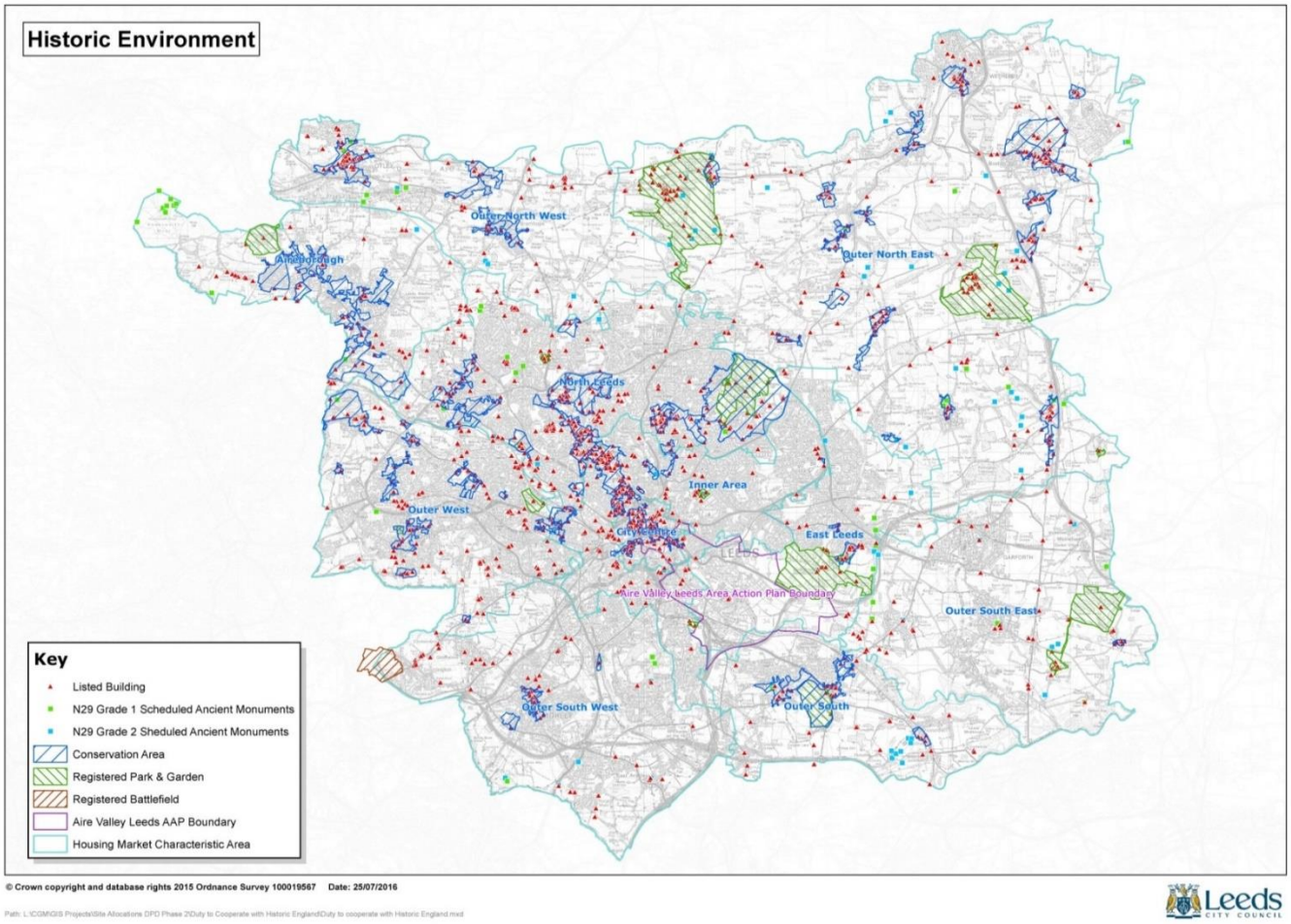
east. Broad valleys, widening to the east, with their more fertile soils support arable crops, while steeper, higher land in the west supports predominantly livestock farming.
Broadleaved woodlands (many of them of ancient origin), coniferous and mixed plantations, and numerous small woods and hedgerow trees all contribute to the well-wooded character of the area. Hamlets, villages and small market towns are particularly distinctive, with strong visual unity, being built in local Millstone Grit Group and Yoredale Group stone in the west and Magnesian Limestone in the east.

A small area in the top north west of Leeds falls within the Southern Pennines area. This area is typified by large scale sweeping landforms with an open character created by exposed gritstone moors at an altitude of 400-450m, deeply trenched by narrow valleys and wooded cloughs. There are also patches of mixed moorland and blanket bog with enclosed pasture of varying qualities at lower elevations, largely defined by drystone walls. The area is home to some valuable wildlife habitats on the open moorland and the moorland fringe including semi-natural boggy mires, acid flashes and wooded cloughs. The valley bottoms are densely populated, with stone buildings extending along valley sides, set against the backdrop of the moorland tops. The area also affords extensive views from elevated locations in all directions.

3.9. HISTORIC ENVIRONMENT

Figure 3.9.1 gives an indication of the location of Listed Buildings, Conservation Areas, Scheduled Ancient Monuments and Registered Parks and Gardens and Historic Battlefield within the Leeds district.

Figure 3.9.1: Location of historical designations in Leeds.



Conservation Areas are protected areas of special architectural or historic interest. They are designated by the council, and protect the character and appearance of a whole area, not just its buildings. There are 79 Conservation Areas in Leeds. These range from the City Centre, suburbs such as Headingley and Roundhay, and some towns and villages, including Otley, Wetherby and Pudsey.

There are 2370 Listed Buildings in Leeds. These are included in the National List of Buildings of Special Architectural or Historical Interest and are thereby given special protection. This list is continuing to grow as further buildings are identified by Historic England.

The Historic England Heritage at Risk Register now includes all designated heritage assets with the exception of Grade II Listed Buildings. For Leeds in 2017 the list includes:

- 15 buildings and structures
- 4 places of worship
- 7 Scheduled Monuments
- 2 Historic Parks and Gardens
- 5 Conservation Areas

Historic England also maintains registers of both Historic Parks and Gardens and Historic Battlefields. Leeds has 14 historic parks and gardens:

Armley House (Gotts Park) - Grade II
Beckett Street Cemetery – Grade II
Bramham Park – Grade I
Harewood House – Grade I
High Royds Hospital – Grade II
Hunslet Cemetery – Grade II
Lawnswood Cemetery – Grade II
Ledston Hall Park – Grade II*
Lotherton Hall – Grade II
Oulton Hall – Grade II
Pudsey Cemetery – Grade II*
Roundhay Park – Grade II
Temple Newsham – Grade II

and one historic battlefield at Adwalton Moor near Drighlington.

The most important archaeological sites are designated as Scheduled Monuments. Consent is required from the Secretary of State for any works to them; there are 57 such sites within the Leeds district.

The designated heritage assets represent only a small percentage of the total heritage resource of the District. There are in addition a huge number of non-designated heritage assets.

3.10 SOIL

Little data is available on the quality and protection of soils, particularly with regard to transport impacts. However a proxy indicator of soil quality is the Agricultural Land Classification (ALC) which assesses the quality of farmland based on the assessment of climate, site and soil characteristics. Figure 3.10.1 shows that the best quality agricultural land (grade 2) is found along the eastern edge of the Leeds district, this is the land which can best deliver future crops for food and non-food uses such as biomass, fibres and pharmaceuticals. The majority of the remaining agricultural land in Leeds is categorised into poorer grade soils.

Figure 3.10.1: Provisional Agricultural Land Classification
(Natural England, 2020)

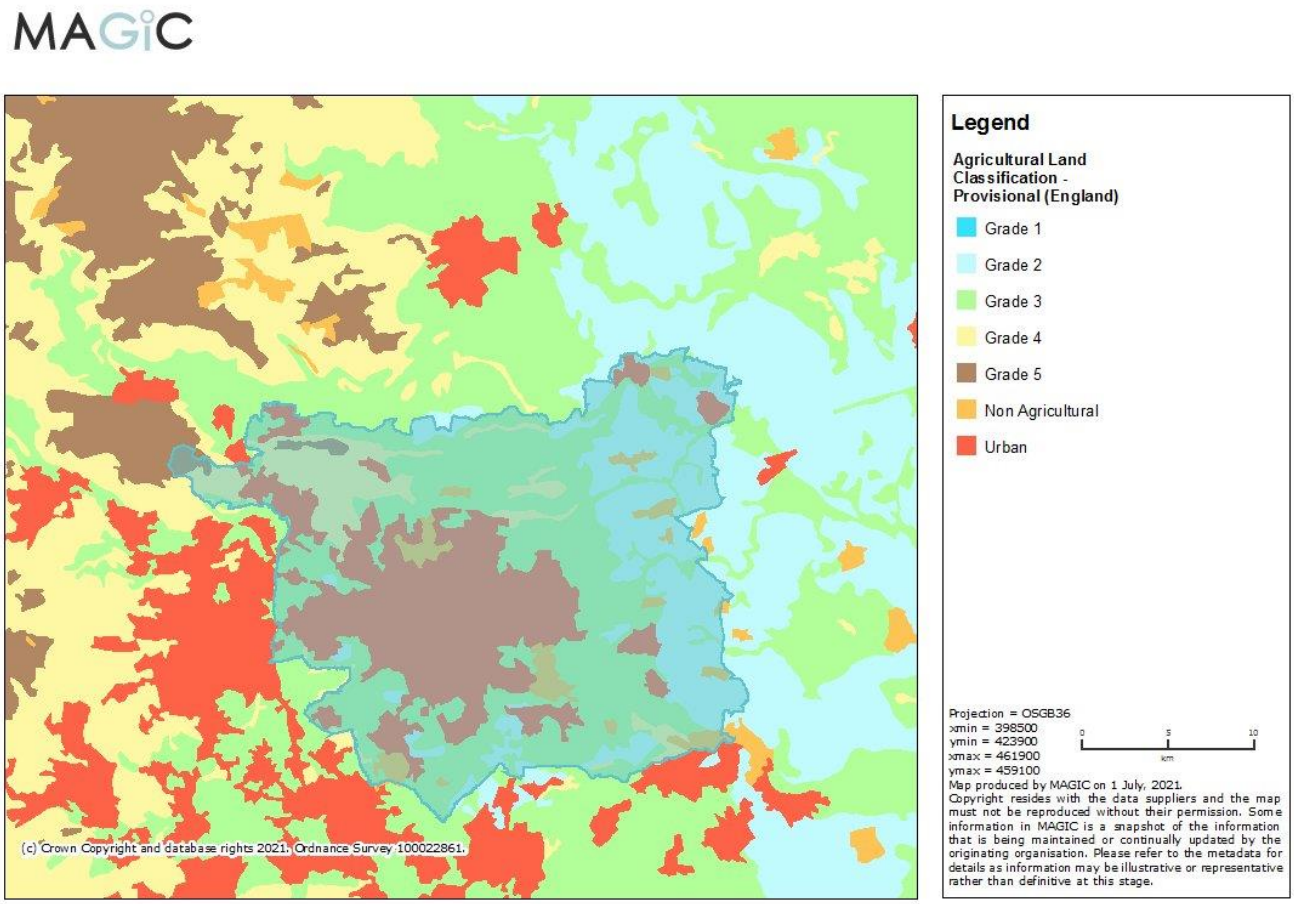
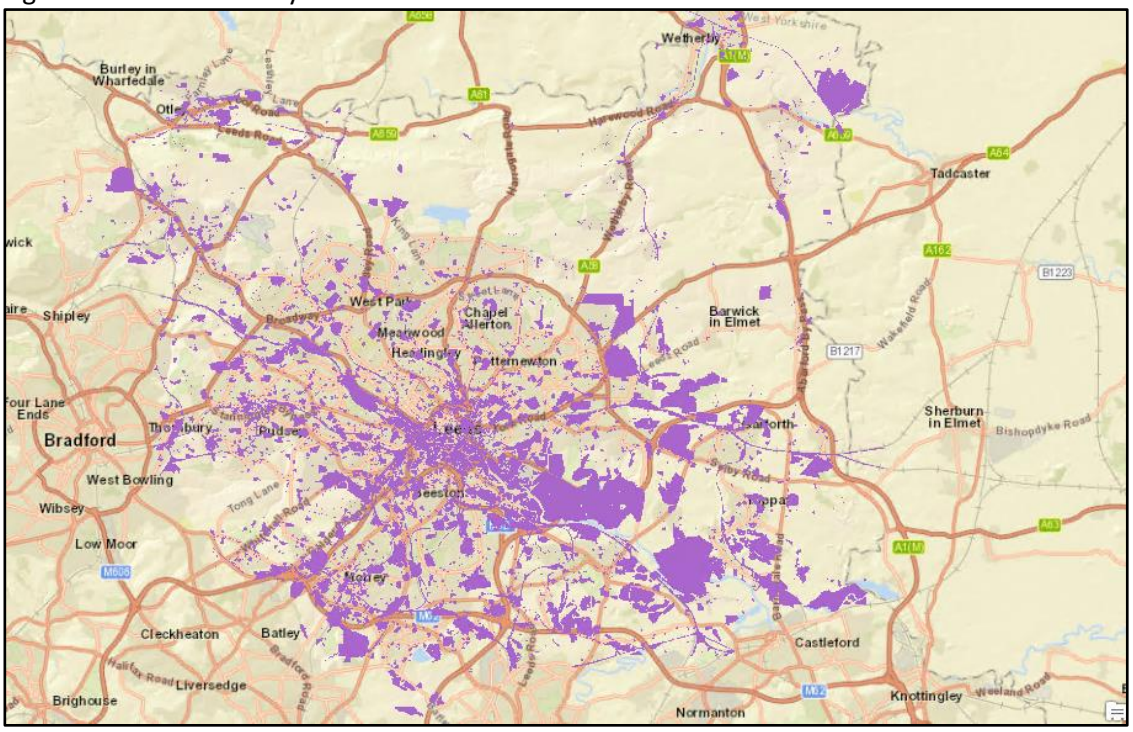


Figure 3.10.2 shows the location of potentially contaminated areas (PCA) in Leeds, which are sites identified by the Leeds Metropolitan District that have the potential to be contaminated due to their previous use. The map shows extensive areas of potentially contaminated land across the city, concentrated around the main urban area and following the course of the River Aire which is reflective of widespread historic industrial activity. Common causes of contamination include previous industrial use; use of contaminated materials as infill and; high levels of naturally occurring contamination such as radon, methane or arsenic. Contaminated land contains substances which could cause harm to people, property or protected species, or significant pollution for surface or ground waters. Where contaminated land is being developed the developer will need to arrange for the clean-up of the land either as part of the planning permission or as part of the development.

Figure 3.10.2: Potentially contaminated sites in Leeds

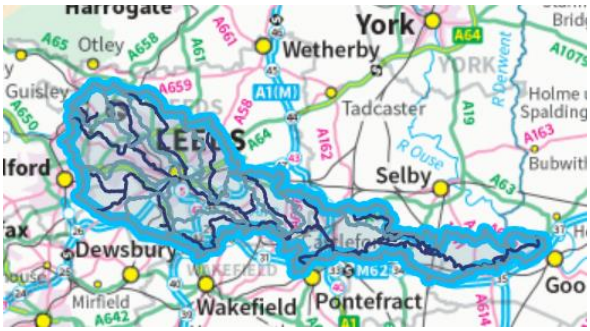


3.11. WATER

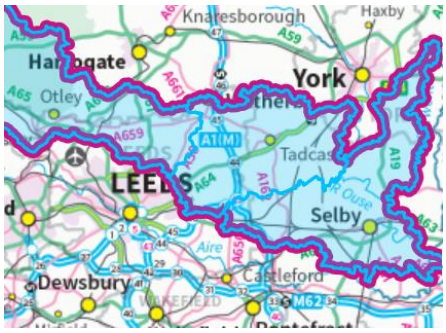
The Water Framework Directive (WFD) (2000/60/EC) introduced a comprehensive river basin management planning system to help protect and improve the ecological health of rivers, lakes, estuaries and coastal and groundwaters. River Basement Management Plans provide a long-term framework for managing the issues that affect the quality of the water environment in the river basin district. Leeds falls within the Humber River Basin Management Plan, within which water has played an important role in the growth of the cities and manufacturing industries. The main rivers in Leeds are the River Aire and the River Wharfe, and there is an extensive canal network in the Aire and Calder catchment, including the Leeds Liverpool Canal which is the longest in Britain.

There are fifteen district catchments within the Humber River Basin. The majority of Leeds falls within the Aire and Calder Catchment although a smaller area to the north of the District is within the Wharfe and Ouse Catchment (figure 3.11.1). These river catchments are further divided into operational catchments for water management purposes, in Leeds the relevant operational catchments are the Aire Lower and the Wharfe and Ouse Lower (figure 3.11.1).

Figure 3.11.1: Humber River Basin Management Plan Operational Catchments covering Leeds.
(Environment Agency, 2021)



Aire Lower operational catchment (left)



Wharf and Ouse Lower operational catchment (right)

The Water Framework Directive is underpinned by the use of environmental standards to help assess risks to the ecological quality of the water environment and to identify the scale of improvements that would be needed to bring waters under pressure back into a good condition. Figure 3.11.2 shows a summary of water body classifications for water bodies in Leeds. Initially it appears that while the ecological status of water bodies is largely stable (albeit with a decline in quality in some stretches) there has been a sudden and significant deterioration in water pollution. However Defra issued an explanation[1] that although it is correct that there has been little improvement in water quality the seemingly sudden deterioration of chemical water quality also reflects a change in the methods used to classify English water bodies to more accurately report the presence of certain chemicals. The adoption of more accurate monitoring techniques explain why the results show that no surface water bodies have met the criteria for achieving 'good chemical status' anywhere in England, and that previous data has instead overestimated the quality of water bodies.

Figure 3.11.2: Summary of Environment Agency Water Body Classifications

Water body	Ecological water quality				Chemical water quality			
	2010	2013	2016	2019	2010	2013	2016	2019
Ecup reservoir	Moderate	Moderate	Moderate	Moderate	n/a	Good	Good	Fail
Aire from Gill Beck (Baildon) to River Calder	Poor / bad	Poor / bad	Moderate	Moderate	Fail	Fail	Good	Fail
Carlton Beck from Source to River Aire	Good	Moderate	Moderate	Moderate	n/a	Good	Good	Fail
Cock Beck Catchment (trib of Wharfe)	Moderate	Poor / bad	Poor / bad	Poor / bad	n/a	Good	Good	Fail
Collingham Bk Catchment (trib of Wharfe)	Poor / bad	Poor / bad	Moderate	Moderate	n/a	Good	Good	Fail
Gill Beck Guiseley from Source to River Aire	Moderate	Moderate	Moderate	Moderate	n/a	Poor / bad	Good	Fail
Lin Dike from Source to River Aire	Moderate	Moderate	Moderate	Moderate	n/a	Poor / bad	Good	Fail
Low/Wortley/Pudsey Becks	Moderate	Moderate	Moderate	Moderate	n/a	Good	Good	Fail
Meanwood Beck from Source to River Aire	Moderate	Moderate	Moderate	Moderate	n/a	Good	Good	Fail
Milshaw Beck to Low/Wortley/Pudsey Bks	Moderate	Moderate	Moderate	Moderate	n/a	Poor / bad	Good	Fail
Oulton Beck from Source to River Aire	Moderate	Moderate	Moderate	Moderate	Good	Good	Good	Fail
Stank Beck catchment (trib of Wharfe)	Moderate	Moderate	Moderate	Moderate	n/a	Good	Good	Fail
Thorner Beck Catchment (trib of Wharfe)	Good	Good	Poor / bad	Poor / bad	n/a	Good	Good	Fail
Wyke Beck from Source to River Aire	Moderate	Poor / bad	Moderate	Moderate	Good	Poor / bad	Good	Fail

Ecological water quality		Chemical water quality
Good		Good
Moderate		
Poor / bad		Fail

[1] https://deframedia.blog.gov.uk/2020/09/18/latest-water-classifications-results-published/

Rainwater draining from roads and pavements carries many pollutants including metals, vehicle emissions, silt, grit, bacteria from animal faeces and oil. Key interventions to help address road runoff pollution include introducing new sustainable drainage systems (SuDS) and wetlands (*'Road Runoff Water Quality Study', Greater London Authority, 2019)*. Both of these use natural vegetation and can be designed to suit the needs of each location to capture and treat pollutants. SuDS capture pollutants before they enter the surface water sewer and/or river and can be located at the roadside close to the source of the pollution. Wetlands can be used to treat surface water downstream.

3.12. FLOOD RISK

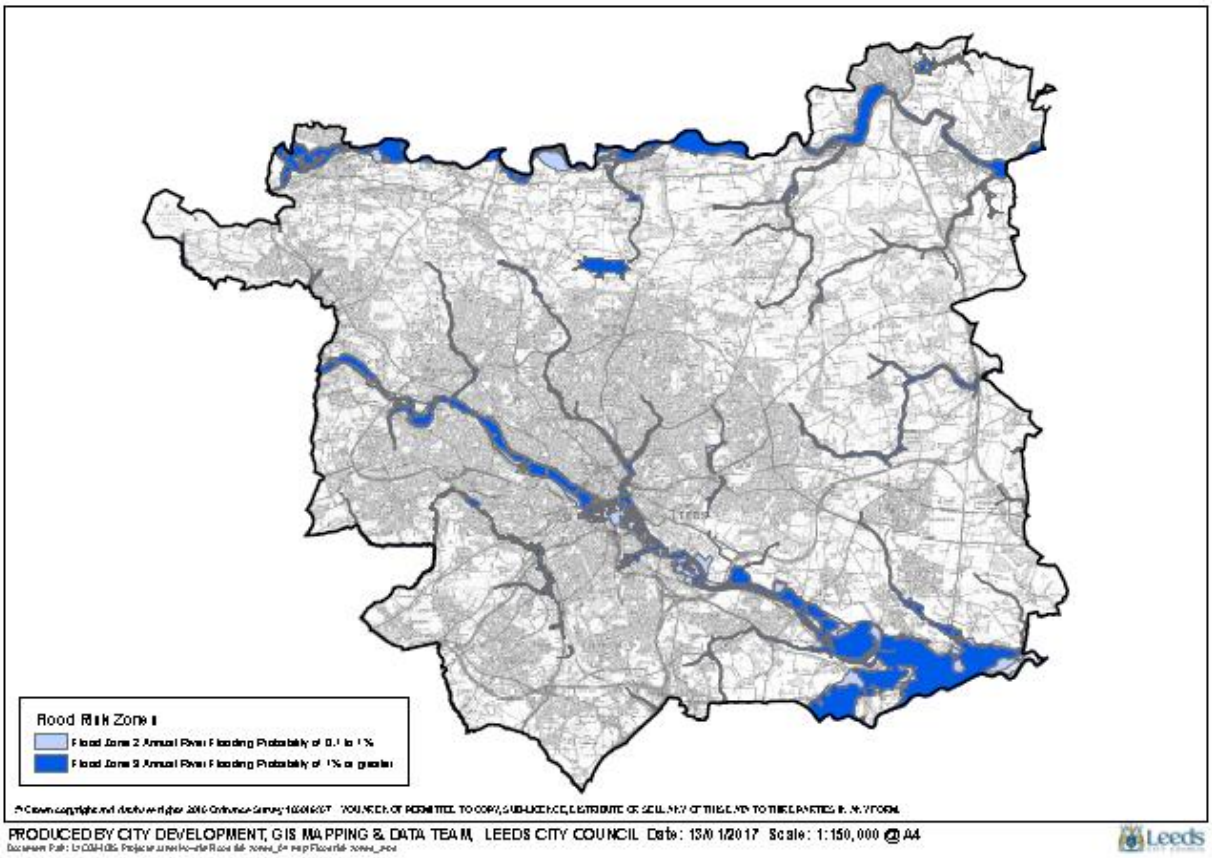
A Strategic Flood Risk Assessment (SRFA) was undertaken for Leeds in 2007 and concluded that many of the key population centres within the District are situated along watercourses, and not surprisingly a considerable proportion of the District is affected by flooding. The Environment Agency estimates that 1,500 properties and 500 businesses are at 'significant' risk of flooding (i.e. at risk of flooding with an annual probability of 1 in 75 years).

Areas liable to flood are illustrated in Figure 3.12.1 following, areas shaded in blue are at the highest risk of flooding. There are particular issues from flooding in the Aire Valley and at a number of locations along the River Wharfe which follows the northern boundary of the district. The River Aire and the River Wharfe were highlighted as susceptible to flooding, and this occasionally leads to flooding in the Kirkstall area and the A65 / A659. Parts of the rail network are also affected by flooding, including at Kirkstall.

Although there are existing flood defences in some areas, these do not fully remove the risk of flooding to all properties within the District. In many areas, the standard of protection provided by the defences is less than a 1 in 100 year flood, and there is uncertainty surrounding the structural integrity of the defences. It should also be recognised that there is a risk to properties as a result of localised flooding issues such as groundwater flooding, local catchment run off and/or overloading of the sewer system. These localised flooding issues affect many parts of the District, both within the fluvial flood plain and in areas of higher ground away from the flood plain.

Smaller watercourses and drains are far more susceptible to flash flooding than the larger river systems (i.e. the River Wharfe and River Aire), responding very rapidly to localised intense rainfall. With changing climate patterns it is expected that storms of this nature will become increasingly common.

Figure 3.12.1: Flood risk zone in Leeds.



3.13. ECONOMY

Leeds has retained its historic manufacturing strength as well as consolidating its position a major centre for finance and business services. Total employment in Leeds in 2017 was estimated at around 400,000. During the next decade, Leeds is expected to account for 32% of net additional jobs in the Yorkshire and the Humber region (44,600 out of 137,950). Between 2013 and 2023 Leeds is expected to have the second largest increase in jobs of cities in the UK, just behind Birmingham. Net employee numbers were unchanged between 2003 and 2013 despite the recession and are expected a 39,000 increase between 2013 and 2023. In terms of productivity, Leeds MD's GVA was £26.2bn in 2018, representing around 44% of West Yorkshire's and 20% of Yorkshire and the Humber's GVA.

Financial and business services account for 38% of total output. Other key sectors include retail, leisure and the visitor economy, construction, manufacturing and the creative and digital industries.

Figure 3.13.1: Key employment statistics for Leeds

Population	798,800
Aged 16-64	520,600
Economically active total	445,300
% Economically active employed	84.1%
% Economically active unemployed	4.3%
Job density	1.02

3.14. KEY HEALTH STATISTICS

Public Health England publish regular Local Authority Health Profiles to help aid decision making understanding of the health of local communities. The 2019 health profile for Leeds included the following key indicators:

Life expectancy and causes of death

Indicator	Age	Period	Count	Value (Local)	Value (Region)	Value (England)	Change from previous
1 Life expectancy at birth (male)	All ages	2016 - 18	n/a	78.3	78.7	79.6	↑
2 Life expectancy at birth (female)	All ages	2016 - 18	n/a	82.1	82.4	83.2	↑
3 Under 75 mortality rate from all causes	<75 yrs	2016 - 18	6792	380.6	363.2	330.5	↑
4 Mortality rate from all cardiovascular diseases	<75 yrs	2016 - 18	1513	86.3	82.0	71.7	↓
5 Mortality rate from cancer	<75 yrs	2016 - 18	2569	147.5	141.2	132.3	↓
6 Suicide rate	10+ yrs	2016 - 18	225	10.9	10.7	9.64	↓

Injuries and ill health

Indicator	Age	Period	Count	Value (Local)	Value (Region)	Value (England)	Change from previous
7 Killed and seriously injured (KSI) rate on England's roads	All ages	2016 - 18	992	42.1	49.1	42.6 ~	–
8 Emergency hospital admission rate for intentional self-harm	All ages	2018/19	1885	227.0	205.8	193.4	↑
9 Emergency hospital admission rate for hip fractures	65+ yrs	2018/19	680	558.9	544.5	558.4	↓
10 Percentage of cancer diagnosed at early stage	All ages	2017	1505	52.6	50.6	52.2	↓
11 Estimated diabetes diagnosis rate	17+ yrs	2018	n/a	77.2	81.9	78.0	↑
12 Estimated dementia diagnosis rate	65+ yrs	2019	6417	74.9 *	71.6 *	68.7 *	↑

Behavioural risk factors

Indicator	Age	Period	Count	Value (Local)	Value (Region)	Value (England)	Change from previous
13 Hospital admission rate for alcohol-specific conditions	<18 yrs	2016/17 - 18/19	170	34.1	32.2	31.6	↓
14 Hospital admission rate for alcohol-related conditions	All ages	2018/19	4624	649.0	729.0	663.7	↑
15 Smoking prevalence in adults	18+ yrs	2018	113023	18.2	16.7	14.4	↑
16 Percentage of physically active adults	19+ yrs	2017/18	n/a	68.2	64.0	66.3	↑
17 Percentage of adults classified as overweight or obese	18+ yrs	2017/18	n/a	61.7	64.1	62.0	↓

Child health

Indicator	Age	Period	Count	Value (Local)	Value (Region)	Value (England)	Change from previous
18 Teenage conception rate	<18 yrs	2017	314	27.3	20.6	17.8	↓
19 Percentage of smoking during pregnancy	All ages	2018/19	1125	12.3	14.4 ~	10.6	↑
20 Percentage of breastfeeding initiation	All ages	2016/17	6877	71.1	69.3	74.5	↑
21 Infant mortality rate	<1 yr	2016 - 18	119	3.95	4.03	3.93	↓
22 Year 6: Prevalence of obesity (including severe obesity)	10-11 yrs	2018/19	1807	21.0	21.0	20.2	↑

Inequalities

Indicator	Age	Period	Count	Value (Local)	Value (Region)	Value (England)	Change from previous
23 Deprivation score (IMD 2015)	All ages	2015	n/a	26.6	-	21.8	–
24 Smoking prevalence in adults in routine and manual occupations	18-64 yrs	2018	n/a	26.9	27.4	25.4	↓

Wider determinants of health

Indicator	Age	Period	Count	Value (Local)	Value (Region)	Value (England)	Change from previous
25 Percentage of children in low income families	<16 yrs	2016	29660	20.3	19.7	17.0	↑
26 Average GCSE attainment (average attainment 8 score)	15-16 yrs	2018/19	339189	46.4	45.7	46.9	↑
27 Percentage of people in employment	16-64 yrs	2018/19	391700	75.5	73.7	75.6	↓
28 Statutory homelessness rate - eligible homeless people not in priority need	Not applicable	2017/18	1202	3.60	1.04	0.79	↑
29 Violent crime - hospital admission rate for violence (including sexual violence)	All ages	2016/17 - 18/19	1600	62.6	54.3	44.9	↑

Health protection

Indicator	Age	Period	Count	Value (Local)	Value (Region)	Value (England)	Change from previous
30 Excess winter deaths index	All ages	Aug 2017 - Jul 2018	622	29.8	31.1	30.1	↑
31 New STI diagnoses rate (exc chlamydia aged <25)	15-64 yrs	2018	4266	819.5	629.1	850.6	↑
32 TB incidence rate	All ages	2016 - 18	204	8.66	6.84	9.19	↓

* rate per 100,000 population

Key

Significance compared to goal / England average:

Significantly worse	Significantly lower	↑ Increasing / Getting worse	↑ Increasing / Getting better
Not significantly different	Significantly higher	↓ Decreasing / Getting worse	↓ Decreasing / Getting better
Significantly better	Significance not tested	↑ Increasing	↓ Decreasing
		↑ Increasing (not significant)	↓ Decreasing (not significant)
		– Could not be calculated	→ No significant change

The health of people in Leeds is varied compared with the England average. Key issues highlighted in the tables above include:

- About 20.3% (29,660) children live in low income families.
- Life expectancy for both men and women is lower than the England average.
- Life expectancy is 11.5 years lower for men and 9.4 years lower for women in the most deprived areas of Leeds than in the least deprived areas.
- In Year 6, 21.0% (1,807) of children are classified as obese.
- The under 75 mortality rate from cardiovascular diseases and under 75 mortality rate from cancer are worse than the England average.

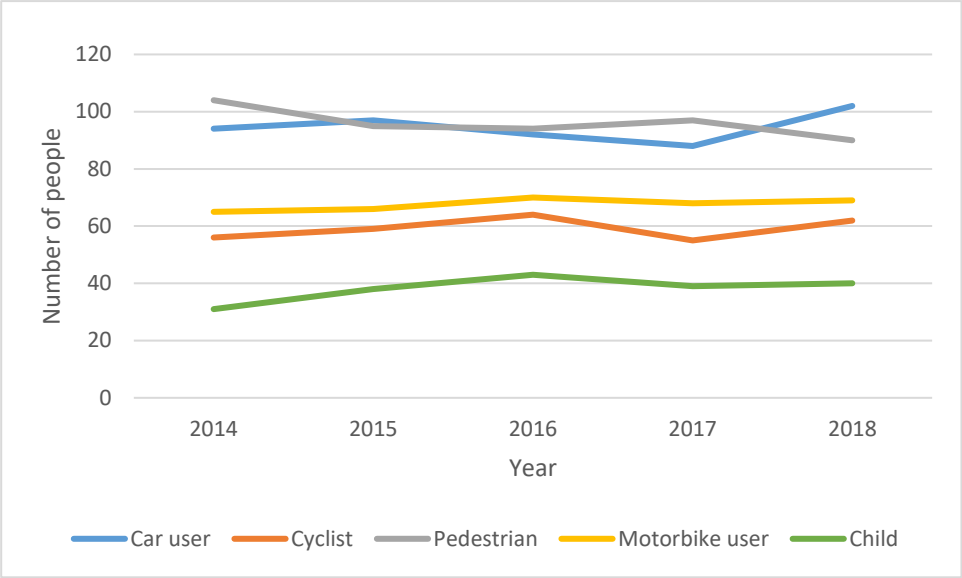
3.15. ROAD SAFETY AND ACCICENTS

The overall number of road casualties in Leeds fell for the third consecutive year for all categories of road users in 2018 (most recent data) as shown in figure 3.15.1. However the number of people killed or seriously injured rose 4% to 337, and 26 people died in road traffic collisions – a rise of 73% compared to 2017. Further analysis of those killed or seriously injured (figure 3.15.2) shows that the increase in casualties is particularly noticeable in car users and cyclists, whereas there is a sustained reduction in the number of pedestrians suffering serious injuries.

Figure 3.15.1: All road casualties in Leeds

Road user	2014	2015	2016	2017	2018
All	2,532	2,664	2,550	2,203	1,995
Car user	1,392	1,523	1,455	1,253	1,072
Cyclist	340	321	347	281	286
Pedestrian	406	385	388	321	315
Motorbike user	192	192	181	170	144
Child	253	254	299	239	217

Figure 3.15.2: Number of people killed or seriously injured on Leeds roads.



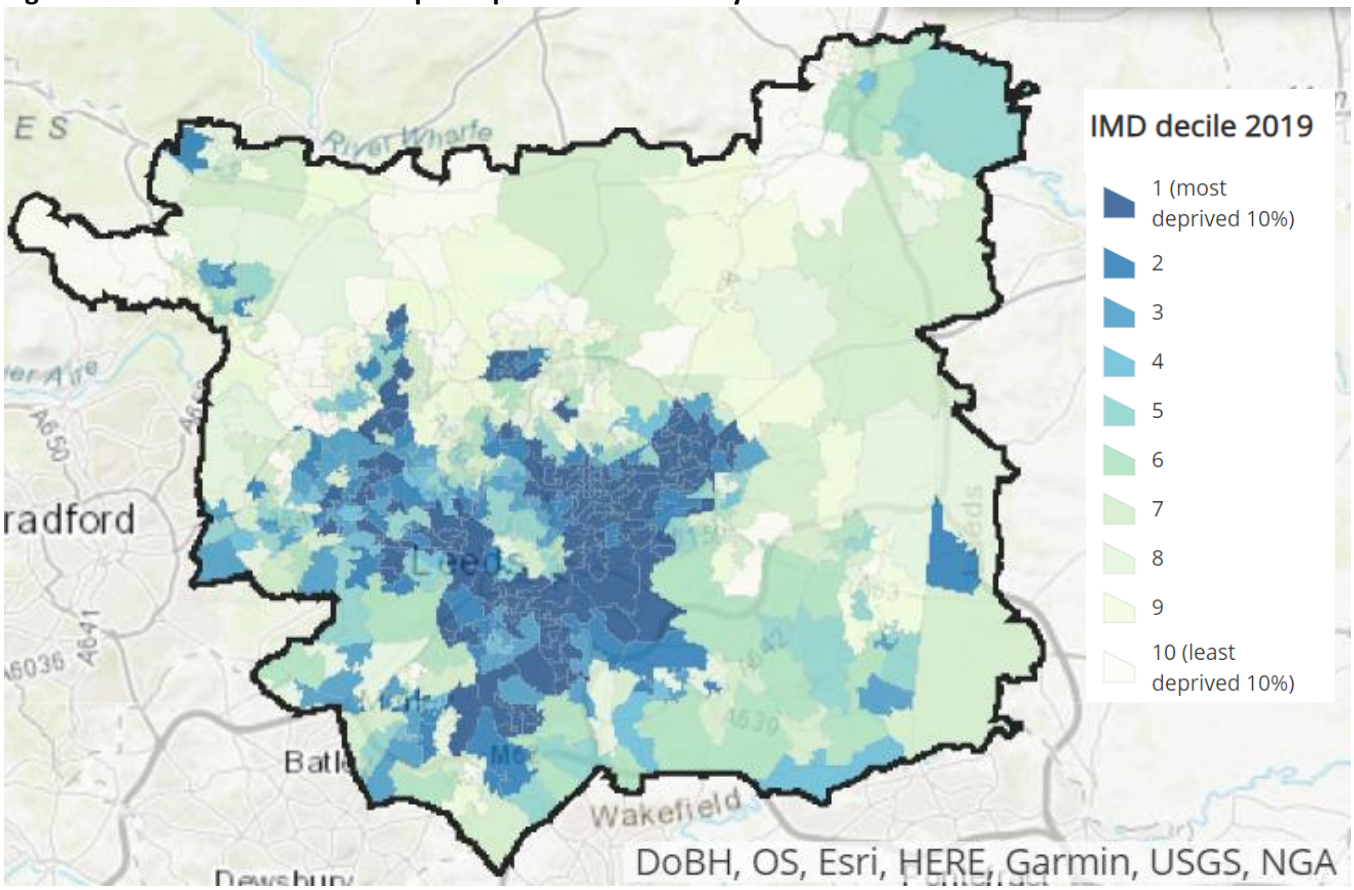
3.16. SOCIAL DEPRIVATION

The Index of Multiple Deprivation (IMD) is the official measure of relative deprivation for small areas across England. The IMD combines information about seven different types of deprivation to produce an overall relative measure of deprivation. In the IMD 2019, there are 39 datasets (indicators) organised into the seven domains of deprivation:

- Income deprivation.
- Employment deprivation.
- Education deprivation.
- Health deprivation.
- Crime deprivation.
- Barriers to housing and services deprivation.
- Living environment deprivation.

The domains are weighted, with the income and employment domains given the most weight. Figure 3.16.1 shows the 482 lower layer super output areas (LSOAs) in Leeds coloured according to their IMD decile, with dark blue showing areas in the most deprived 10% in England. LSOAs are geographic areas designed to have a consistent population size of approximately 1500 people. It's important to notice that the densely populated LSOAs near the centre of Leeds are much smaller than the rural areas on the outskirts. Altogether there are 114 LSOAs in the most deprived 10% in England - this is 24% of Leeds LSOAs. It is apparent from figure 3.16.1 that the full range of deciles are found in Leeds, highlighting the disparity in deprivation with the least deprived areas being predominantly to the north and east of the district and the most deprived areas surrounding the city centre and to the south of the district.

Figure 3.16.1: 2019 Index of Multiple Deprivation in Leeds by

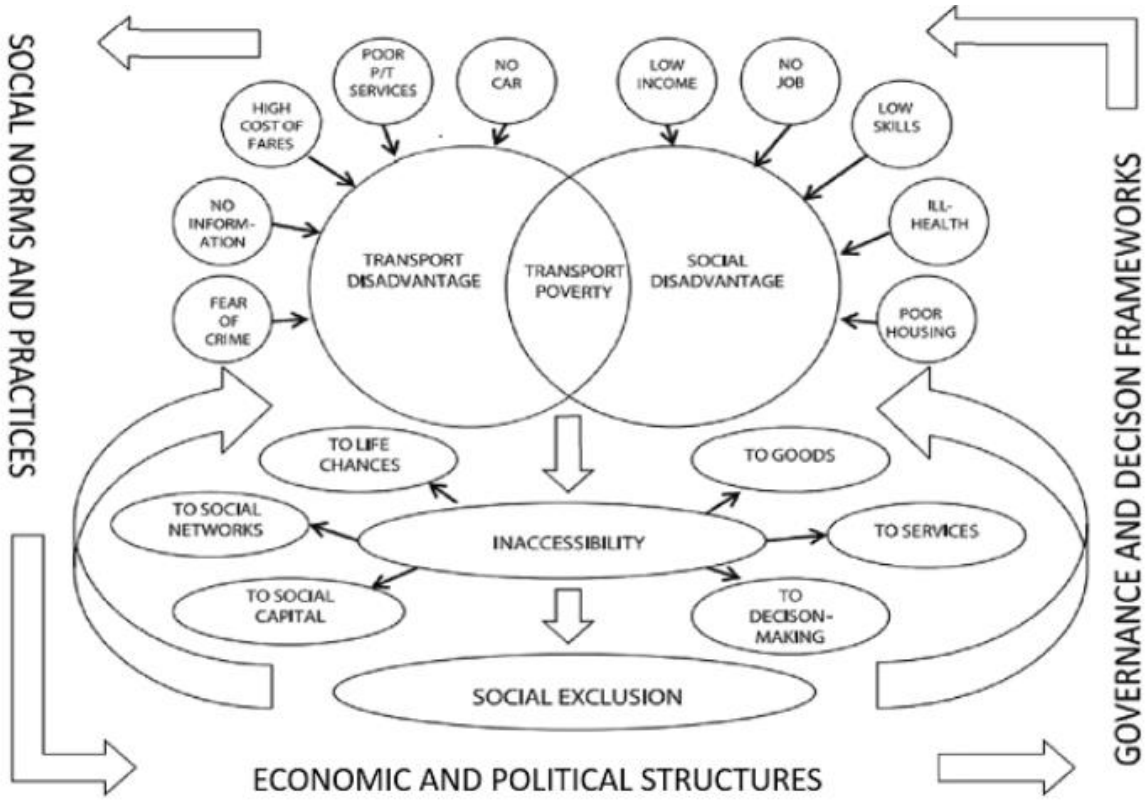


Research relating to the links between transport and health inequalities shows that:

- people without access to a car can experience health problems as a result of lack of access to essential services and amenities and increased level of social exclusion.
- disadvantaged groups are more likely to be involved in a road accident.
- deprived communities tend to experience poorer air quality as a result of transport related air pollution, and therefore they are more likely to experience the resulting health impacts;
- the pedestrian death rate for children from families in social class V is higher than for children of social class I.
- speeding is more common in less affluent areas.

Figure 3.16.2 shows the links between transport and social disadvantage, and how they can combine to result in social exclusions for some.

Figure 3.16.2: The relationship between transport disadvantage, social disadvantage and social exclusion
(Taken from 'Transport and inequality: An evidence review for the Department for Transport', NatCen Social Research, 2019).



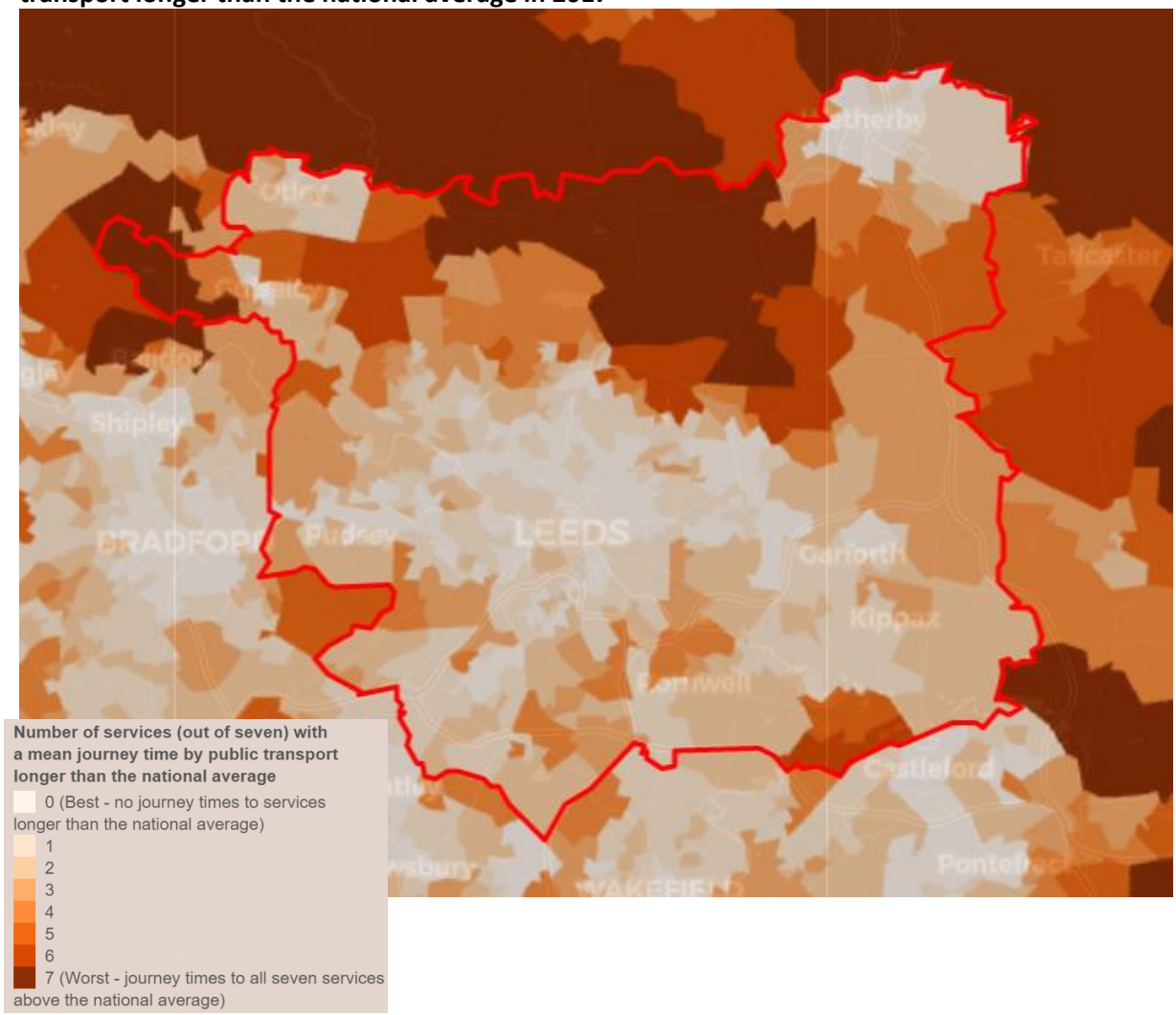
3.17. PUBLIC TRANSPORT ACCESSIBILITY TO KEY SERVICES

The National Audit Office have developed a journey time model (*'Transport accessibility to local services: a journey time tool', National Audit Office, 2020)* that analyses journey time via the public transport system to the following 7 service locations:

- State-funded primary schools
- State-funded secondary schools
- Further education establishments
- Acute hospital trusts
- GP surgeries
- Large employment centres
- Town centres

Figure 3.17.1 shows the number of services in each lower super output area with a mean journey time by public transport longer than the national average in 2017. From this we can see that public transport provision to key services is very good for much of the Leeds district, particularly in urban areas in the central and southern parts of Leeds and along routes linking Leeds to Bradford, Huddersfield and Wakefield. Public transport provision to key services across large parts of northern Leeds are much worse however, and we can see that in areas surrounding Bramhope, Arthington, Harewood and Collingham journey times to all 7 key services is worse than the national average.

Figure 3.17.1: The number of services (out of seven) in each area with a mean journey time by public transport longer than the national average in 2017



APPENDIX 4: DESCRIPTION OF ALTERNATIVE STRATEGY OPTIONS

Scenario 1: Do Minimum – Don't deliver Leeds specific strategy or action plan	**Scenario 2: Produce Connecting Leeds Transport Strategy + action plan**	**Scenario 3: Produce Leeds Action plan without strategy**
Continued investment and prioritisation against the three Local Transport Plan priorities as follows; • Economy • Low Carbon • Quality of Life As a 'do-minimum' this would be continued through the life of the Transport Strategy. *Scenario Components:* • Transport Hubs Programme • Park and Ride Sites • Improvement to Bus Stations • New Rail Stations • Local road improvements and traffic management • Bus Shelter Programme • Transport Hubs Programme • Rail Station Redevelopment • Cycle City Ambition Grant 1 and 2 schemes (CCAG1 £30m, CCAG2 £22m). - • Safer Roads Programme (c. £4.4m p/annum) • Customer Information Screens (£1m) –. • Network Management (c. £2.5m p/annum) – • Yorcard (c.£1m p/annum) – • Wifi on Trains (£750k) • Rail Station Accessibility Improvements (£250k) • Access Bus (£1.2m) • Asset Management Efficiency (c. £30m p/annum) • Green Bus Fleet Conversion (£tbc • ULEV technology (£250k/annum)	Develop Connecting Leeds Transport Strategy with specific focus on Leeds City Council pillars of • Tackling the Climate Emergency • Delivering Inclusive Growth • Improving Health and Wellbeing Scenario Components: **All of Do minimum (LTP + Transport Fund**) Plus: Produce Leeds specific transport strategy which aligns with WY Transport Policy but also meet Leeds specific targets. Specific targets include: • Doubling bus patronage • 2030 – Net-zero carbon target • 30% reduction in modal share of private vehicles and 30% in distances travelled by car. Schemes to be delivered through new funding pots including but limited too Transforming Cities fund, Levelling up Fund and Town deals. Specific focus on measures to reduce car convenience prioritising active travel. An action to better integrate land use planning and transport policies, leading to higher density	Develop action plan to implement West Yorkshire Transport Strategy within Leeds. *This includes* **Do Minimum scenario** Plus: Development of an action plan to deliver WYTS targets. Leeds based action plan based upon principles of West Yorkshire Transport Strategy. Focusing on the delivery of schemes solely align to West Yorkshire targets and priorities.

Supporting SEP economic growth through local growth deal 2 and continuation of Transport Fund schemes for targeted congestion reduction through road and rail based capacity improvement. West Yorkshire Transport Fund Plus • WYTF Corridor Schemes • WYTF Orbital Road Schemes • WYTF Key Development Areas Schemes Continued reliance on interim Transport Strategy detailing measures to be promoted through the Leeds Public Transport Investment Programme.	development and transit orientated development. Specific policy and actions to de-carbonise transport, reducing the need to travel, re-moding how we travel and encouraging the uptake of electric vehicles. Development of action plan alongside strategy detailing measures to be undertaken.	