

## West Yorkshire Connectivity Plan

Five Towns to Leeds: Case for Change

November 2020

Mott MacDonald  
Floor 3  
1 Whitehall Riverside  
Leeds LS1 4BN  
United Kingdom

T +44 (0)113 394 6700  
F +44 (0)113 394 6701  
mottmac.com

# West Yorkshire Connectivity Plan

Five Towns to Leeds: Case for Change

November 2020

## Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Document reference: 401619 | 02 | K

Information class: Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.



# 1 Introduction

## 1.1 The role of this Case for Change

This Case for Change report for Five Towns to Leeds provides an important first step, and part of the evidence, for identifying a connectivity pipeline of future transport investments for this part of the region.

This report provides analysis of transport and socio-economic data, to identify an initial long list of potential transport investments aimed at improving connectivity. The approach takes the view that transport should not be a barrier to people accessing jobs, to businesses choosing to invest here and to improving the health of our residents and visitors. Improvements in transport should be a catalyst for change across all these objectives.

This report's outputs will be integrated with other Case for Change reports, and other workstreams, including proposals to decarbonise transport, Urban Mass Transit market testing, Bus Network Reviews, a Rail Capacity Study, Local Cycling and Walking Infrastructure Plans and a Future Mobility Strategy, to produce a connectivity plan and long term investment programme for the whole of West Yorkshire, to the 2040's.

## 1.2 Background to the report

The West Yorkshire Combined Authority has adopted a Transport Strategy to 2040. The strategy was a collaboration between the Combined Authority and the West Yorkshire partner councils of Bradford, Calderdale, Kirklees, Leeds and Wakefield and covers the geography of West Yorkshire but recognises the importance of the wider Leeds City Region, and that people and goods travel longer distances across administrative boundaries. The strategy provides a framework of high-level transport policies aimed at delivering a world-class, modern, integrated transport system, that will play a key role in transforming the region's economy and delivering inclusive, sustainable growth.

A daughter document, the Leeds City Region HS2 Growth Strategy, set out the strategic case for change for building on the once-in-a-generation opportunity provided by the arrival of High Speed 2 (HS2) and Northern Powerhouse Rail (NPR) in the region, to transform the City Region's economy. The benefits of HS2 and NPR alone cannot however drive inclusive growth; a range of factors are essential to create more and better jobs, with a highly skilled workforce to sustain them - and a lack of transport capacity and infrastructure at the City Region and local level will inhibit growth. The HS2 Growth Strategy identified corridors and communities which are in economic need of improved connectivity.

Significant investments in transport are planned through the West Yorkshire Transport Fund, Connecting Leeds and Transforming Cities Fund programmes, and by the rail industry, which will provide the early years of the connectivity pipeline. However, there remains insufficient capacity and resilience in our transport system, particularly to key employment centres, which will constrain business and labour market catchments, and the ability to train and develop the next generation, by restricting access to colleges and universities. The National Infrastructure Commission identified that this is affecting many places across the North of England and will increasingly inhibit economic development and living standards.

An important next step is to support the delivery of our strategies is to develop a plan and pipeline of longer-term investments, which address a full range of strategic and local connectivity needs.

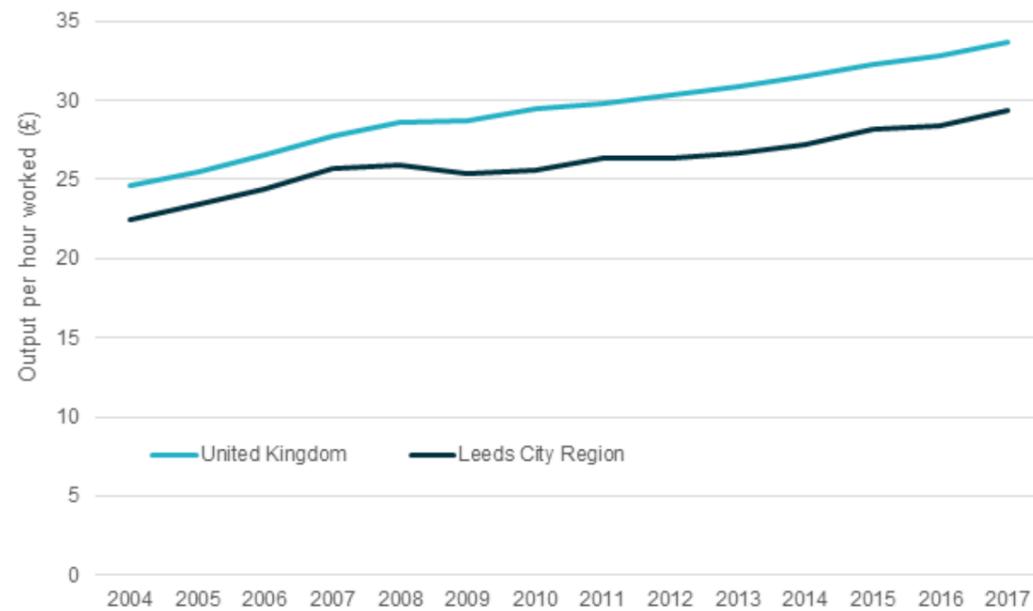
Ten Case for Change reports have been produced with the input of the partner councils which address corridors covering the geography of West Yorkshire and including parts of the wider City Region, to provide detailed evidence of connectivity needs. These Case for Change reports should be read in conjunction with the Connectivity Plan Appraisal Handbook for further detail on background and methodology.



### 1.3 West Yorkshire's priorities for growth

The emerging Industrial Strategy for West Yorkshire highlights a significant and widening productivity and innovation deficit, as shown in Figure 1. Living standards across the City Region have stalled with several communities facing persistent poverty.

**Figure 1: Illustration of productivity gap in West Yorkshire**



Source: Office for National Statistics, 2019

The West Yorkshire Transport Strategy recognises that our transport network currently constrains opportunities for growth and is a key factor in shaping experiences of poverty. Our network does not sufficiently support sustainable travel as the obvious choice for many. In the wake of the declaration of a “climate emergency” by all West Yorkshire districts, there is a growing need to de-carbonise our transport network; as the transport sector contributes 41% of Leeds’s and 37% of Wakefield’s total CO<sub>2</sub> emissions<sup>1</sup>. This needs immediate action as transport emissions are expected to grow, constraining West Yorkshire’s ability to meet overall emissions targets.

We have four priorities for the region aimed at addressing our key challenges. These are summarised in Table 1.

**Table 1: West Yorkshire’s four priorities for growth**



**Enabling Inclusive Growth** – Ensuring that economic growth leads to opportunities for all who live and work in the region



**Boosting Productivity** – Helping businesses grow and bringing new investment into the region to drive economic growth and create jobs



**Tackling the Climate Emergency** - Growing our regional economy whilst cutting carbon dioxide emissions



**Delivering 21<sup>st</sup> Century Transport** - Creating efficient transport infrastructure that makes it easier to get to work, do business and connect with each other

Source: West Yorkshire Combined Authority

<sup>1</sup> UK local authority and regional carbon dioxide emissions national statistics: 2005-2016

### 1.4 Defining the scope and study area

This section explains the process undertaken to define the corridor from the original scope to an economic area in which to focus the evidence base, develop key connectivity concepts and interventions.

The Leeds City Region HS2 Growth Strategy identified a network of communities and corridors that would benefit from inclusive growth. Table 2 shows a list of the corridors and the corresponding reports with their approximate extents illustrated in Figure 2. All the Case for Change corridors are shown in Figure 3 with the Five Towns to Leeds corridor highlighted in red.

**Table 2: Reporting index**

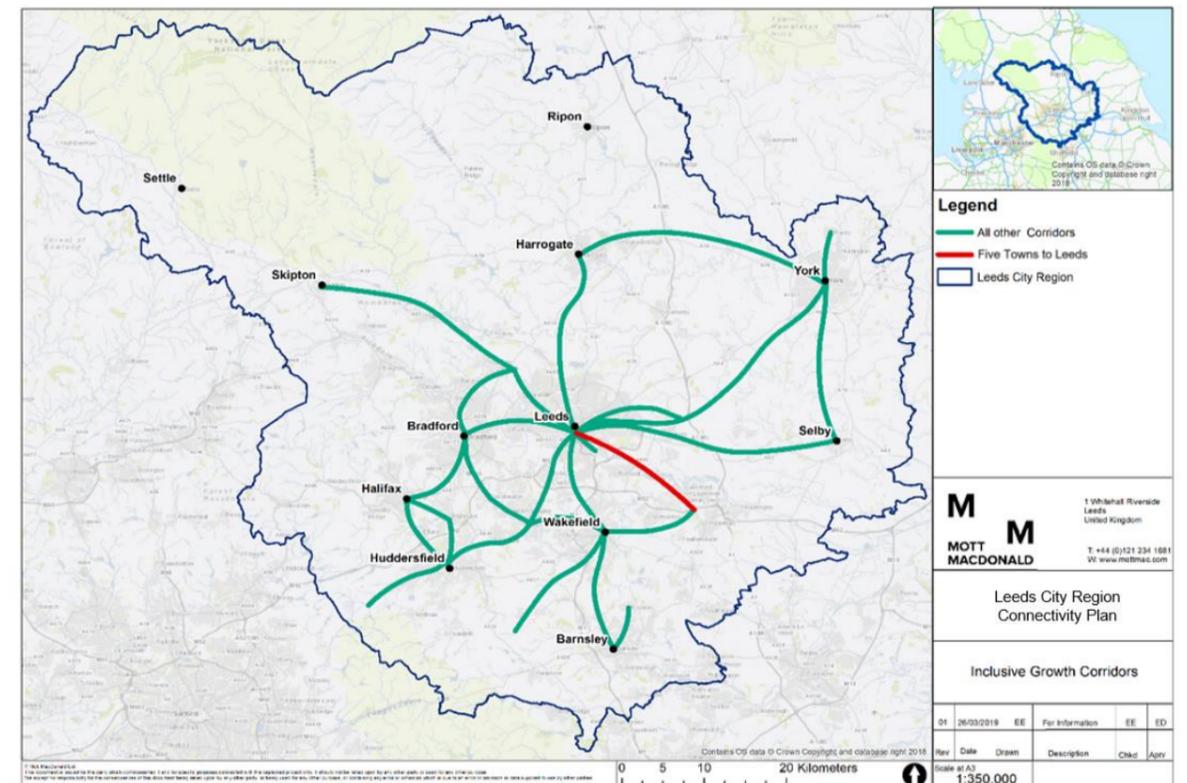
Ref.	Report Name	Original corridor name
1		Strengthening high value assets in the North West of Leeds, the University of Leeds, Kirkstall Forge and the airport
1	Airport, Airedale and Wharfedale: Case for Change	Skipton to Leeds
1		Stimulating development from the city centre into North Bradford towards Shipley, Saltaire and the airport
2	Calder Valley and Bradford: Case for Change	The Calder Valley and Bradford
3	West Kirklees to Calderdale: Case for Change	Huddersfield to Brighouse
3		South West Kirklees (including Slaithwaite) to Brighouse
3		Huddersfield – Halifax
3		Halifax to Brighouse
4	Leeds – Bradford: Case for Change	Leeds Bradford cross connectivity
4		South Bradford and North Kirklees – Bradford
5	Leeds – Huddersfield: Case for Change	Dewsbury / Huddersfield to the HS2 Hub
6	East Kirklees to Wakefield: Case for Change	Dewsbury to Wakefield
6		East Kirklees (including Denby Dale) to Wakefield
6		Five Towns to Wakefield
7	South and East Leeds: Case for Change	Extending the South Bank opportunity to the south of Leeds
7		Accelerating inclusive growth in the East of Leeds towards St James' Hospital and the East Leeds extension
8	North Yorkshire to Leeds: Case for Change	Harrogate to the HS2 Hub
8		York to Leeds
8		Se by to the HS2 Hub
9	Five Towns to Leeds: Case for Change	Five Towns to Leeds
10	Barnsley and Wakefield to Leeds: Case for Change	Barnsley and Wakefield to Leeds
10		North Barnsley to Barnsley

Source: Mott MacDonald

**Figure 3: West Yorkshire Connectivity Plan: Reporting Map**



**Figure 2: West Yorkshire Connectivity Plan: Corridor Map**



The corridor is predominantly urban, comprising the Five Towns of Castleford, Pontefract, Knottingley, Featherstone and Normanton, and communities that lie between Leeds and the Five Towns, including Methley, Woodlesford, Rothwell and Hunslet. Whilst Wakefield City is an important destination for this corridor, it comes under further study in other Case for Change reports. The defined economic area is shown in the next chapter.

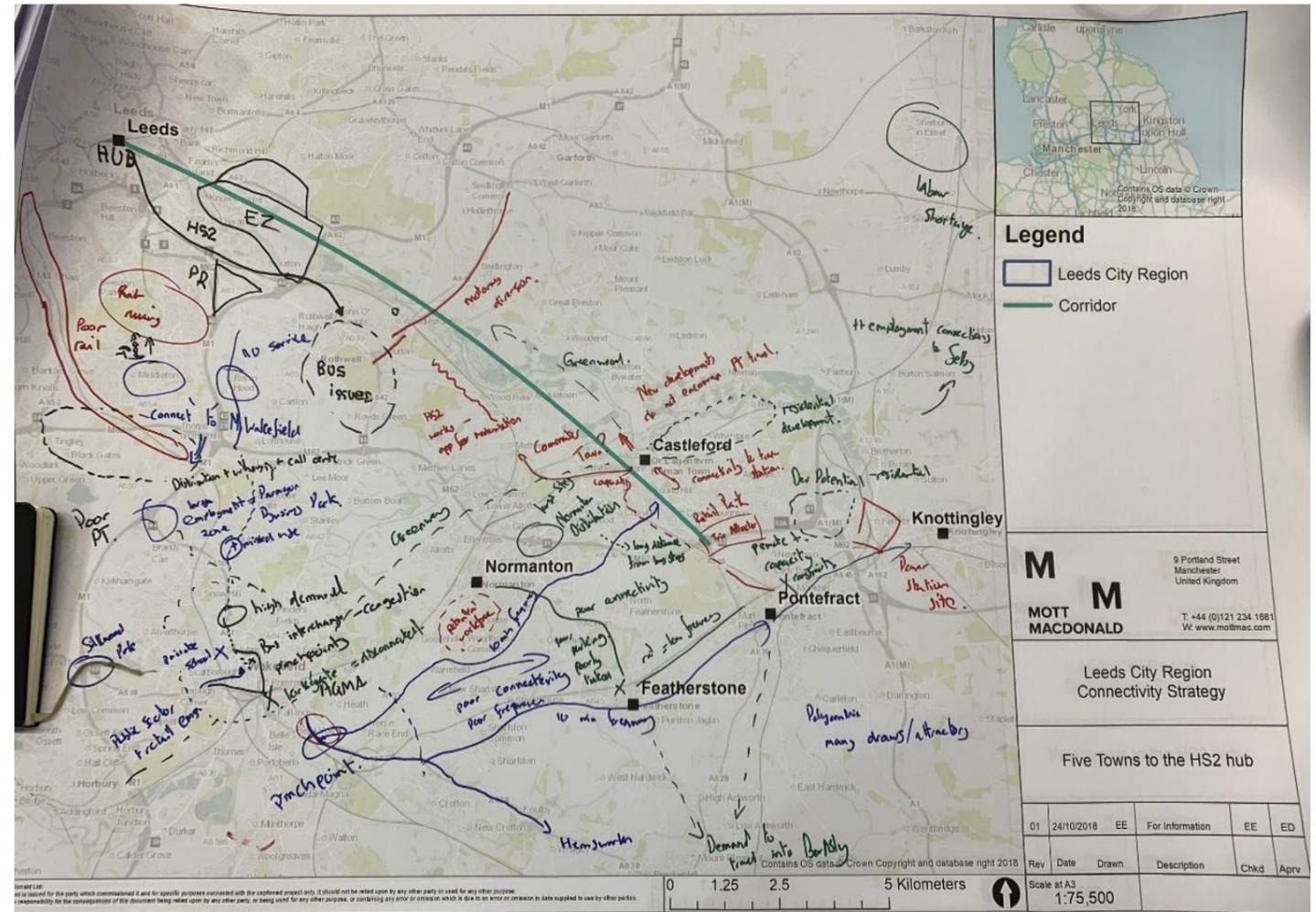
The study area has been defined in consultation with officer representatives from Leeds, Wakefield and Selby districts (these will now be referred to as the partners). An initial workshop helped to identify and confirm the key “problems and opportunities” for the study area. An example of the outputs from this is shown in Figure 4.

The findings were then used to define both the extent of the corridor or economic area, the main elements of the accompanying “story map” (which summarises the key issues and opportunities in the spatial context, and sits behind the Case for Change as the data repository and analysis tool) and to develop a set of corridor-specific aspirations.

### 1.5 Five Towns to Leeds: at a glance

The following two pages provide some highlights for this study area – these cover the key socio-economic features of the geography as well as the connectivity challenges it faces and conclude with prioritised investment proposals to meet these challenges. The 2-page summary is designed as a double sided “lift out” of the key issues and conclusions. Further detail to underpin these summary points is provided in subsequent Chapters.

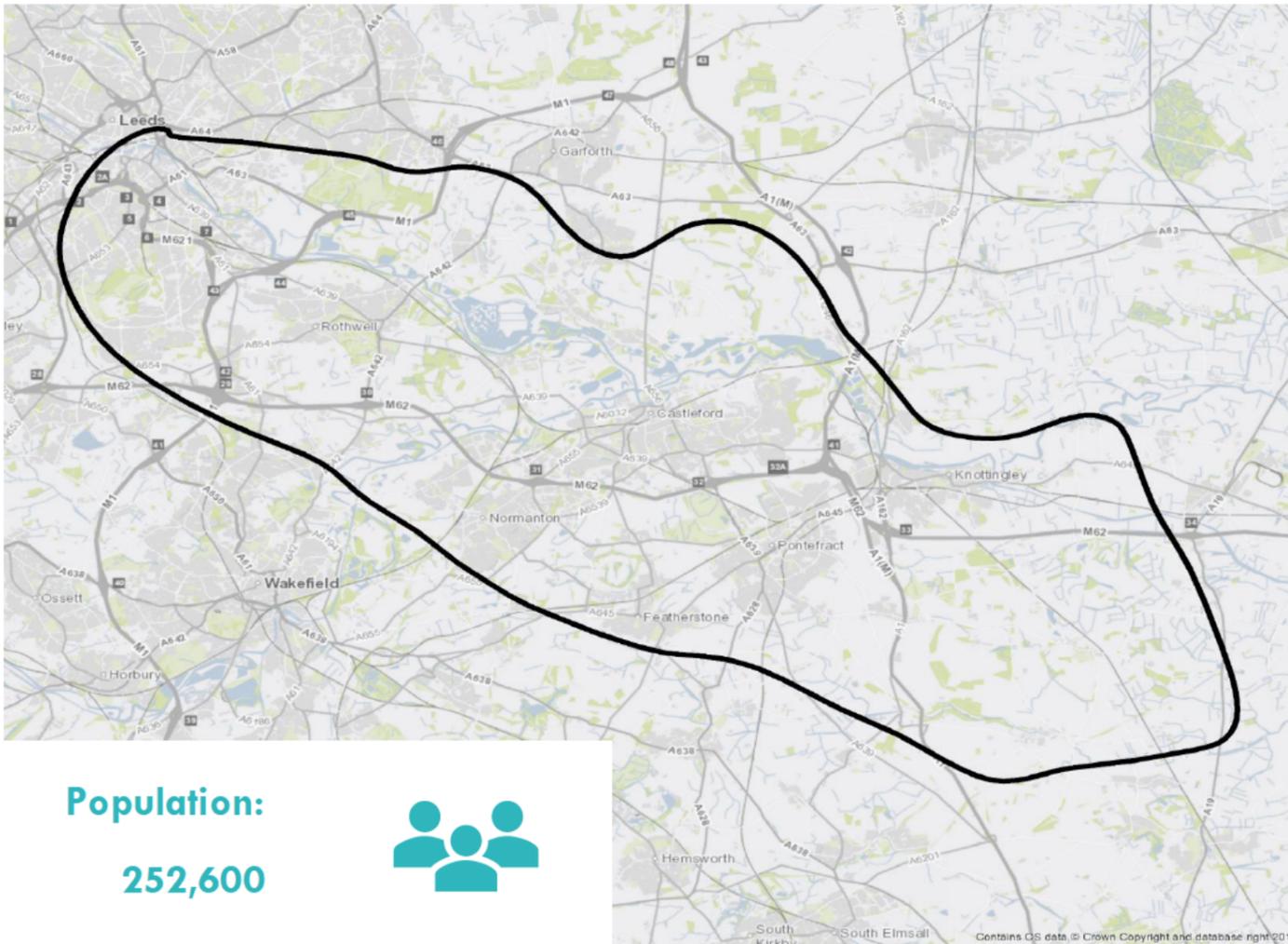
Figure 4: Example of issues identification and corridor definition from stakeholder workshop



Source: Mott MacDonald

# Five Towns to Leeds: socio-economic profile

This corridor covers the predominantly urban area between Leeds and the Five Towns which comprise Castleford, Pontefract, Featherstone, Normanton and Knottingley. Average household income in the corridor is lower than both national and regional averages and the number of people in employment is just below national average. There are a high number of new housing and employment growth sites throughout the corridor and connectivity to these future sites is fundamental to enable inclusive growth throughout the Leeds City Region.



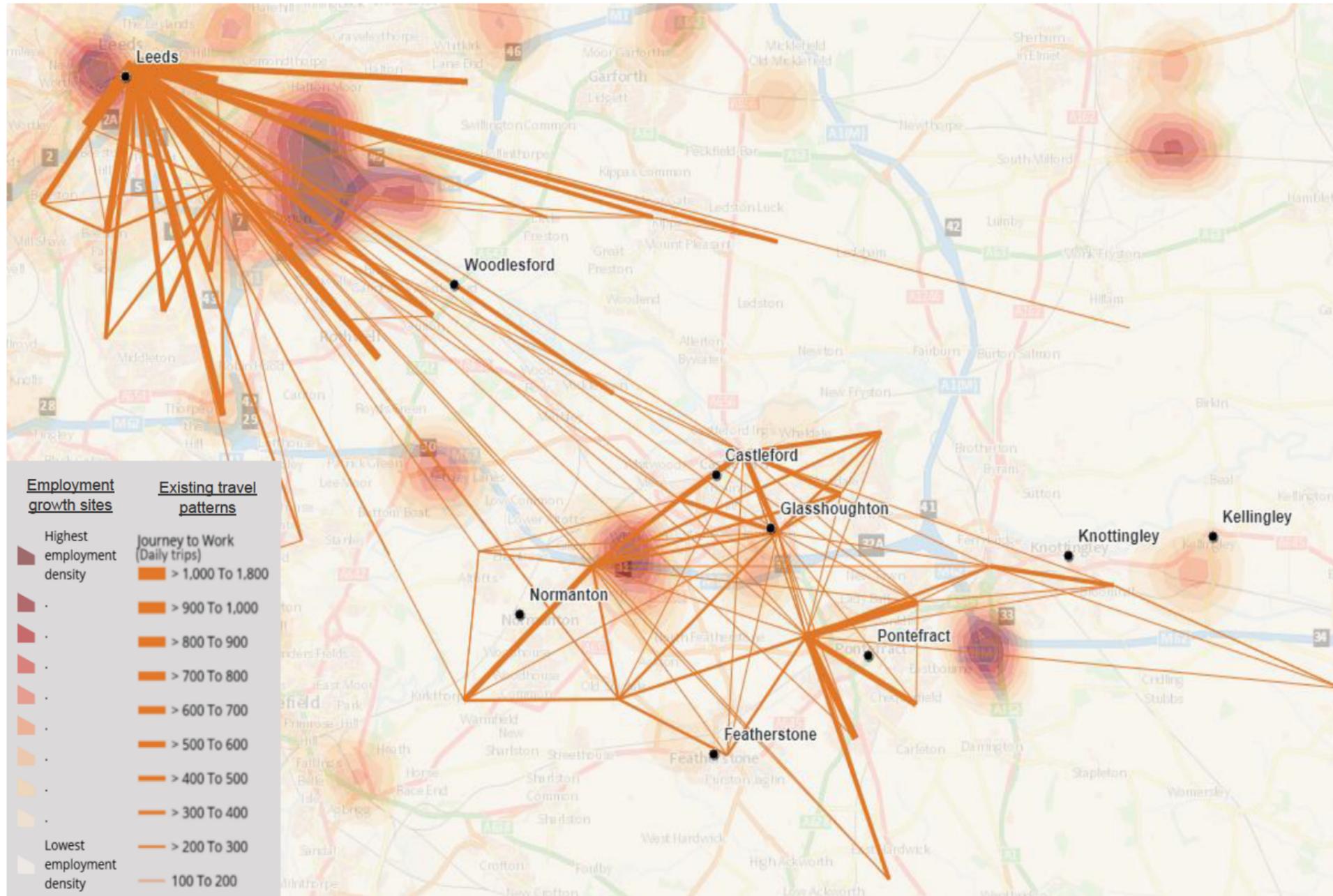
**Places with challenges for:**



**Places with opportunities for:**



## Five Towns to Leeds – connectivity highlights



### Key connectivity challenges:

- Existing employment opportunities adjacent to the M62 are poorly served by public transport and have working or shift patterns that fall outside traditional public transport operating hours. Overcoming this would help to **boost productivity**
- There is a skills gap. Pontefract, Middleton and Stourton are in the top 10% most deprived areas for education in England. Improving connectivity to education opportunities will ultimately help people to find better employment, helping to ensure **inclusive growth**
- Several rail stations are in remote locations away from centres of population and employment, and coupled with poor bus service provision even in the peak hours, this restricts the achievement of a **21<sup>st</sup> century transport system**
- High levels of peak-time traffic and associated congestion on routes including the M621, M62, A655 and A645 must be addressed to **tackle the climate emergency**

Investment is required in improved connectivity, both for local trips within and between the Five Towns and to opportunities in Leeds and the Aire Valley. Schemes that will best address these connectivity challenges will be taken forward into a West Yorkshire pipeline of interventions to deliver inclusive and clean growth.

## 2 Spatial context

This chapter sets out the key spatial challenges for each of our four regional priorities in the corridor. It presents the key outputs from the “story map” for this corridor; this is a web-based Geographical Information System (GIS) data repository and analysis tool, which summarises the key issues and opportunities in the spatial context and sits behind the Case for Change. The story map was developed from a wide range of spatial datasets and the resulting narrative was shared with and shaped by feedback from key stakeholders on top issues, opportunities and local priorities. These are presented alongside the major priorities for the City Region.

Please refer to Chapter 6 of the Appraisal Handbook for a summary of the datasets which form part of the evidence base for the “story map” that supports the development of the Case for Change.

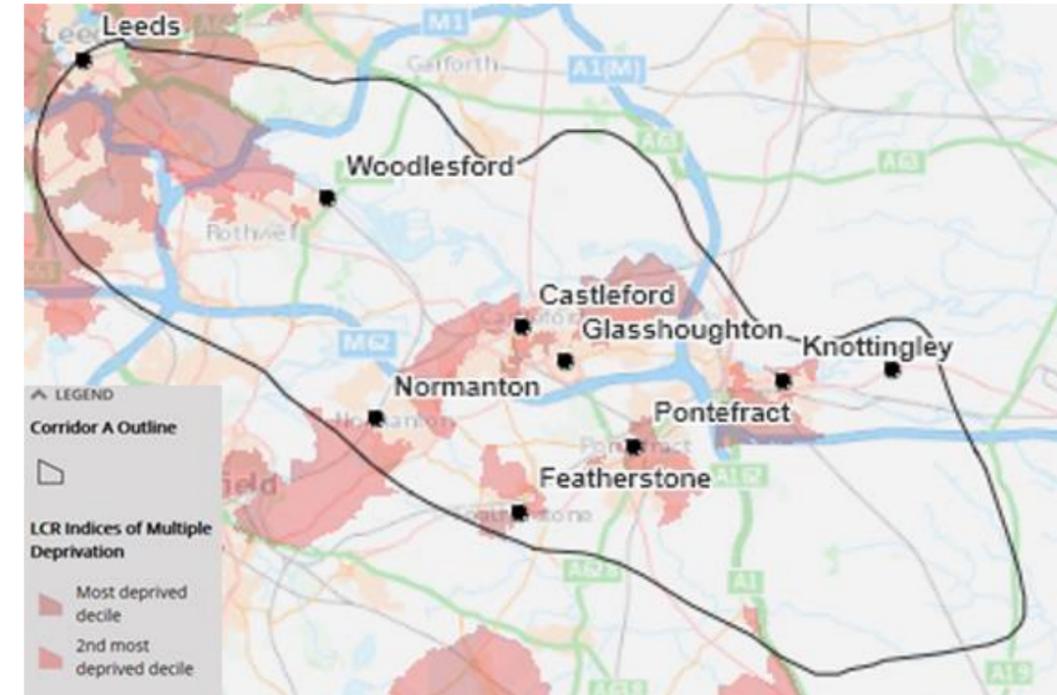
### 2.1 Enabling Inclusive Growth

#### 2.1.1 Deprivation

Figure 5 shows areas that are within the top two deciles of the indices of multiple deprivation. Deciles are calculated by ranking the 32,844 Lower Super Output Areas (LSOA) in England from most deprived to least deprived and dividing them into 10 equal groups. LSOAs in decile 1 fall within the 10% most deprived LSOAs nationally, whilst LSOAs in decile 10 fall within the 10% least deprived of LSOAs nationally<sup>2</sup>. The index of multiple deprivation is an overall relative measure of deprivation constructed by combining seven domains of deprivation according to their respective weights.<sup>3</sup> These include:

- Income Deprivation
- Employment Deprivation
- Education, Skills and Training Deprivation
- Health Deprivation and Disability
- Crime
- Barriers to Housing and Services
- Living Environment Deprivation

Figure 5: Areas of high deprivation



Source: Mott MacDonald

Deprivation is concentrated within the urban areas of the Five Towns themselves, and to the north west of the economic area, in the suburbs of Leeds in communities such as Middleton and industrial areas such as Stourton. These are associated with poor levels of health and economic activity.

Pontefract, Middleton and Stourton are in the top 10% deprived areas for education in England with large parts of Castleford and Knottingley in the top 20%. **People in these areas are more likely to suffer from poor connectivity and fewer opportunities to access jobs and education and many will rely on convenient and reliable transport; connecting these areas is vital to enabling inclusive growth<sup>4</sup>.**

<sup>2</sup> English Indices of Deprivation 2015 – Department for Communities and Local Government

<sup>3</sup> ibid

<sup>4</sup> Tackling transport-related barriers to employment in low-income neighbourhoods (2018) accessed via: <https://www.irf.org.uk/report/tackling-transport-related-barriers-employment-low-income-neighbourhoods>

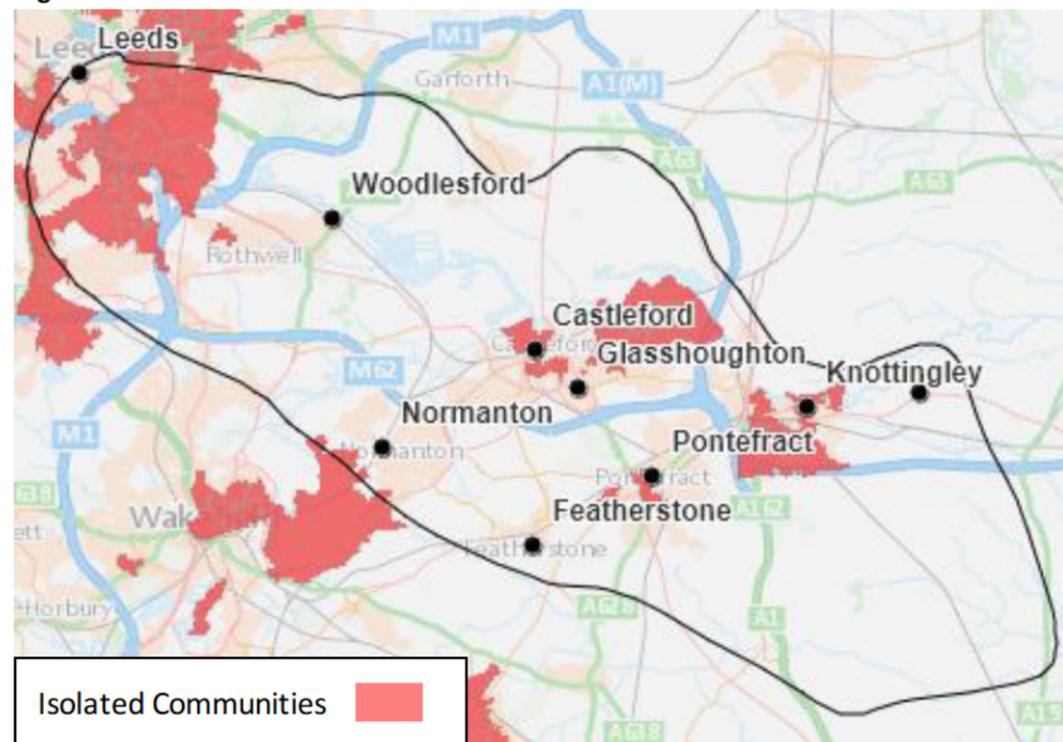
### 2.1.2 Isolated communities

**Isolated communities have high levels of deprivation (are within the top 20% most deprived in England) and can access a lower than average number of employment destinations.** Residents find that job opportunities are difficult to access because of public transport journey times, reliability (perceived as well as actual) and affordability<sup>5</sup>.

This uses the approach adopted for the Joseph Rowntree Foundation for “Tackling transport related barriers to employment in low-income neighbourhoods” – Census data (distance travelled to work, and the average number of destinations people can reach for journeys to work across the LCR).

There are several areas to the south east of Leeds City Centre as well as in the Five Towns, particularly Knottingley and to the east of Castleford, that are defined as “isolated communities” (see Figure 6).

Figure 6: Isolated communities



Source: Mott MacDonald

**Around 50,800 people in the corridor live within an isolated community, approximately 20% of the corridor.**

Improving connectivity in these areas is fundamental to enabling inclusive growth. People within these communities are unable to access many destinations for work, meaning many people have limited access to job opportunities. Many people in isolated communities also rely on affordable, convenient and reliable transport to

<sup>5</sup> Tackling transport-related barriers to employment in low-income neighbourhoods (2018) accessed via: <https://www.irf.org.uk/report/tackling-transport-related-barriers-employment-low-income-neighbourhoods>

access education and job opportunities. Ensuring that these areas are well connected by public transport to access employment and education is therefore fundamental to achieving inclusive growth<sup>6</sup>.

### 2.1.3 Car ownership

The motorway network ensures that some of these areas are reasonably well connected. **However, there are several areas throughout the Five Towns which are characterised by low car ownership** (see Figure 7), meaning that not everyone can benefit from the connectivity opportunities this brings.

**Ensuring that key employment areas are connected by good public transport links in both peak and off-peak time periods will enable people to access employment without owning a car. A high-quality integrated transport system will also encourage people to choose to travel by public transport rather than car which is key to meeting carbon reduction targets.**

Figure 7: % No car ownership



Source: Mott MacDonald

Partners have highlighted that many warehousing and distribution jobs are in out-of-town locations and poorly accessible by any modes other than private car. These sites also employ workers on different shift patterns, meaning many locations that do have a public transport connection are in reality poorly served outside of traditional peak times when there are travel needs.

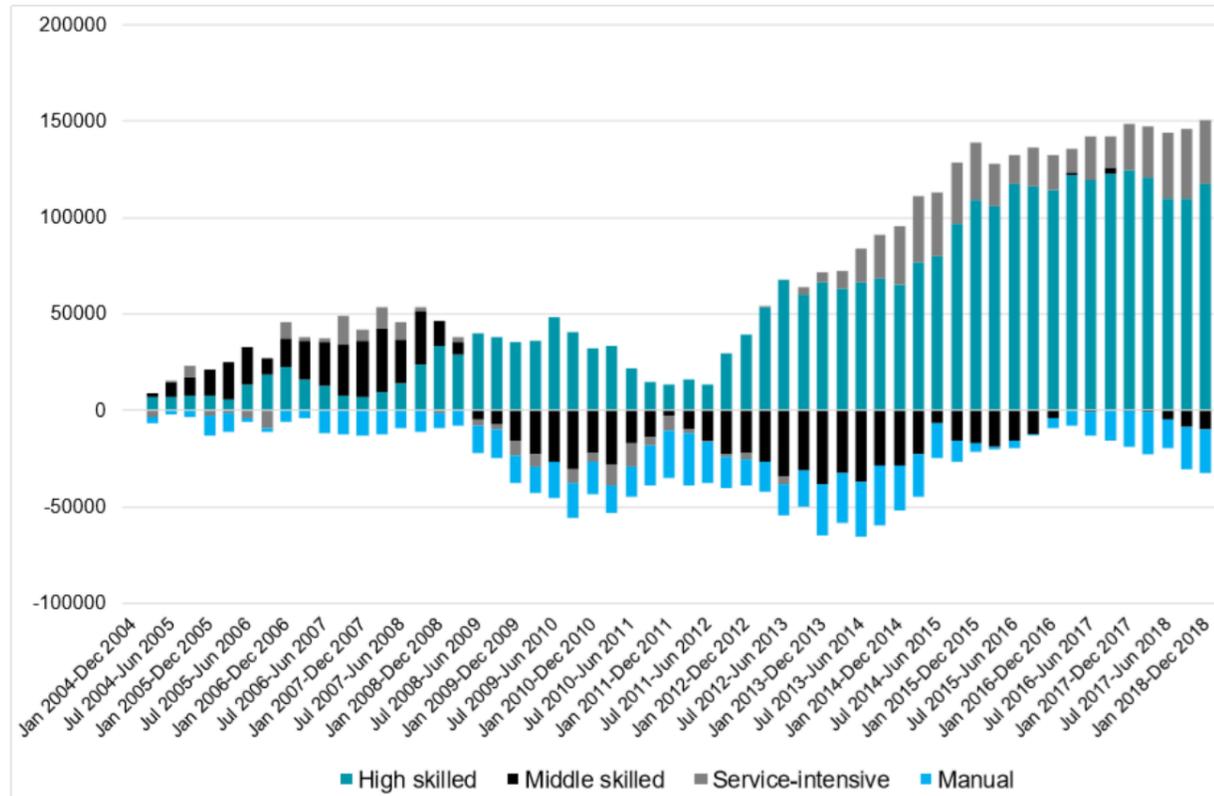
<sup>6</sup> Tackling transport-related barriers to employment in low-income neighbourhoods (2018) accessed via: <https://www.irf.org.uk/report/tackling-transport-related-barriers-employment-low-income-neighbourhoods>

## 2.2 Boosting Productivity

### 2.2.1 Employment characteristics

The emerging Industrial Strategy for West Yorkshire highlights an increase in highly skilled employment in the City Region (see Figure 8). Within this corridor, this includes opportunities in manufacturing and logistics. This affects commuting flows as these workers often commute further and travel more. Having an effective and reliable transport system is therefore paramount to maximise productivity in the region.

**Figure 8: Occupational contribution to cumulative employment growth**



Source: LCR Industrial Strategy (emerging)

The Five Towns to Leeds corridor has some distinct employment characteristics and strengths.



In terms of the number of employees, the mining and quarrying sector and the electricity, gas, steam and air conditioning supply sector have *over three times the national average* and the construction sector and water supply sectors have *twice the national average*<sup>7</sup>.

Transportation and warehousing is also an important employment sector in this area with a quotient of 1.67 employees in the sector (where 1 is national average). The motorway network provides an attractive environment for businesses in this sector; there are at least 7 large warehousing, industry and distribution centres sited adjacent to the M62 between Junctions 30 and 32. These draw employees from the nearby communities of Normanton, Featherstone and south west Castleford.

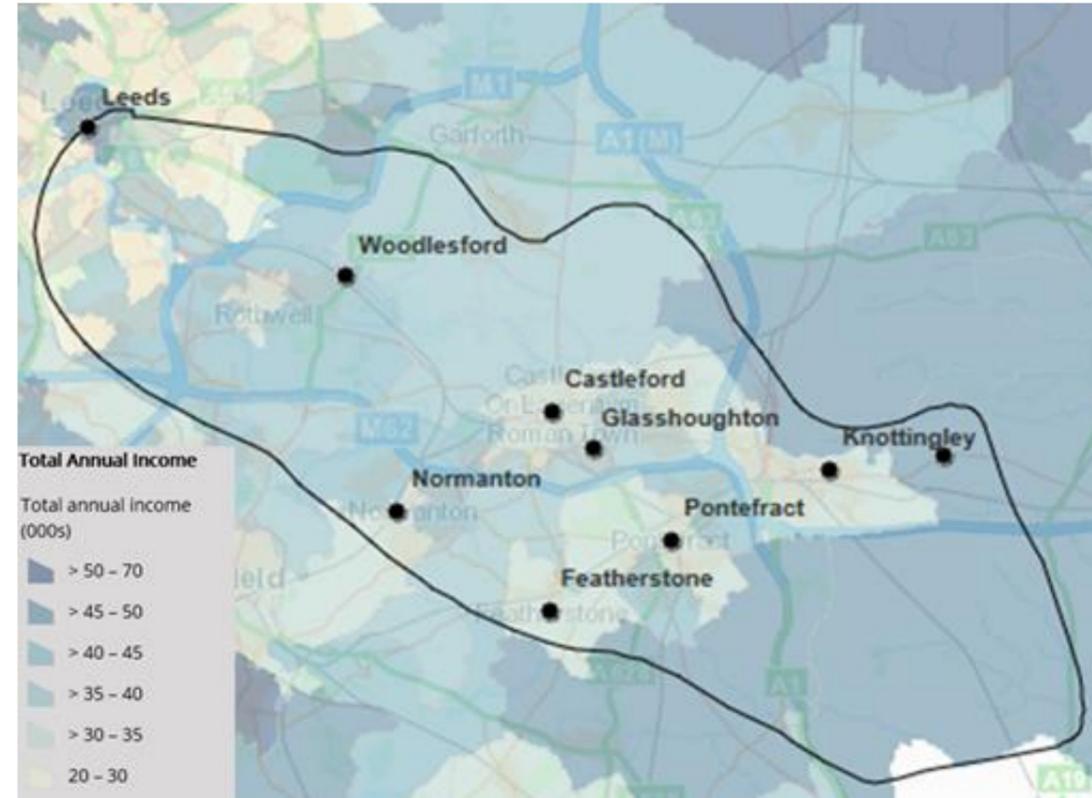
**Connectivity to these specialisms is fundamental to boosting productivity.**

<sup>7</sup> Business Register and Employment Survey: open access (2017)

### 2.2.2 Household income

Average total annual household income in the corridor (£35,789) is lower than the average for England and Wales (£41,642) and Yorkshire and Humber (£36,526) and is particularly low in areas within the Five Towns and areas around Leeds City Centre (shown in Figure 9). The gross value added per head (GVA) according to the West Yorkshire Combined Authority for Wakefield is 80% of the UK average and has seen an average growth rate of 3.3%. This general measure of prosperity suggests the need for action to boost productivity, including better connections in the area to create opportunities to help enhance the economy.

**Figure 9: Total annual household income**



Source: Mott MacDonald

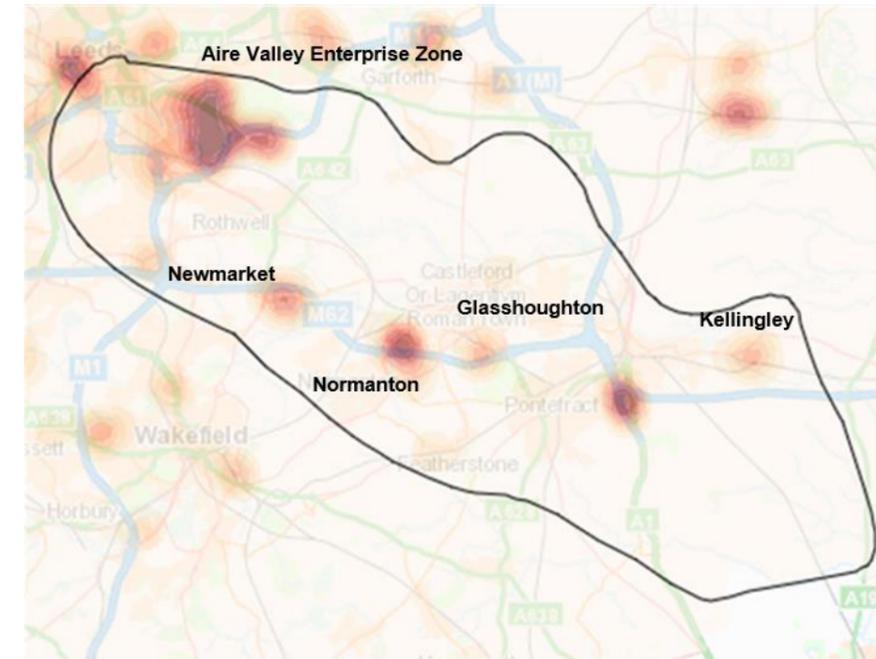
Connecting areas of deprivation and low annual household income is important to provide opportunities for people to access education and employment and in enabling inclusive growth throughout the corridor.

### 2.2.3 Growth areas

The Five Towns to Leeds corridor is subject to considerable growth plans. To maximise the economic benefit and potential that these bring, their connectivity requirements must be considered carefully, and in the context of the existing socio-economic issues. The emerging Industrial Strategy for West Yorkshire highlights that over the past five years business base growth in Leeds has occurred faster than the UK. However, Wakefield's business growth has been slower, at around 19%. This emphasises the need for good transport options connecting Wakefield businesses to potential employees and customers.

Figure 10 shows a heatmap of employment growth sites in the Five Towns to Leeds corridor. The Wakefield Local Plan<sup>8</sup> aims to enhance the number of jobs by expanding many of these sites adjacent to the M62, particularly at Newmarket, Glasshoughton and Knottingley. Kellingley has employment growth identified in the Selby Local Plan. The Aire Valley Enterprise Zone also lies within this corridor, offering additional job opportunities. Partners also highlighted opportunities outside the corridor, particularly at large employment sites in Sherburn. Most future large employment sites are B2 (general industrial) and B8 (storage and distribution) uses suggesting growth in these sectors of employment.

**Figure 10: Employment growth sites heatmap**



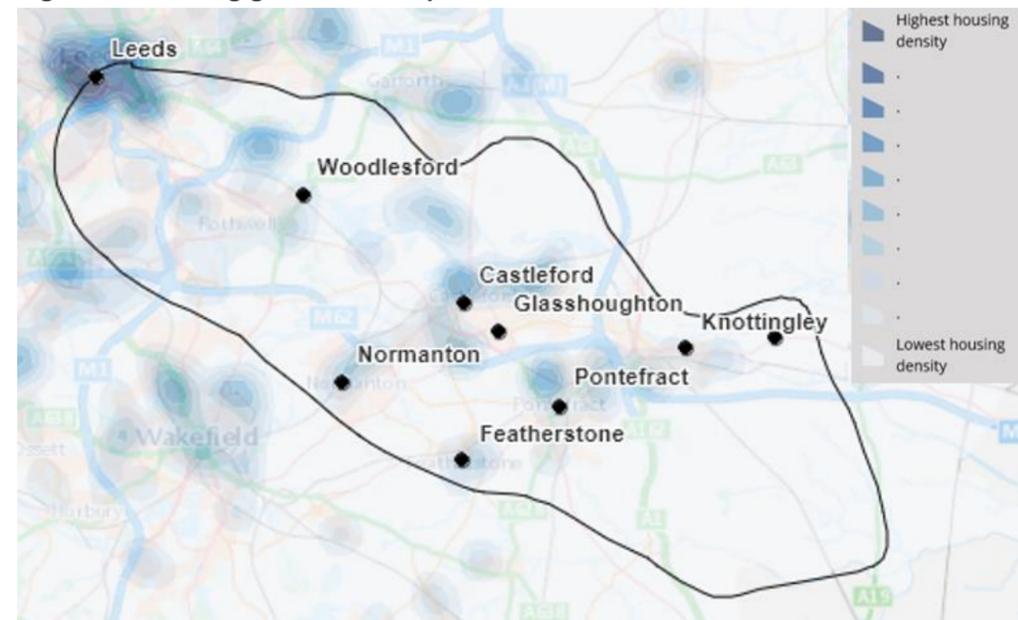
Source: Mott MacDonald

As well as employment growth, one of West Yorkshire's priority growth sites for housing is located within the Castleford Growth Zone (see Figure 11). Additional housing is also proposed as part of the Aire Valley Enterprise Zone, as well as urban extensions to Knottingley and Featherstone towards the M62.

**Further employment growth (particularly with some of it being focused in locations adjacent to the motorway) emphasises the need to improve public transport connectivity to these areas, both from existing communities and new housing growth sites, to enable access to employment opportunities for everyone.**

<sup>8</sup> Wakefield Local Development Plan 2036 - Initial Draft Local Plan Consultation - January 2019

Figure 11: Housing growth heatmap



Source: Mott MacDonald

## 2.3 Tackling the Climate Emergency

### 2.3.1 Carbon emissions

The West Yorkshire Transport Strategy recognises that our transport network currently constrains opportunities for growth and is a key factor in shaping experiences of poverty, but also that our networks do not sufficiently support sustainable travel as the obvious choice for many.

This is reflected in the evidence that the transport sector is the largest emitter of damaging carbon dioxide in the region, with transport contributing 4.9 MtCO<sub>2</sub>e/year (millions of tonnes of carbon emissions per year). Transport sector emissions are dominated by emissions from road transport with 4.4 MtCO<sub>2</sub>e/year being from road transport<sup>9</sup>, representing roughly 40% of total CO<sub>2</sub> emissions in West Yorkshire (11.1 MtCO<sub>2</sub>e/year)<sup>10</sup>. Road transport emissions are dominated by emissions from private cars, vans and lorries - with conventional petrol and diesel internal combustion engines the dominant technology across all vehicle types.

In June 2019 the Combined Authority, in line with all the West Yorkshire partner councils and most Leeds City Region local authorities, formally declared a Climate Emergency. This declaration signals the Combined Authority and partner councils' ambition for the region to become net zero-carbon by 2038, with significant progress being made by 2030. The 2038 target was determined following work by the Tyndall Centre for Climate Change Research, which was commissioned to create a science-based carbon budget for the Leeds City Region that is consistent with the objectives of the UN Paris Agreement on Climate Change (Paris Agreement) and the Intergovernmental Panel on Climate Change (IPCC)<sup>11</sup>.

The Combined Authority published, in July 2020, the findings of a Carbon Emissions Reduction Pathways (CERP) study<sup>12</sup>. This report, produced for the Leeds City Region and York and North Yorkshire local enterprise partnerships, is the first step in identifying the actions needed to create a net zero carbon economy.

<sup>9</sup> West Yorkshire Combined Authority, 2020. West Yorkshire Carbon Emission Reduction Pathways Key Findings Report. Available at: <https://westyorkshire.moderngov.co.uk/documents/s16572/Item%2011%20-%20Appendix%201.pdf>

<sup>10</sup> ibid

While three pathways have been identified through the CERP work, there are several common actions identified in all the pathways, including a series of measures on transport. These modelled pathways all recognise the need for further modal shift to achieve the scale of reduction in carbon emissions from transport required to meet the ambitious net zero target and timeline.

Transport is therefore a critical sector for carbon emissions reduction across West Yorkshire requiring ambitious action that goes beyond current national policy and targets. The CERP asserts that this will require a significant shift in behaviour change and the fast adoption of low carbon technology.

At the time of publication, no further specific evidence on carbon emissions was available (pending release of West Yorkshire Combined Authority Emissions Reduction Pathway study and other work on carbon emissions), however **these influences, once understood, will be critical in understanding and prioritising connectivity requirements in future.**

### 2.3.2 Air quality and Carbon

Partners across West Yorkshire, including the Combined Authority, the five district councils, and Public Health England, have developed the West Yorkshire Low Emissions Strategy (2016). The focus of the strategy is "tackling transport emissions as pollution from transport causes most local air quality problems".

The strategy highlights that health effects associated with exposure to air pollution are significant; more deaths are caused by air pollution than preventable liver or respiratory disease. In West Yorkshire in 2013, 5.1% of all deaths (1 in 20 deaths) were caused by exposure to particulate air pollution with up to 6% in some local authority areas. Traffic in our urban centres and on busy roads results in levels of air pollution which have a significant impact on the health of the population, with those having underlying health conditions being most at risk. There are two pollutants of greatest concern: nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM<sub>n</sub>) which have an adverse impact on health and mainly result from emissions from traffic, particularly exhaust emissions from older diesel vehicles.

Nitrogen dioxide and particulate matter, together with other air pollutants, have been set an upper air quality limit value that the general population should not be exposed to that is legally binding in UK law. Since 1997 each local authority has been carrying out review and assessment of air quality in its area, and where it is found likely that national air quality objectives will not be achieved, an air quality management area must be declared<sup>13</sup>.

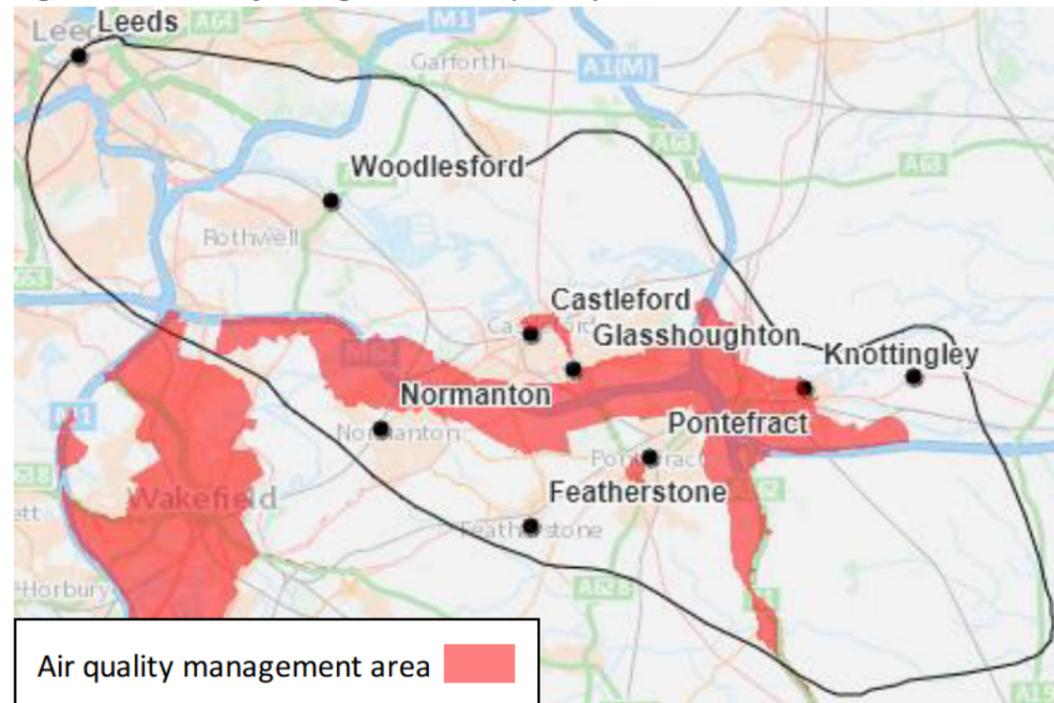
There is a large air quality management area that runs throughout the corridor aligned with the M62 and junction 32A, as shown in Figure 12. **Facilitating sustainable modes of transport will reduce car use, enabling a consequent reduction in traffic congestion and the associated emissions that cause air pollution and poor air quality.**

<sup>11</sup> ibid

<sup>12</sup> ibid

<sup>13</sup> Department for Environment Food & Rural Affairs at <https://uk-air.defra.gov.uk/aqma/> accessed in October 2020

Figure 12: Air Quality Management Areas (AQMA)



Source: Mott MacDonald

## 2.4 Delivering 21<sup>st</sup> Century Transport

### 2.4.1 Active modes

The ability for people to frequently and safely cycle and walk has been identified in policy as having a significant role to play in the strategic transport network in West Yorkshire and the wider Leeds City Region.

Within the corridor the off-highway network between Leeds and Castleford is relatively well connected, with recent improvements of approximately 9km to the Trans Pennine Trail from Woodlesford to Leeds, and 6km of new greenway delivered through the CityConnect programme creating a 16km off highway route between Castleford and Wakefield.

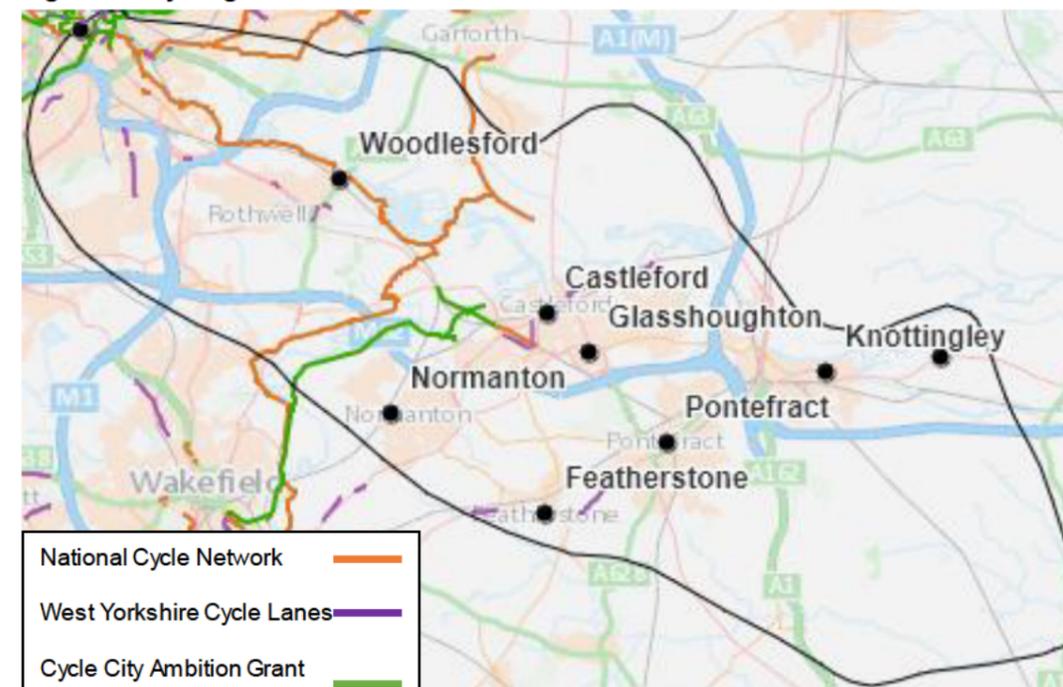
However, as Figure 13 shows, there remain missing links in this part of the network towards Leeds, with no connections between the Castleford Greenway and the Trans Pennine Trail through Methley Village, and barriers alongside the Aire Navigation, such as the Skelton Grange Road Bridge, preventing a continuous, traffic free route. Towards the Five Towns from Castleford there is little or no provision of off-highway routes.

Throughout the corridor, there is minimal high quality on-highway cycle provision of the type that would align to best practice guidance to support any significant increase in journeys. The road and rail networks cause severance and limited opportunities for people to cross the network. Improvements to the highway would be needed to make journeys safe and more realistic by cycling.

There is significant opportunity for more movement of people by bike, or by foot, throughout this corridor, with a relatively flat topography as well as potential for people to make more local journeys between employment sites in the Five Towns, that are currently not well-served by public transport provision. The planned increase in housing developments and employment sites within the area could generate more local trips.

The corridor is also the focus of the Combined Authority's Transforming Cities Fund investment, with planned measures to invest in the A639 corridor to improve facilities for walking and cycling, as well as the Streets for People<sup>14</sup> project focused around Pontefract Horsefair.

Figure 13: Cycling network



Source: Mott MacDonald

<sup>14</sup> Streets for People is a West Yorkshire-led series of design principles that focuses on creating safe and healthy places that take into consideration a number of factors, including traffic management, reducing air pollution, creating places which help people to interact and encouraging sustainable methods of transport such as cycling, walking and public transportation.

### 2.4.2 Bus

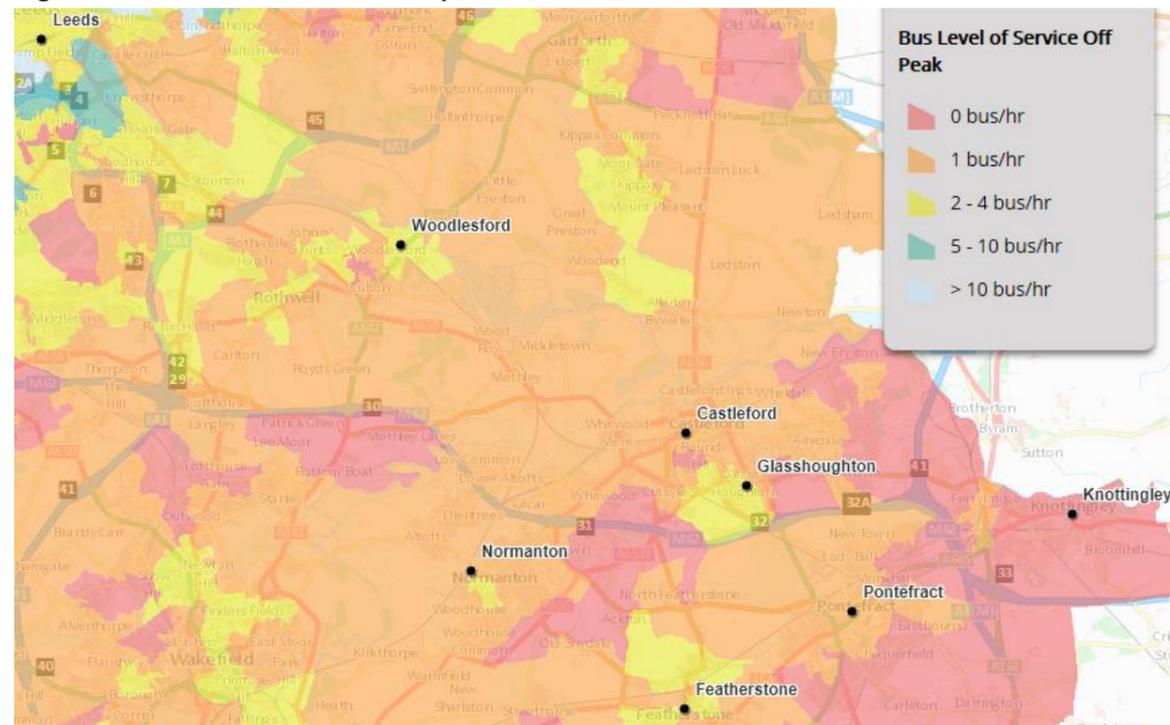
Figure 14 shows levels of bus service during the off-peak period in the corridor. This uses information about service frequencies across all routes at individual bus stops and calculates an average level of service across census output areas. This helps to characterise areas by their level of accessibility alongside comparable socio-economic characteristics outlined in earlier sections.

Most of the corridor is served by just one bus per hour or less, as shown in the orange and red. This pattern limits the population's access to the transportation and warehousing job opportunities, which are likely to operate irregular working hours. For the purposes of this report, bus service data was not collected for the North Yorkshire area.

**Excluding those that live in North Yorkshire around 45,800 people in the corridor (18%) have no access to a bus service outside of peak periods and 128,000 people (52%) have access to just one bus per hour.**

The lack of consistency in bus service throughout the corridor limits connectivity. There are several large warehousing, industrial and distribution centres sited adjacent to the M62 between junctions 30 and 32, which are forced to rely on other modes. However, there are areas with good bus levels of service (2-4 buses per hour) and connectivity in Leeds, Wakefield, Woodlesford, Featherstone and Glasshoughton.

**Figure 14: Bus level of service – off-peak**



Source: Mott MacDonald

### 2.4.3 Rail

The current rail network connects parts of the Five Towns both within the local area and beyond towards Leeds, Wakefield & Huddersfield, York, Goole & Hull, Sheffield and Doncaster (see Figure 15).

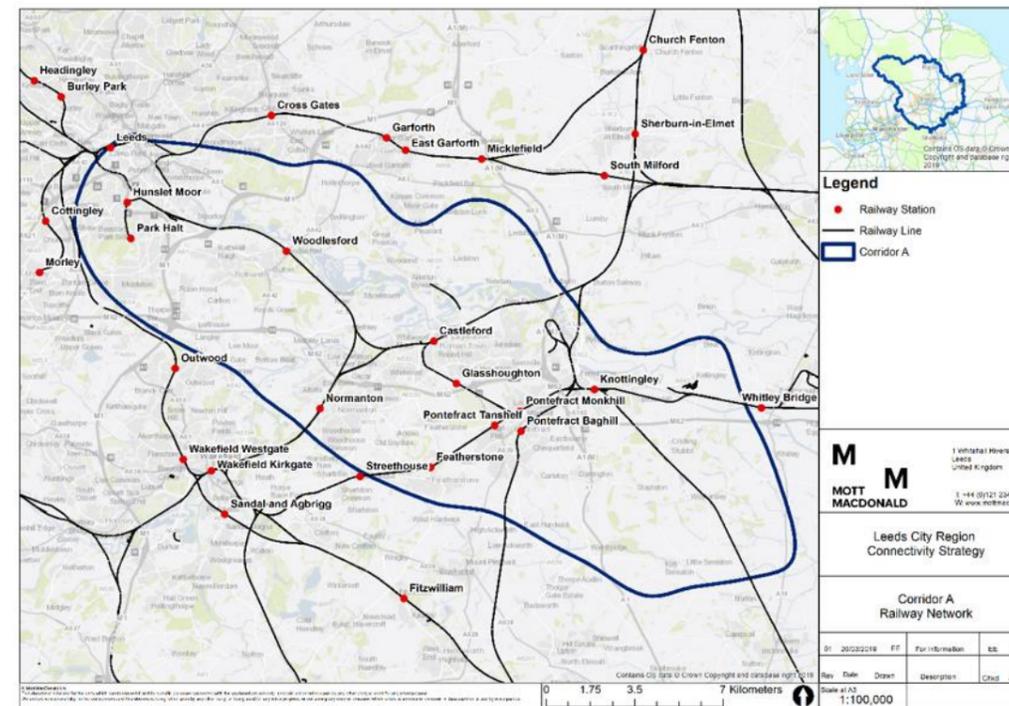
At present, regular passenger trains operate only towards Leeds and Wakefield, with services towards Goole, Sheffield, Doncaster and York being irregular and infrequent based on current timetables. Several additional potential passenger routes are used predominantly for freight. Current passenger services in this area do not normally exceed one train per hour.

Rail connectivity has potential in the corridor, but there are issues with capacity and frequency to/from Leeds. Challenges for rail services in the corridor include regular overcrowding of trains into and out of Leeds. Frequencies also do not meet existing Combined Authority policy standards which state that all routes serving Leeds should have at least two trains per hour. However, there is also limited network capacity to operate additional and/or longer trains and an absence of electrification across the network within the corridor. Most lines in this area see significant freight traffic, both crossing the area and serving the Europort container terminal.

Partners have also highlighted that train stations in the Five Towns tend to be in remote locations away from key centres and therefore do not always provide good accessibility or integration with other modes.

While this report makes recommendations that are directly or indirectly relevant to rail, most rail and freight content will be identified separately in WYCA's Rail Strategy work. That Rail Strategy sits alongside these Case for Change reports, informed by them and informing them, and this report should be read in conjunction with the Rail Strategy.

**Figure 15: Current Rail Network**

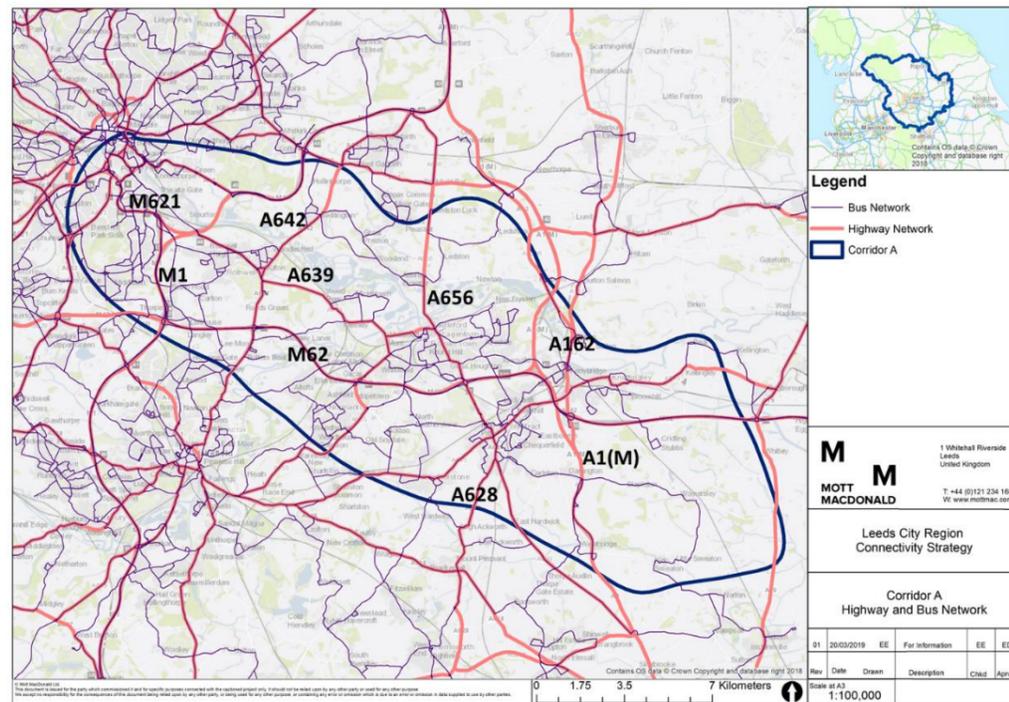


Source: Mott MacDonald

### 2.4.4 Road

Figure 16 presents the current road and bus networks throughout the corridor. The strategic road network includes the M621, M1, M62 and the A1(M). The A639 runs east-west connecting Leeds and Castleford. Key roads which connect north-south throughout the corridor include the A642, A628, A656 and A162.

**Figure 16: Current bus and highway network (A roads and motorway network)**



Source: Mott MacDonald

#### 2.4.4.1 Highway network performance

Figure 17 shows the speed difference (kmph) on the highway network between the peak and off-peak. The largest reductions in peak speed occur along the M621 between J4 and J7 and on the M62 from J29 towards Bradford beyond the corridor, indicating significant capacity constraints. Peak speed reductions also occur on the M62 between J32 and J31 and on the A655 into Castleford from M62 J31.

Additional capacity constraints are seen along the A645 through Pontefract and Knottingley, A642 through Swillington, A639 towards Castleford and the A1(M).

Such congestion not only inhibits the connectivity of the area, and allied to high traffic flows, has also contributed towards the declaration of the large AQMA along the M62 and J32A. Partners highlighted capacity constraints on the motorway network and junctions as limiting opportunities for further growth in areas adjacent to the M62 including Newmarket, Glasshoughton and Kellingley.

**Introducing more opportunities to travel to these areas via public transport will help to promote mode shift and thereby reduce capacity constraints on the network and enable inclusive growth.**

**Figure 17: Highway network on-peak vs off-peak speed difference**



Source: Trafficmaster

#### 2.4.5 Patterns in transport demand

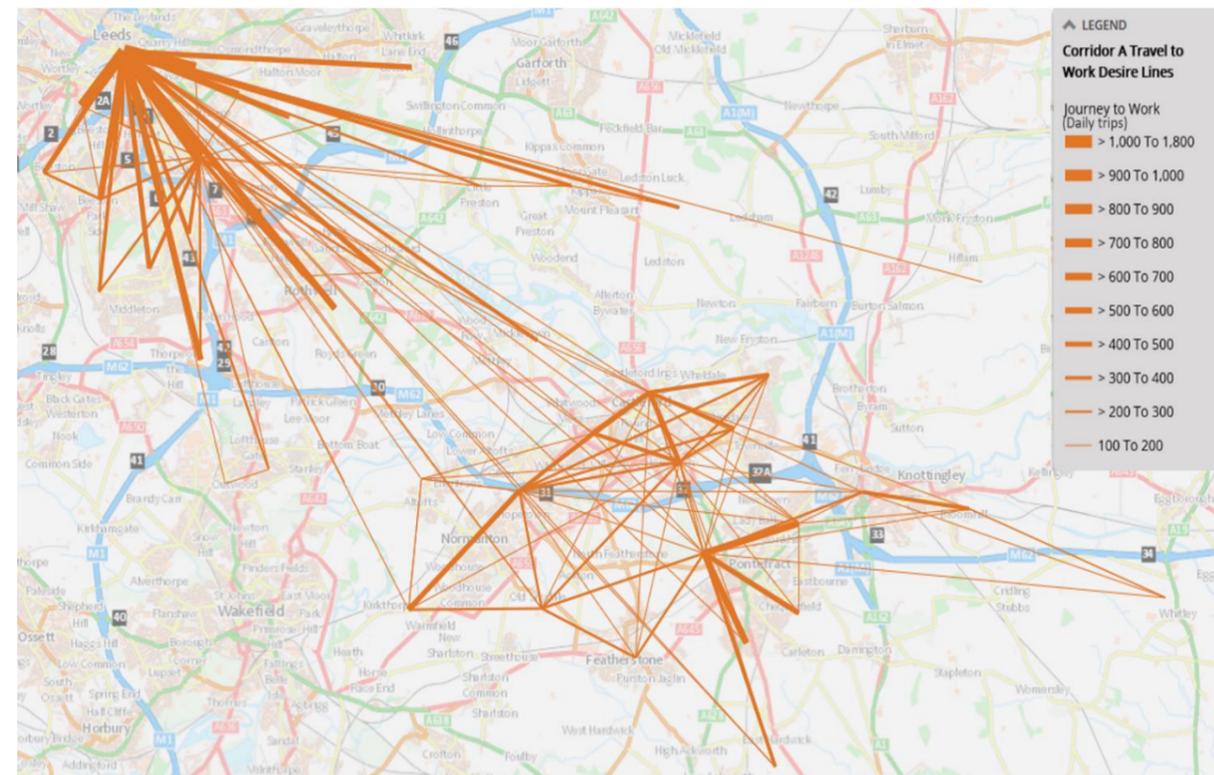
Figure 19 shows that key movements in the area (in the form of journey to work desire lines – person daily trips to work, Census 2011) are towards Leeds City Centre and between the Five Towns themselves, with notable attractors in Pontefract and Castleford. Travel horizons in the Five Towns are low; the concentration of desire lines between the Five Towns in Figure 19 shows this pattern with limited trips between the Five Towns and central Leeds. Areas in Knottingley, Pontefract and to the east of Castleford are defined as “isolated communities”. People within these communities have limited access to destinations for work and are reliant on public transport to access job opportunities. This means there is likely to be a future reliance on public transport in the corridor highlighting the need for good public transport options to ensure inclusive growth for all.

Figure 18 and Figure 20 show where new housing and employment sites are located and the current travel to work patterns.

**These graphics indicate that there is value in improving connectivity in this area, in order to broaden these historically limited travel horizons and ensure its current and future residents and employees benefit from the growth opportunities that will become available. They also illustrate the potential for travel patterns to change, and where demand is likely to increase, and therefore where investment needs to be made in order to connect people to these new growth sites.** This is explained in further detail in Chapter 4.

Change in employment locations is likely to have the most significant effect on travel patterns; therefore, it is crucial to connect these places with a range of travel choices to ensure inclusive growth.

Figure 19: Journey to work desire lines



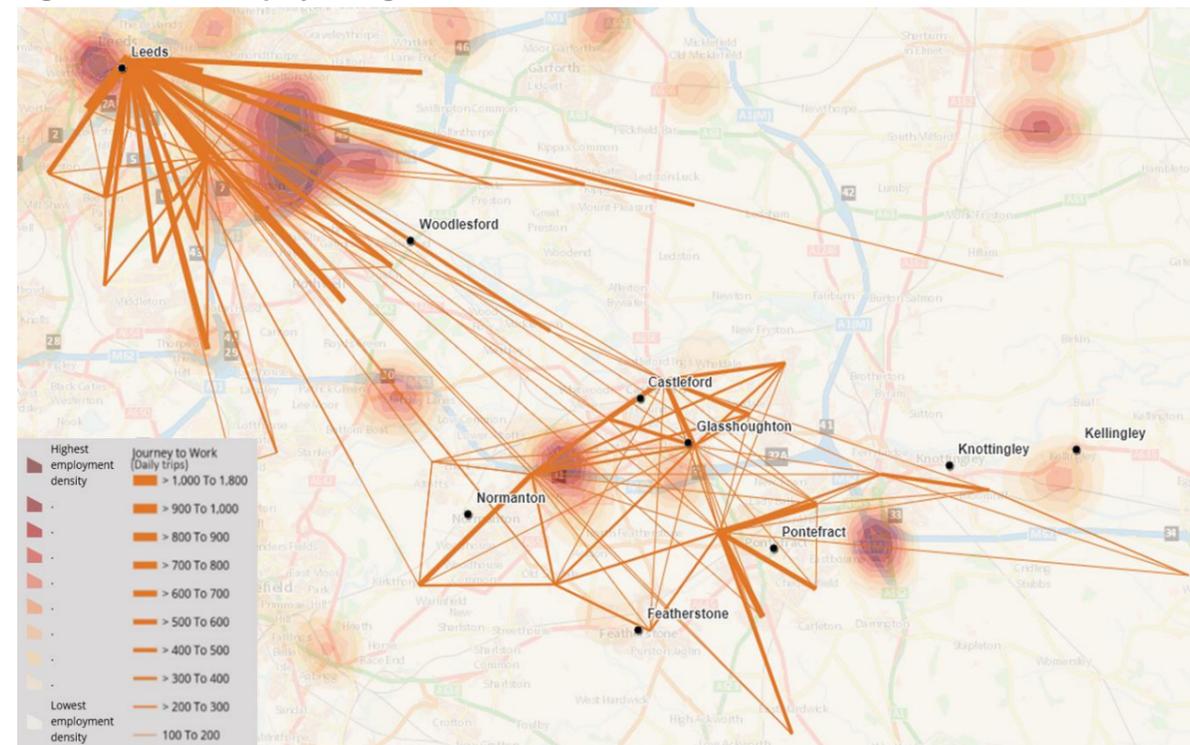
Source: Mott Macdonald

Figure 18: Future housing growth and current travel to work desire lines



Source: Mott Macdonald

Figure 20: Future employment growth and current travel to work desire lines



Source: Mott Macdonald

## 2.5 Summary

To **enable inclusive growth**, improved connectivity is needed to provide better access to work for people in communities within the Five Towns, including in Castleford, Knottingley and Pontefract. These communities are characterised by low employment and skills prospects, low household income (14% below national average) and low car ownership, with several areas being within the 10% of most deprived communities in the UK.

Employment prospects in the corridor are focused on light industry and logistics, especially in the M62 and M1 corridors and the Aire Valley Enterprise Zone. Job opportunities at these locations rely heavily on car access, and yet, the communities of the Five Towns and several other communities that lie within the corridor towards Leeds including Stourton and Middleton are characterised by low car ownership (with over 50% of households without access to a car in some areas).

There is therefore a disconnect between jobs located in places that have poor access for people without a car and communities with low car ownership. To improve the prospects of these communities, and to **boost productivity**, employment opportunities must be better connected to communities of the greatest economic need.

There is also a skills gap. Pontefract, Middleton and Stourton are in the top 10% most deprived areas for education in England. Improving connectivity to education opportunities will help close this skills gap and help people to find better employment, contributing to opportunities for everyone in the area. Improving productivity through better connectivity to employment and skills will also help improve broader economic indicators.

To help **tackle the climate emergency** and achieve carbon emission targets, congestion and traffic levels on these strategic links must be addressed. Options for travel that has lower carbon emissions must be improved, both through cleaner public transport options and an expanded active travel network.

Several areas also suffer from poor air quality; particularly adjacent to the M62 and M1. This not only affects people in Knottingley and central Castleford, but also affects a high number of commuters travelling through the AQMAs.

The Connectivity Plan for this area will focus upon **delivering 21<sup>st</sup> century transport** that connects the places of greatest economic need to employment and skills opportunities through greener modes of transport. Ensuring cleaner, greener modes are used will contribute to achieving a zero-carbon economy in the City Region.

The focus should be on:

- Strategic trips from key transport and employment hubs towards opportunities in Leeds and Aire Valley
- Local trips within and between the Five Towns
- Local trips to key transport and employment hubs, such as Castleford.

Four summary maps have been created to summarise the spatial context highlights for each of the regional priorities. These are shown in **Appendix A**.

### 3 Corridor aspirations

This section outlines the processes through which the corridor aspirations have been defined, and how they link to the evidence base and local policy.

Please refer to Chapters 4 and 8 of the Appraisal Handbook for details of how the West Yorkshire Connectivity Plan core objectives have been derived from key policy drivers and how they and corridor-specific aspirations are used in the development of the Case for Change.

#### 3.1 Defining objectives

The core objectives have been derived from strategic visions and ambitions from policy and have been agreed with the West Yorkshire Combined Authority. They ensure that the West Yorkshire Connectivity Plan supports the delivery of the long-term vision for the Leeds City Region – as identified in the LCR HS2 Growth Strategy – as well as the priorities and ambitions outlined in the Strategic Economic Plan (SEP), the LCR HS2 Connectivity Strategy, and the West Yorkshire Transport Strategy 2040. These objectives are applicable to all inclusive growth corridors.

Corridor-specific aspirations have been developed from the key issues, opportunities and priorities identified in the workshop with local officer representatives. These aspirations ensure that the interventions developed align with the priorities of West Yorkshire and its districts. Each intervention is assessed against both the core objectives and corridor-specific aspirations to ensure the best possible fit.

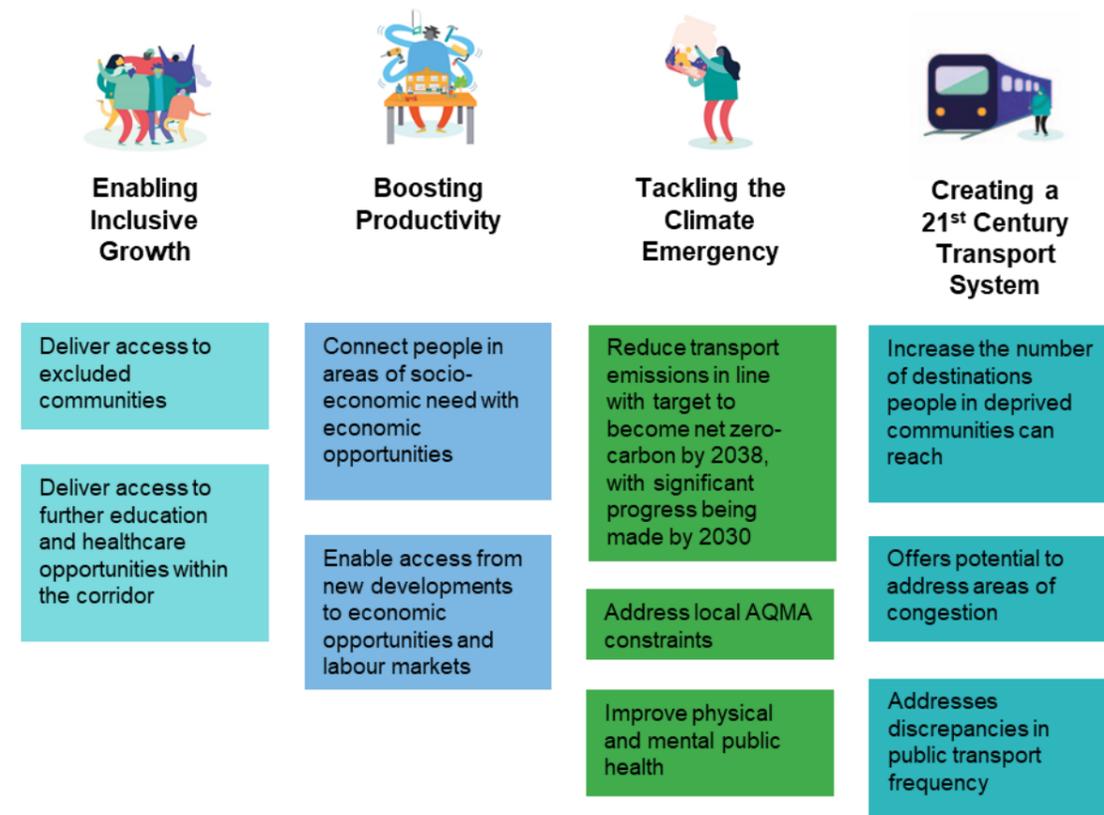
#### 3.2 Core objectives

The West Yorkshire Connectivity Plan core objectives are aligned to the City Region's core priorities, as illustrated below:

**The West Yorkshire Connectivity Plan Core Objectives are to:**

- Connect people in areas of socio-economic need with economic opportunities
- Enable access from new developments to economic opportunities and labour markets
- Deliver access to further education and healthcare opportunities within the corridor
- Deliver access to excluded communities
- Increase the number of destinations people in deprived communities can reach
- Offer potential to address areas of congestion
- Address discrepancies in public transport frequency
- Reduce transport emissions in line with target to become net zero-carbon by 2038, with significant progress being made by 2030
- Address local AQMA constraints
- Improve physical and mental public health

**Figure 21: Alignment of the West Yorkshire Connectivity Plan core objectives to the City Region's core priorities**



#### 3.3 Corridor-specific aspirations

Drawing on the key issues and opportunities identified from the evidence base, corridor-specific aspirations have been agreed for the Five Towns to Leeds, in consultation with stakeholders from Leeds, Wakefield and Selby districts.

**The Five Towns to Leeds Aspirations are to:**

- Reduce car use and/or need to travel
- Ensure more deprived communities are connected to current and future job opportunities
- Improve connections to current and future employment, housing and education sites
- Improve access to those working shift patterns
- Improve perception of access/increase travel horizons
- Improve public transport connectivity and access, to serve a greater number of origins and destinations with good service frequency and journey times
- Address capacity and service issues on the rail network
- Address congestion issues to improve growth potential and public transport journey reliability and attractiveness

These all align to current local policy documentation such as the Wakefield District Transport Strategy (2011 – 2025) and the Interim Leeds Transport Strategy (2016).

### 3.4 Measuring objectives

#### 3.4.1 The appraisal process

The core objectives and corridor-specific aspirations provide the foundation of the West Yorkshire Connectivity Plan options appraisal process, alongside spatial analysis. Interventions are assessed against a set of criteria aligned with the objectives, and the spatial evidence base in a Geographical Information System (GIS) – such as whether the intervention connects to areas of deprivation and employment, housing and education sites. A description of the data that underpins this is detailed in Chapter 7 of the Appraisal Handbook.

The outputs are then fed into the Mott MacDonald’s Investment Sifting & Evaluation Tool or “INSET” – this is a WebTAG-compliant decision support process, based on multi-criteria analysis. It enables interventions to be assessed and “sifted” against specially defined and flexible parameters which determine how well the interventions meet the objectives and corridor-specific aspirations.

INSET is like the Department for Transport (DfT) Early Assessment and Sifting Tool (EAST) but has been built to surpass its capabilities – such as the ability to assess interventions across a full range of themes, including economic, social and environmental indicators, depending on local circumstances, and to reflect on multiple future scenarios.

The appraisal is classified into four assessment themes, all linked to the core policy priorities. These are used to classify the core objectives and have specific scoring criteria – as shown in Table 3. The assessment themes also enable policy makers and scheme promoters to sift interventions that will meet specific policy drivers (e.g. economic growth, social, transport, environmental) enabling them to quickly respond to different funding opportunities as they come forward. Interventions can be assessed individually relative to other Business Case factors such as deliverability.

**Table 3: Key themes for multi-criteria assessment**

Core objective	Assessment theme	Scoring notes
<ul style="list-style-type: none"> <li>Deliver access to further education and healthcare opportunities within the corridor</li> <li>Deliver access to excluded communities</li> </ul>	<p><b>Enabling Inclusive Growth</b></p> 	Based on the number of Equality, Diversity and Inclusion hotspots the intervention connects to as well as health and education sites. This theme helps to address the need to connect people including those in excluded communities to education and health facilities which links to the key objectives in the HS2 Connectivity Strategy.
<ul style="list-style-type: none"> <li>Connect people in areas of socio-economic need with economic opportunities</li> <li>Enable access from new developments to economic opportunities and labour markets</li> </ul>	<p><b>Boosting Productivity</b></p> 	Based on the number of housing and employment growth sites the intervention connects to, as well as the affected population for deprivation, low car ownership and the total number of jobs. This helps to identify interventions that best help to improve inclusive growth by connecting people to jobs who are living in areas of deprivation and low car ownership.
<ul style="list-style-type: none"> <li>Reduce transport emissions in line with target to become net zero-carbon by 2038, with significant progress being made by 2030</li> <li>Address local AQMA constraints</li> <li>Improve physical and mental public health</li> </ul>	<p><b>Tackling the Climate Emergency</b></p> 	<p>At the time of assessment, no quantifiable evidence on carbon emissions was available (pending release of West Yorkshire Combined Authority Emissions Reduction Pathway study and other work on carbon emissions) – therefore, based on the broad understanding that significant modal shift alongside fast adoption of low carbon technology will be required, it is assumed that all schemes would inherently contribute to the decarbonisation agenda, unless they are road schemes.</p> <p>As a proxy, scoring was influenced by how many Air Quality Management Areas (where it can be reasonably assumed there will be action to tackle emissions from transport) and touchpoints with the National Cycle Network (which may positively influence mode shift to cleaner modes) the intervention connects to, as well as their performance against the Healthy Streets<sup>TM15</sup> principles (again, an influence on positive mode shift to cleaner modes).</p>
<ul style="list-style-type: none"> <li>Increase the number of destinations people in deprived communities can reach</li> <li>Offers potential to address areas of congestion</li> <li>Addresses discrepancies in public transport frequency</li> </ul>	<p><b>Delivering 21st Century Transport</b></p> 	Based on how well the intervention connects areas with low levels of existing travel identified as isolated communities as well as areas with a large speed difference between on-peak and off-peak periods on the highway network and those with poor levels of bus service. As these are transportation schemes, a high number of interventions scored well for this theme.

Source: Mott MacDonald

The multi-criteria analysis is done in three “sifts”. These are summarised below and the sub-criteria and scoring approach for each is available in Chapter 8 of the Appraisal Handbook.

**Sift 1: Early sift.** This is based on the potential for the intervention to address the Core Objectives – it is simply scored using a Yes / No outcome against a series of sub-criteria, linked to the spatial data in GIS. On its own, the early sift can be used to rule out interventions at a very high-level; i.e. if it does not address one or more of the four themes or policy priorities or does not meet a criterion or combination of criteria.

<sup>15</sup> Pedestrians from all walks of life; Easy to cross; Shade and shelter; Places to stop and rest; Not too noisy; People choose to walk, Cycle and use public transport; People feel safe; Things to see and do; People feel relaxed; Clean air.

**Sift 2: Local fit.** This is based on the potential for the intervention to address the corridor-specific aspirations – again, it is simply scored using a Yes / No assessment by determining whether an intervention meets a certain criterion (or combination of criteria) and/or whether it is above or below a certain threshold for a given objective.

**Sift 3: Level of impact.** Like the first sift, this is based on the potential for the intervention to address the Core Objectives identified; however, the third sift has a *quantitative* element, drawing on the spatial evidence from the datasets in GIS. It also introduces a degree of standardisation to mitigate against the scale of intervention, and ensure schemes are tested fairly in terms of their level of impact relative to their size and spatial scale.

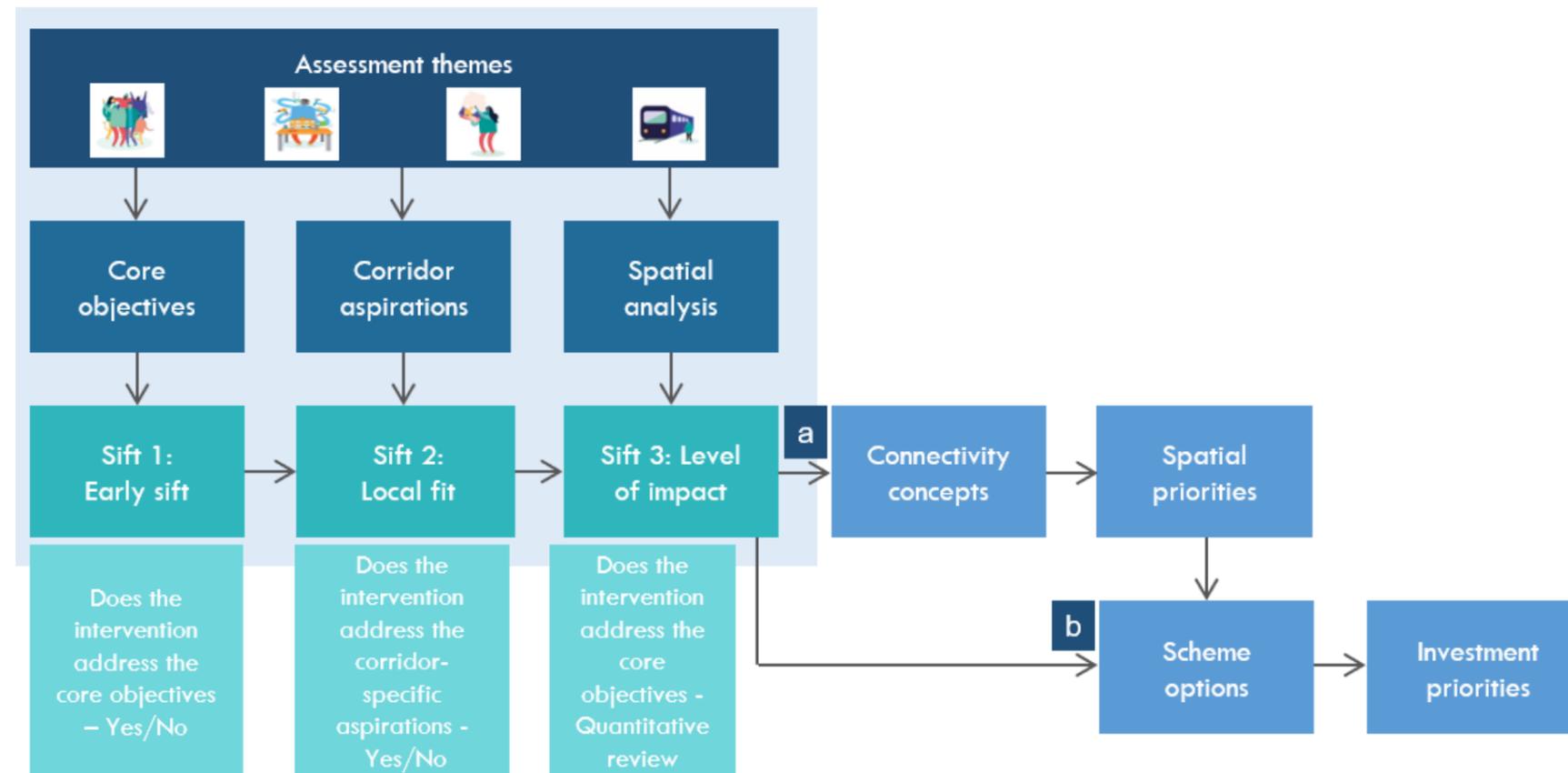
The key outcomes from the appraisal are two-fold – (a) a set of spatial priorities determined from several “connectivity concepts” (mode agnostic connections between key places – described further in Chapter 4), and (b) investment priorities determined from a number of interventions.

The diagram below summarises the appraisal process:

weighting that is applied for the assessment themes and criteria to perform sensitivity tests or to simply enable interventions to be filtered for their suitability for future funding streams – such as how they score against specific policy levers, and their readiness or timescales for delivery (e.g. Transforming Cities). Corridor specific objectives can also be “switched-off” to enable a more Leeds City Region focused list of priorities. The appraisal process can also be used to better understand the relative strength or weakness of different interventions and can highlight opportunities to “repackage” schemes for future funding streams.

Please refer to Chapters 8, 9 and 10 of the Appraisal Handbook for the detailed workings of option appraisal process and its outcomes.

**Figure 22: Appraisal process**



Source: Mott MacDonald

**The core appraisal adopted for Five Towns to Leeds assumes that all assessment themes have equal weighting or importance.** However, the application of the appraisal process is very flexible and can be used to adapt to different requirements (e.g. a change in funding or policy environment). Different weightings can be applied to the four assessment themes. For example, the user can “switch-off”, “switch-on” or change the

## 4 Determining spatial priorities

In determining spatial priorities, the evidence base and stakeholder workshops enable identification of key places to connect and resulting connectivity requirements for the corridor's economic area. From this, "connectivity concepts" are defined. At this stage, connectivity concepts do not relate to a specific transport mode or a specific route alignment. However, they do enable a strategic appraisal of whether there is merit in connecting people and places, as well as helping to define spatial priorities within the area. Connectivity concepts will allow further exploration of alignments, transport modes and specific interventions should they meet a series of key objectives.

### 4.1 Places to connect

Table 4 shows the key places to connect that have been identified, reflecting the inputs of partners and supported by the evidence base.

Key sections of the evidence base that have informed the identification of these places include:

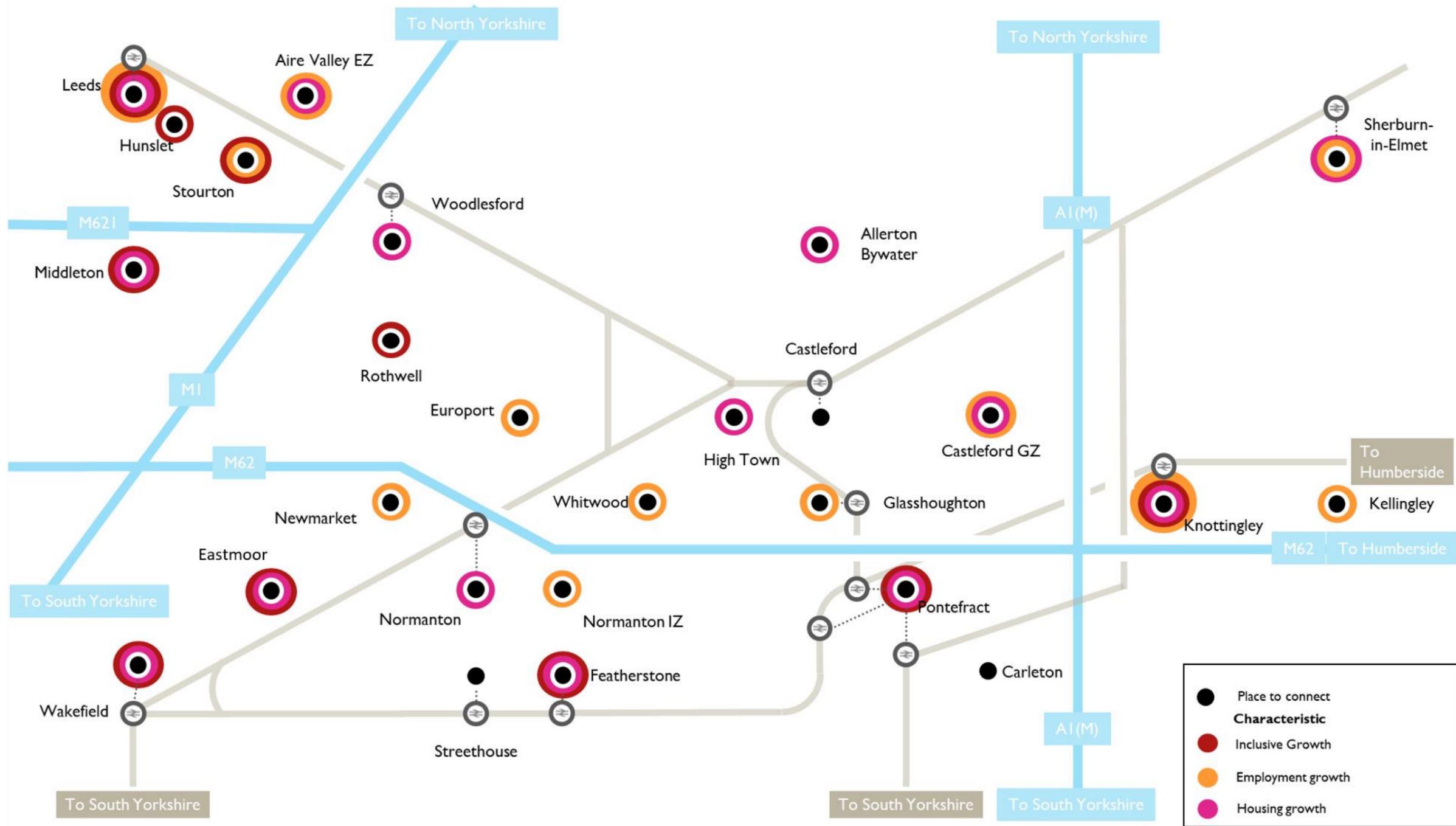
- Section 2.1.1: Deprivation
- Section 2.1.2: Isolated Communities
- Section 2.2.1: Employment Characteristics
- Section 2.2.2: Household Income
- Section 2.2.3: Growth Areas
- Section 2.4.3: Rail

The principal characteristic influencing the selection of each place to connect is also shown. Places include key settlements, transport hubs, housing and employment growth zones. These were identified on the "story map" for the Five Towns to Leeds corridor and are shown in Figure 23. This illustrates the places to connect in the context of the wider rail network (shaded grey lines) and motorway network (shaded blue lines). There are low travel horizons within the Five Towns, therefore improving connectivity between these places is fundamental to improving travel horizons throughout the corridor.

**Table 4: Key places to connect**

Key place	Characteristic	Scale / justification
Aire Valley Enterprise Zone	Large employment growth / housing growth	Approximately 100ha of new employment land allocated and 1800 dwellings at the Skelton Gate site
Allerton Bywater	Housing growth	Approximately 520 dwellings planned
Carleton	Local Plan site	Included following stakeholder consultation
Castleford	Principal town	One of the Five Towns and has a train station
Castleford Growth Zone	Large employment growth / housing growth	Approximately 19ha of new employment land and around 1100 new dwellings
Eastmoor	Housing growth/deprived	Growth area to the east of Wakefield
Europort	Large employment growth	Multi-modal freight site with further employment growth expected
Featherstone	Housing growth / deprived	58% of people have no qualifications and 48% of people are economically inactive in one area of Featherstone. One of the Five Towns and has a train station as well as 660 new dwellings allocated.
Glasshoughton	Large employment growth	Approximately 20ha of new employment land allocated
Hightown	Housing growth	Approximately 125 new dwellings allocated
Hunslet	Deprived	Total annual household income of £22,800 within MSOA and within the top 10% most deprived in England.
Kellingley	Large employment growth	Approximately 40ha of new employment land allocated
Knottingley	Deprived/employment growth/housing growth	One of the Five Towns and has a train station. Areas in the top 20% most deprived in England and around 600 new dwellings allocated
Leeds	Sub-regional city. Housing growth/employment growth /deprived	A key hub for HS2 and a core city in the region. Substantial housing and employment development sites, including South Bank and areas of deprivation.
Middleton	Housing growth/ deprived	Around 10,000 people within the top 10% most deprived in England and over 100 new dwellings
Newmarket	Large employment growth	Approximately 60ha of new employment land allocated
Normanton	Housing growth	One of the Five Towns and has a train station as well as around 600 new dwellings allocated
Normanton Industrial Zone	Large employment growth	Approximately 20ha of new employment land allocated
Pontefract	Housing growth/ deprived	One of the Five Towns with a train station as well as areas of housing growth around the town centre and in the top 20% deprived areas in England
Rothwell	Deprived	Large settlement. Part of Rothwell has an IMD score in the bottom 10%. Rothwell sits within the Green Belt.
Sherburn-in-Elmet	Large employment growth/housing growth	Approximately 100ha of new employment land and 880 dwellings allocated for development
Streethouse	Train station	Key settlement with train station / motorway access
Stourton	Employment growth/ deprived	Around 3000 people within top decile for deprivation in England and 35ha of new employment land
Wakefield	Sub-regional city / housing growth / deprived	Slower than average growth emphasises the need for good transport options connecting Wakefield businesses to potential employees and custom. Within top 10% most deprived in England and 170 dwellings planned.
Woodlesford	Housing growth	Approximately 120 dwellings allocated. Key settlement with train station catering for a large population to the south and east
Whitwood	Large employment growth	Approximately 17ha of new employment land allocated

Figure 23: Places to connect – key attributes



Source: Mott MacDonald

**Table 5: Programmed investment**

Programme	Scheme	Description
West Yorkshire Plus Transport Fund	Castleford Growth Corridor Scheme	Highway improvements and new road scheme around the north of Castleford. Reducing traffic through the town centre and allowing the development of land for housing, employment and mixed-use schemes, starting summer 2020.
West Yorkshire Plus Transport Fund	Castleford Station Gateway	Improvements to Castleford Station and providing better car parking, customer facilities and link to Castleford bus station. Work started in 2019 and is expected to end in 2020
West Yorkshire Plus Transport Fund	Normanton rail Station Park & Ride	Provision of up to 200 additional car parking spaces at Normanton rail station (56 existing spaces), to help improve connectivity across West Yorkshire. Work has been ongoing since 2014
West Yorkshire Plus Transport Fund	Glasshoughton Southern Link Road	New road to link J32 of the M62 with a housing and mixed-use site. Also, to improve congestion around Glasshoughton and the J32 shopping area / Xscape. Currently in design stage. Construction started in early 2019 with completion due 2020
West Yorkshire Plus Transport Fund	Temple Green Park and Ride	Park & Ride facilities to the east of Leeds and within the Enterprise Zone. Connecting employment land with the city centre and reducing the inflow of traffic from the east by providing park and ride. This site is now open. Expansion to the site is proposed as part of LPTIP.
Connecting Leeds	Castleford to Wakefield Greenway	Full surfaced cycle path from Castleford to Wakefield along the River Calder. First section opened in March 2018.
Leeds Public Transport Investment Programme	A61 South – Wakefield to Leeds via Hunslet and Stourton	Proposals to improve the A639 Low Road / A61(south) Hunslet Road corridor from Stourton to Leeds City Centre. Providing a dedicated bus lane, fully segregated cycle path, junction improvements and pedestrian and cycle links from local communities to the corridor.
Leeds Public Transport Investment Programme	Stourton Park and Ride	Catering for trips south-east of the city with access via Junction 7 of M621, A61S and A639. Completion aimed for September 2020
Transforming Cities Fund	A61 South	An additional package of schemes within the corridor along the A61 providing bus priority, streetscaping and active travel improvements.
Transforming Cities Fund	A639 Corridor	A package of schemes within the corridor along the A639 providing bus priority, transport hub and active travel improvements.
Transforming Cities Fund	Wakefield City Centre	Several interventions in the urban centre of Wakefield to enhance public transport and active travel access.
Network Rail	Castleford Rail Station	Reinstate platform 2 at Castleford Rail Station and provide new access for all bridges
Network Rail and Wakefield Council	Pontefract Monkhill Rail Station	New access for all bridges at Pontefract Monk Hill rail station, partly funded by Wakefield Council

Despite these planned investments, there are further opportunities to better connect areas to the south and east of Leeds (such as Middleton and Stourton) to other areas of the corridor for housing and employment opportunities. Partners have also highlighted the opportunities for further active travel improvements.

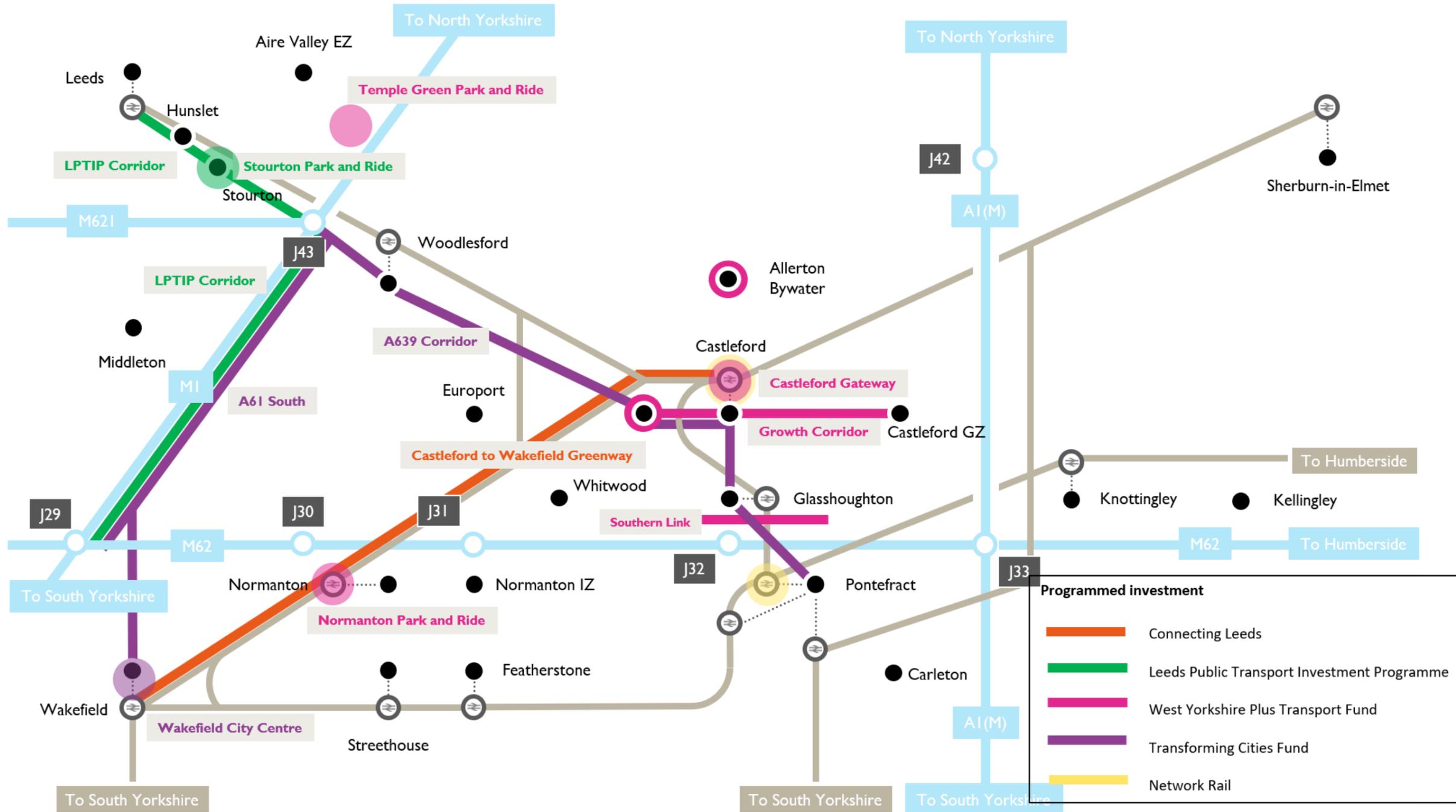
Similarly, there are opportunities to better connect communities in the Five Towns to local employment opportunities, as well as enhancing connectivity towards Leeds.

## 4.2 Existing connectivity improvements

There are several existing proposals scheduled for implementation within the corridor. Figure 24 presents a conceptual map showing the planned highway and active travel corridors and interventions as part of the West Yorkshire Plus Transport Fund (WYPTF) and Connecting Leeds. These include several transport projects to improve connectivity on key routes as well as several proposals to enhance the active travel network, such as Castleford to Wakefield Greenway. Specific schemes from the Leeds Public Transport Investment Programme (LPTIP) also fall within the corridor area. Evidence from these Case for Change reports has also informed the emerging programme of investment for bus priority, walking and cycling through the Transforming Cities Fund (TCF).

Table 5 provides a description of each programme currently providing connectivity improvements throughout the corridor.

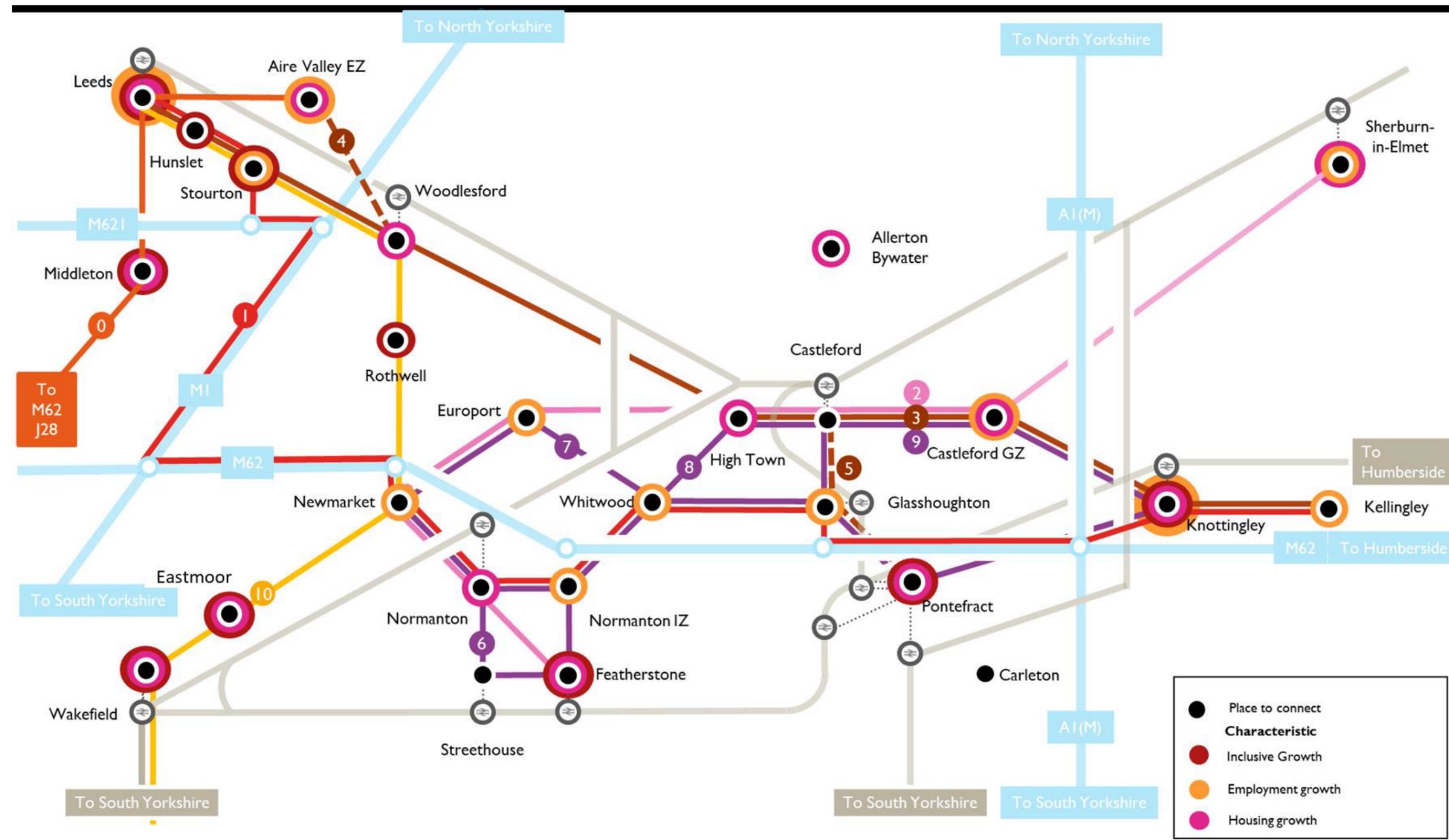
Figure 24: Programmed investment



### 4.3 Connectivity concepts

Based on the feedback from partners and the spatial analysis (which together provide an assessment of the current transport network and issues, future development plans and investment programmes), several “connectivity concepts” have been defined across the economic area, to demonstrate the need for improved connectivity between key places. At this stage, connectivity concepts do not relate to a specific transport mode or a specific route alignment. However, they do enable a strategic appraisal of whether there is merit in connecting people and places, as well as helping to define spatial priorities within the area. Some places not connected through the connectivity concept framework have been addressed in other strands of work such as the West Yorkshire Bus Network Review. Ten connectivity concepts have been defined for the Five Towns to Leeds corridor. These are shown in Figure 25 with an additional concept (the orange line) illustrating a connectivity concept identified through work undertaken for the South East Leeds corridor. A brief narrative for each concept is given below:

Figure 25: Connectivity Concepts Five Towns to Leeds



Source: Mott MacDonald

1 -The Red Concept (Leeds to Kellingley via M62/M1)			
<b>Concept function</b>	Provides <i>strategic</i> connectivity		
<b>Summary</b>	This concept provides a strategic connection between the Five Towns and Leeds. It connects deprived communities such as Whitwood and Knottingley to the economic opportunities across the M1. It draws on the existing road network and using sustainable modes will help to alleviate air quality issues along these congested areas.		
Enabling Inclusive Growth	Boosting Productivity	Tackling the Climate Emergency	Delivering 21 <sup>st</sup> Century Transport
<ul style="list-style-type: none"> <li>Connects deprived communities in south east Leeds, Whitwood and Knottingley to economic opportunities</li> </ul>	<ul style="list-style-type: none"> <li>Connects key areas of employment and housing at Stourton, Newmarket, Normanton, Normanton Industrial Zone, Whitwood, Glasshoughton, Knottingley and Kellingley with the Leeds</li> </ul>	<ul style="list-style-type: none"> <li>Intersects with 56% of the corridors AQMA areas</li> <li>Offers the potential to make use of existing infrastructure to connect key places in a more sustainable and/or innovative way</li> </ul>	<ul style="list-style-type: none"> <li>Provides a strategic connection between the Five Towns and the Leeds, connecting over 1500 people from isolated communities</li> <li>Draws on the connectivity provided by the existing strategic road network (M62, M1, M621), by broadly following its alignment but linking into key "places to connect" in the Five Towns</li> </ul>
<b>Indicative mode</b>	Bus Rapid Transit / Bus		

2 - The Pink Concept (Featherstone to Sherburn in Elmet)			
<b>Concept function</b>	Provides <i>strategic</i> connectivity		
<b>Summary</b>	This concept provides a strategic connection between the Five Towns, improving connectivity amongst the towns of Castleford, Normanton and Featherstone. It provides connection to the employment growth at Sherburn in Elmet, whilst also connecting housing growth sites at Castleford Growth Zone, Europort and Newmarket. This tackles connections across the motorway network and would help to tackle air quality issues.		
Enabling Inclusive Growth	Boosting Productivity	Tackling the Climate Emergency	Delivering 21 <sup>st</sup> Century Transport
<ul style="list-style-type: none"> <li>Connects deprived communities to the east and west of Castleford</li> <li>Connects deprived communities in Featherstone.</li> </ul>	<ul style="list-style-type: none"> <li>Improves connectivity between the Five Towns and the employment growth area at Sherburn-in-Elmet</li> <li>Improves connectivity to other employment and housing growth sites within the Five Towns, including Castleford Growth Zone, Europort and Newmarket</li> </ul>	<ul style="list-style-type: none"> <li>Tackles connections across the motorway network, which currently contribute towards poor air quality</li> <li>Intersects with 33% of the corridors AQMA areas</li> </ul>	<ul style="list-style-type: none"> <li>Improves connectivity to Castleford, Normanton and Featherstone rail stations</li> </ul>
<b>Indicative mode</b>	Bus Rapid Transit / Bus		

3 – The Brown Concept (Kellingley to Leeds) 4 – The Brown Concept: Aire Valley Branch (Kellingley to Aire Valley Enterprise Zone) 5 – The Brown Concept: Pontefract Branch (Pontefract to Leeds)			
<b>Concept function</b>	Provides <i>strategic</i> connectivity		
<b>Summary</b>	This concept provides a strategic connection between the Five Towns and Leeds and/or the Aire Valley Enterprise Zone. In doing so it connects deprived communities with housing and employment growth sites, connecting over 1800 people from isolated communities.		
Enabling Inclusive Growth	Boosting Productivity	Tackling the Climate Emergency	Delivering 21 <sup>st</sup> Century Transport
<ul style="list-style-type: none"> <li>Connects deprived communities in south east Leeds, Castleford, Knottingley and Pontefract.</li> </ul>	<ul style="list-style-type: none"> <li>Provides a strategic connection between the Five Towns and Leeds and/or the Aire Valley Enterprise Zone</li> <li>Improves connectivity to housing and employment growth areas including, Castleford Growth Zone, Glasshoughton and Kellingley</li> </ul>	<ul style="list-style-type: none"> <li>Improves connectivity on routes where congestion is an issue.</li> <li>Accords with 3 Healthy Street Principles</li> </ul>	<ul style="list-style-type: none"> <li>Improves connectivity to Woodlesford, Castleford, Glasshoughton, Knottingley and Pontefract rail stations</li> <li>Connects over 1800 people from isolated communities</li> </ul>
<b>Indicative mode</b>	Rail infrastructure		

6 – The Purple Concept (Featherstone – Normanton Loop) 7 – The Purple Concept (Normanton – Whitwood – Europort Loop) 8 – The Purple Concept (Whitwood – Glasshoughton – Castleford Loop) 9 – The Purple Concept (Castleford – Pontefract – Knottingley Loop)			
<b>Concept function</b>	Provides <i>local</i> connectivity		
<b>Summary</b>	This concept provides short distance connections, unlocking opportunity within the Five Towns and connecting them to other "key places to connect". It offers alternatives to congested motorway networks, whilst providing connectivity to housing growth sites at Europort, Newmarket, Normanton Industrial Zone and Castleford Growth zone.		
Enabling Inclusive Growth	Boosting Productivity	Tackling the Climate Emergency	Delivering 21 <sup>st</sup> Century Transport
<ul style="list-style-type: none"> <li>Provides short distance connections, unlocking opportunity within the Five Towns.</li> <li>Connects deprived communities in Featherstone, Castleford, Whitwood, Knottingley and Pontefract</li> </ul>	<ul style="list-style-type: none"> <li>Connects employment and housing growth including Europort, Newmarket, Normanton Industrial Zone and Castleford Growth Zone.</li> <li>Connects to over 2000 jobs</li> </ul>	<ul style="list-style-type: none"> <li>Provides connections that offer local alternatives to congested motorway network</li> <li>Has 3 touchpoints to the National cycling Network</li> </ul>	<ul style="list-style-type: none"> <li>Provides connectivity between the Five Towns and other key "places to connect" within the Five Towns area.</li> <li>Improves connectivity to nine rail stations throughout the Five Towns.</li> </ul>
<b>Indicative mode</b>	Bus / Active travel		

## 10 – The Gold Concept (Leeds Chapelthorpe)

**Concept function** Provides *strategic* connectivity

**Summary** This concept provides a strategic connection between Chapelthorpe and Leeds, whilst connecting deprived communities in Wakefield and south east Leeds. Employment opportunities at Stourton, Newmarket and Wakefield are connected to households without access to a car as well as frequently connecting to the national cycle network to encourage active travel.

Enabling Inclusive Growth	Boosting Productivity	Tackling the Climate Emergency	Delivering 21 <sup>st</sup> Century Transport
<ul style="list-style-type: none"> <li>Improves connectivity to health-care facilities at Pinderfields</li> <li>Connects deprived communities in Wakefield and south east Leeds</li> </ul>	<ul style="list-style-type: none"> <li>Improves connectivity to key areas of employment opportunities at Stourton, Newmarket and Wakefield</li> <li>Connects over 400 households without access to a car</li> </ul>	<ul style="list-style-type: none"> <li>Improves connectivity on routes where congestion is an issue, such as the M1</li> <li>Connects to 10 “touchpoints” with the national cycle network</li> </ul>	<ul style="list-style-type: none"> <li>Provides a strategic connection between Chapelthorpe and Leeds improves connectivity to Woodlesford, Sandal and Agbrigg and Wakefield rail stations</li> </ul>

**Indicative mode** Bus / Active travel

#### 4.4 Appraisal outcomes

Our appraisal process (summarised in 3.4.1) has been applied to the 10 connectivity concepts to define spatial priorities in the Five Towns to Leeds corridor.

Each of the four assessment theme scores are averaged to provide an overall INSET score of between 0 and 1, where 1 represents a perfect correlation and anything else represents a degree of deviation from that perfect score. Typically, the total scheme scores lie somewhere between the two numbers with the following categories assigned:

**Table 6: Scoring ranges**

Scores	Ranges
Excellent	0.99 – 1.00
Good	0.75 – 0.99
Average	0.50 – 0.75
Fair	0.25 – 0.50
Low	<0.25

Source: Mott MacDonald

The outcome of the prioritisation for the connectivity concepts is summarised in Figure 26.

Although all concepts were classified as “Good” or “Average” overall, there is differentiation within the defined scoring range. The Brown, Red and Purple concepts (Figure 27) demonstrated the best level of fit across all themes and sifts and therefore have the potential to produce the greatest benefit from intervention. Given that the Red concept predominantly uses the motorway network and connects the same destinations as the Brown concept, further analysis will focus on the **Purple** and **Brown** concepts where additional infrastructure could be considered.

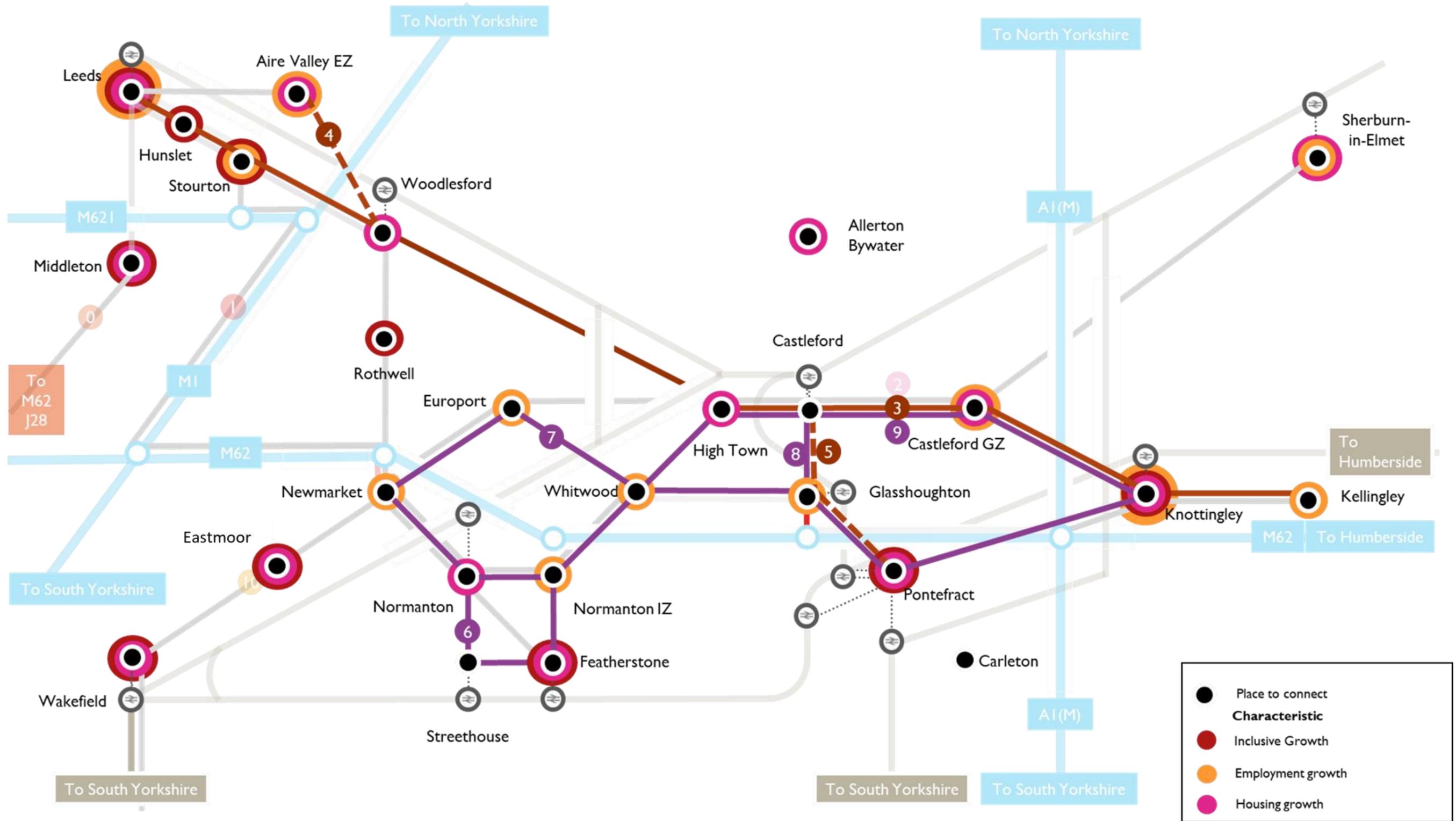
**Figure 26: Appraisal outcomes for connectivity concepts – ranked**

Rank	#	Connectivity concept	Sift 1: Early sift				Sift 1: Early sift Score	Sift 2: Local fit	Sift 3: Level of impact				Sift 3: Level of impact	Overall score
			Enabling Inclusive Growth	Boosting Productivity	Tackling the Climate Emergency	Delivering 21 <sup>st</sup> Century Transport			Enabling Inclusive Growth	Boosting Productivity	Tackling the Climate Emergency	Delivering 21 <sup>st</sup> Century Transport		
1	3	Brown Route Option 1 - Kellingley to Leeds via Castleford	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Fair	Good	Average	Good	Average	Good
2	5	Brown Route Option 3 - Pontefract extension	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Fair	Good	Average	Average	Average	Good
3	1	Red Route - Kellingley to Leeds via Glasshoughton & Normanton	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Fair	Average	Average	Good	Average	Good
4	4	Brown Route Option 2 - Kellingley to Aire Valley Enterprise Zone via Castleford	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Fair	Average	Average	Good	Average	Good
5		Purple Route Combined	Average	Excellent	Excellent	Excellent	Good	Good	Low	Fair	Average	Average	Fair	Good
6	2	Pink Route - Featherstone to Sherburn	Average	Excellent	Excellent	Excellent	Good	Good	Low	Fair	Average	Good	Fair	Average
7	9	Purple Route 9	Average	Excellent	Average	Excellent	Good	Good	Low	Average	Fair	Good	Fair	Average
8	8	Purple Route 8	Fair	Excellent	Excellent	Excellent	Good	Good	Low	Average	Low	Good	Fair	Average
9	7	Purple Route 7	Fair	Excellent	Excellent	Excellent	Good	Good	Low	Fair	Low	Average	Fair	Average
10	6	Purple Route 6	Fair	Excellent	Average	Excellent	Good	Good	Low	Fair	Low	Average	Fair	Average

Source: Mott MacDonald

**Overall, the Brown and Purple connectivity concepts have been identified as the spatial priorities as they are the highest scoring concepts that address *both connectivity requirements to and from the Five Towns and between the Five Towns*. These are shown in Figure 27. Delivering improved connectivity along these connectivity concepts will help to increase travel horizons within the Five Towns and beyond, which have historically been low.**

Figure 27: Prioritised connectivity concepts



Source: Mott MacDonald

### 4.5 Demand

An assessment has been undertaken using the Combined Authority’s Urban Dynamic Model (UDM) to estimate the total peak hour trip demand along each of the prioritised connectivity concepts. This presents 2033 forecasts of demand using established assumptions of the development landscape.

A mode technology framework developed by the Combined Authority has then been used to identify what mode of transport might be appropriate based on having a suitable capacity per hour (see Table 7).

Please refer to Section 9.2.2 of the Appraisal Handbook for the detailed workings of demand estimation.

**Table 7: Mode technology framework**

Mode	Capacity per service	Typical capacity per hour	Potential role
Walking and Cycling	1	Greatest potential for shorter distance journeys, particularly across congested city centre/urban environments	
Demand Responsive Transport	5 - 12	800 – 1,500 passengers	Most suited to low demand areas or periods where a scheduled service would be inefficient with regard to cost and use
Standard Double Decker Bus	70 – 80	Less than 1,000 passengers	Flexible services which meet local accessibility needs – with very high density shopping patterns
Bus Rapid Transit	70 – 80	500 – 2,000 passengers	Limited stops outside of urban centres. Moves large volumes of people relatively short distances within an urban / city centre environment
Light Rail / Tram / Mass Transit	100 – 200	1,000 – 4,000 passengers	BRT is often typically implemented where there is less demand or as a precursor to Mass Transit
Suburban Heavy Rail	500 – 700	2,000 – 6,000 passengers	Move large volumes of people over longer distances (eg:10-30 miles) with limited stops
Inter urban / national Heavy Rail	500 - 1000	Up to 27,000 passengers	Centre to centre fast and direct services

Source: West Yorkshire Combined Authority

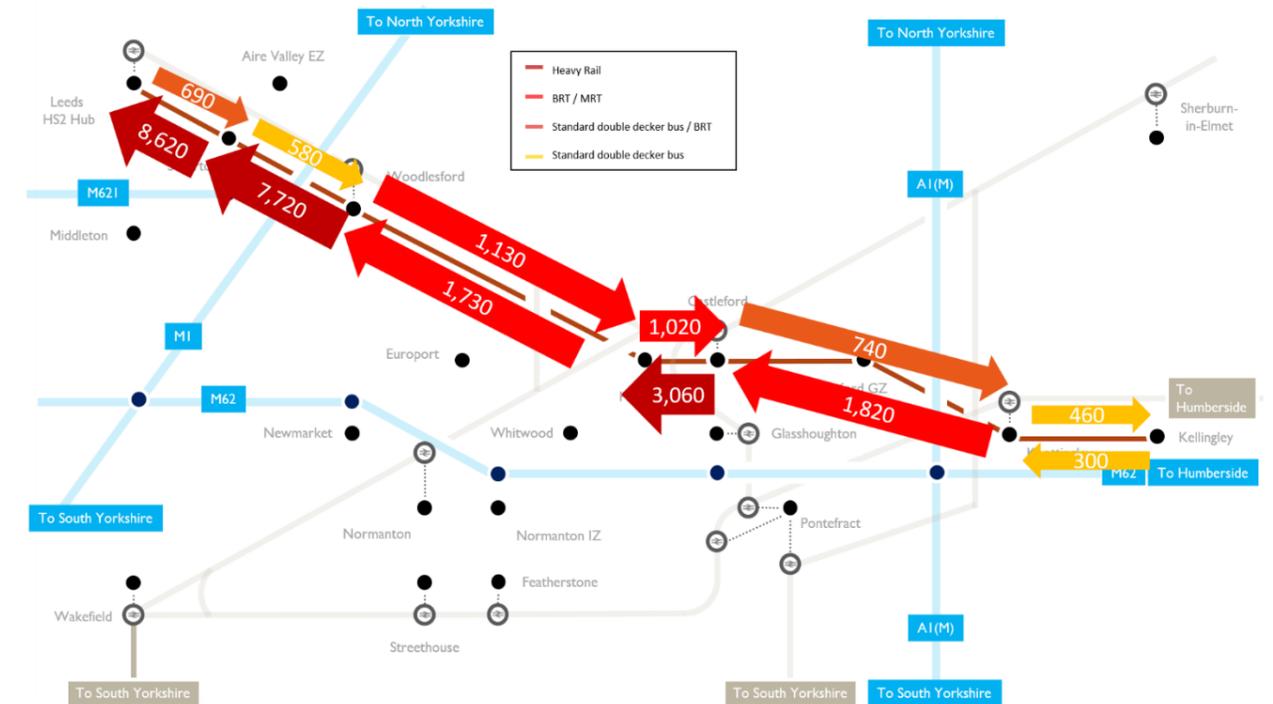
The demand analysis provides indicative evidence in identifying the potential for future modes along the connectivity concepts. Lower capacity modes could also be considered elsewhere in the hierarchy to provide a range of integrated transport services that could address these forecast levels of demand. The figures presented here illustrate

- Unconstrained demand that focuses on the potential of movement between places
- Aggregate flows between each place to connect within the connectivity concept
- Two-way flows to illustrate key attractors on the network
- Variations in demand between places to connect to demonstrate the range of services that could potentially be provided within each connectivity concept.

Figure 28 below shows demand in 2033 along the highest scoring connectivity concept; Brown Concept Option 1. This provides a strategic connection between the Five Towns and Leeds and suggests that the demand may be high enough to require heavy rail on this corridor, particularly between Castleford and Hightown / Whitwood and from Woodlesford to Leeds.

Rail infrastructure already exists on this corridor, but partners have indicated that there is relatively limited potential to significantly increase capacity. This suggests a need to provide additional supporting options along this concept, such as Bus Rapid Transit (BRT) or Mass Rapid Transit (MRT). Demand between Knottingley and Kellingley is much lower than the rest of the corridor indicating standard double decker bus service between these areas may be appropriate; therefore, quality of interchange will be important at Knottingley.

**Figure 28: 3 - Brown Concept Option 1 – Demand 2033**



Source: Urban Dynamic Model (UDM)

Figure 29 shows demand between Castleford and Normanton, Castleford and Pontefract, and Castleford and Knottingley in 2033. This shows a high number of people travelling from Normanton to Whitwood / Hightown, suggesting demand is high enough to support a heavy rail option. Demand from Castleford to Normanton and Pontefract is high, implying the potential for Bus Rapid Transit (BRT) or Mass Rapid Transit (MRT) whereas demand between Knottingley and Castleford is much lower, indicating a standard double decker bus, or potentially BRT, may be sufficient.

Figure 30 shows more localised demand on the Purple Concept in 2033 – more specifically, the level of demand between each neighbouring place to connect. This provides an assessment of the level of short distance, more localised journeys that will take place. This shows that there is high demand between Whitwood / Hightown and Normanton / Featherstone, as well as to Castleford and Glasshoughton, implying the potential for a BRT / MRT level of service. A standard double decker bus or BRT may be more suitable to meet future demand for trips travelling from Knottingley into Castleford and Pontefract. There are slightly lower levels of demand along other connections that suggest standard double decker bus service will





## 5 Conclusion: The need for intervention in the Five Towns to Leeds

### 5.1 Introduction

This Case for Change presents the evidence and strategic narrative for investing in improved connectivity in the Five Towns to Leeds corridor.

Through evidence review, and engagement from district partners, key places to connect have been identified, and a complementary series of connectivity concepts have been developed to show where there is greatest need to improve connections between people and places in the corridor. These places to connect have been used to support evidence gathering in other workstreams and are shown in Figure 31.

An appraisal of each of the concepts provides evidence to demonstrate which connectivity concepts have the greatest potential to enable inclusive growth, boost productivity, tackle the climate emergency, and deliver a 21st century transport system. The connectivity concepts prioritised through this process focus on making connections between and within Leeds and the Five Towns including Pontefract, Castleford, Featherstone, Normanton and Knottingley. The prioritised concepts also provide improved connections within the Five Towns, and to economic growth areas such as Europort, Newmarket, and the Castleford Growth Zone. A high-level demand analysis has been also undertaken on these concepts to illustrate the potential for higher capacity modes of transport that might support improved connectivity between the key places to connect.

The Case for Change is one of several complementary sources that together, form a complex evidence base. Other evidence sources include:

- West Yorkshire Bus Network Review
- Leeds City Region Rail Vision and Capacity Study
- Leeds City Region Emissions Reduction Pathway
- West Yorkshire Walking and Cycling Strategy
- West Yorkshire Future Mobility Strategy
- West Yorkshire Urban Transit Study
- Ongoing engagement with district partners



## 5.2 Connectivity Network

This Case for Change report therefore brings together several strands of evidence that have been evaluated and will ultimately inform the development of a package of interventions across several modes.

The emerging multi-modal network on which future interventions will focus provides a framework to address the key connectivity issues and opportunities that have been highlighted through this study and other strands of evidence. This network for the Five Towns to Leeds is illustrated in Figure 32. This will link with networks developed in other Case for Change reports within the Connectivity Plan to provide a full multi-modal network for West Yorkshire.

**Figure 32: Five Towns to Leeds Connectivity Network**

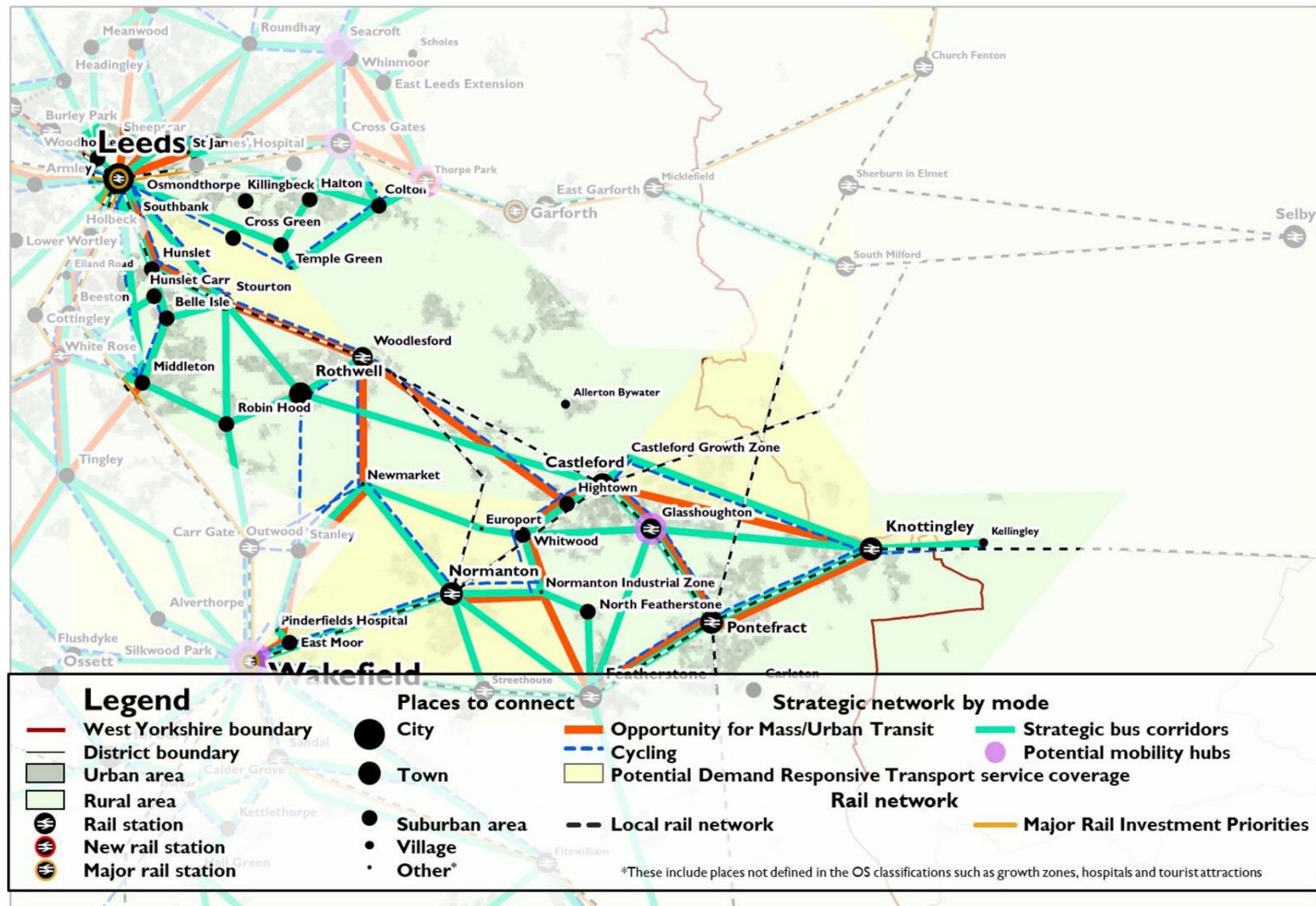
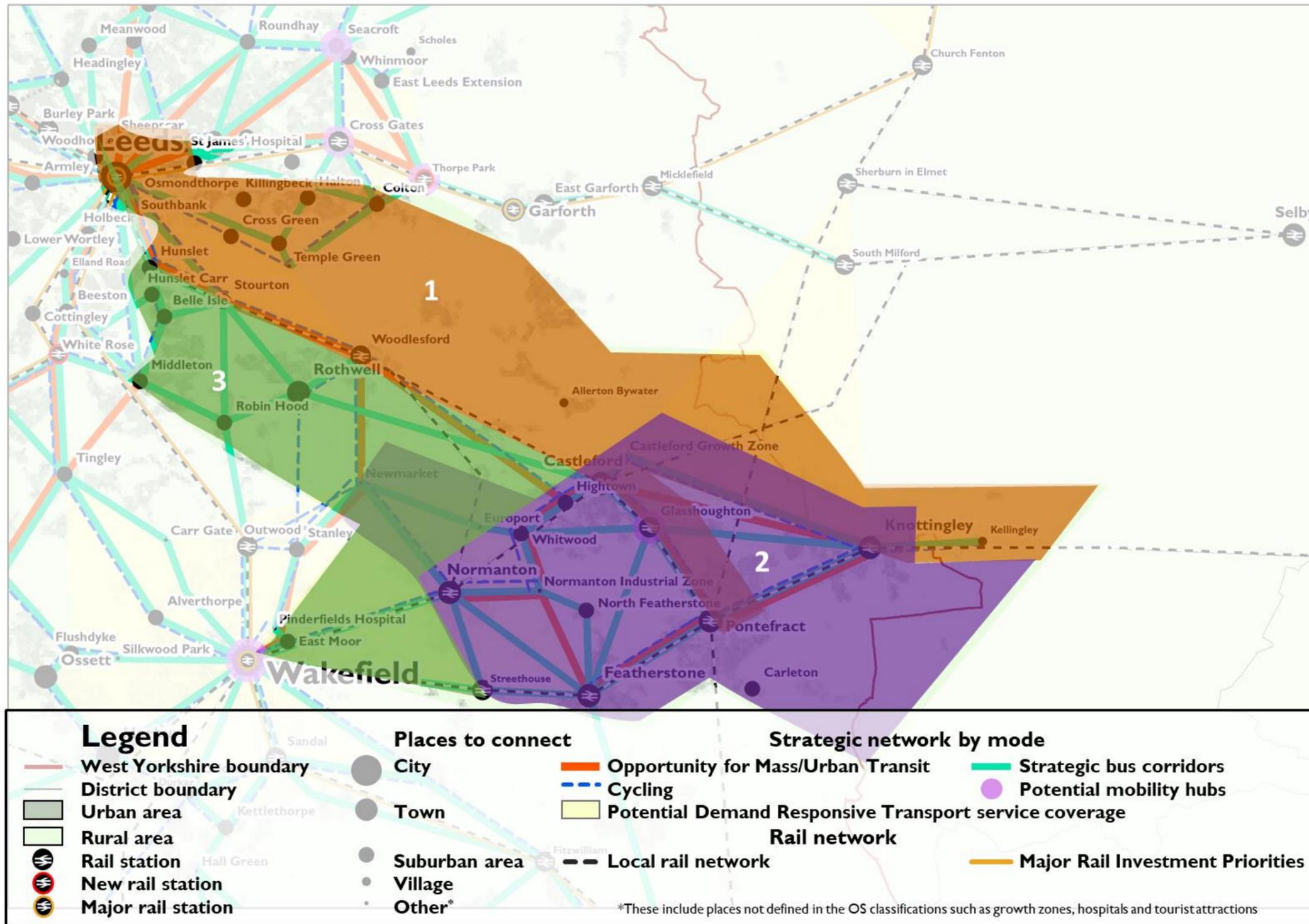


Figure 33 illustrates spatially how the various strands of evidence, including the prioritised connectivity concepts and subsequent demand analysis, provide a rationale for network interventions in the Five Towns to Leeds corridor. These strands of evidence are summarised in Table 8:

**Table 8: Network areas**

Network Area	Description	Rationale				Evidence
		Enabling Inclusive Growth	Boosting Productivity	Tackling the Climate Emergency	Delivering 21 <sup>st</sup> Century Transport	
1	Brown Connectivity Concept	 <p>Connects deprived communities in south east Leeds, Castleford, Knottingley and Pontefract.</p>	 <p>Provides a strategic connection between the Five Towns and Leeds and/or the Aire Valley Enterprise Zone Improves connectivity to housing and employment growth areas including, Castleford Growth Zone, Glasshoughton and Kellingley</p>	 <p>Improves connectivity on routes where congestion is an issue on the approaches to Leeds.</p>	 <p>Demand analysis suggests that heavy rail is likely to best serve this corridor. Rail service exists. However, partners suggest this is at capacity indicating a need to provide an alternative option to meet demands such as BRT or MRT.</p>	Five Towns to Leeds Case for Change report
2	Purple Connectivity Concept	<p>Provides short distance connections, unlocking opportunity within the Five Towns. Connects deprived communities in Featherstone, Castleford, Whitwood, Knottingley and Pontefract</p>	<p>Connects employment and housing growth including Europort, Newmarket, Normanton Industrial Zone and Castleford Growth Zone.</p>	<p>Provides connections that offer local alternatives to congested motorway network</p>	<p>High demand travelling into Whitwood / Hightown from Normanton / Featherstone, as well as Castleford and Glasshoughton, indicates potential for a BRT / MRT level of service. Standard double decker bus service from Knottingley to Castleford and Pontefract. Where there are slightly lower levels of demand, this suggests the need for active travel measures on these concepts.</p>	Five Towns to Leeds Case for Change report
3	South East Leeds	<p>Connects deprived such as Hunslet, Rothwell and Middleton to wider economic opportunities in the south and east of Leeds and north and east of Wakefield</p>	<p>Provides key connections between Leeds and Wakefield through towns such as Middleton and Rothwell.</p>	<p>Improves connectivity on routes where congestion is an issue around the approaches to Leeds.</p>	<p>West Yorkshire Bus Network Review has highlighted the importance of providing bus connections between satellite towns south of Leeds and north of Wakefield, supplemented with active travel improvements.</p>	West Yorkshire Bus Network Review South and East Leeds Case for Change Report Wakefield and Barnsley to Leeds Case for Change Report

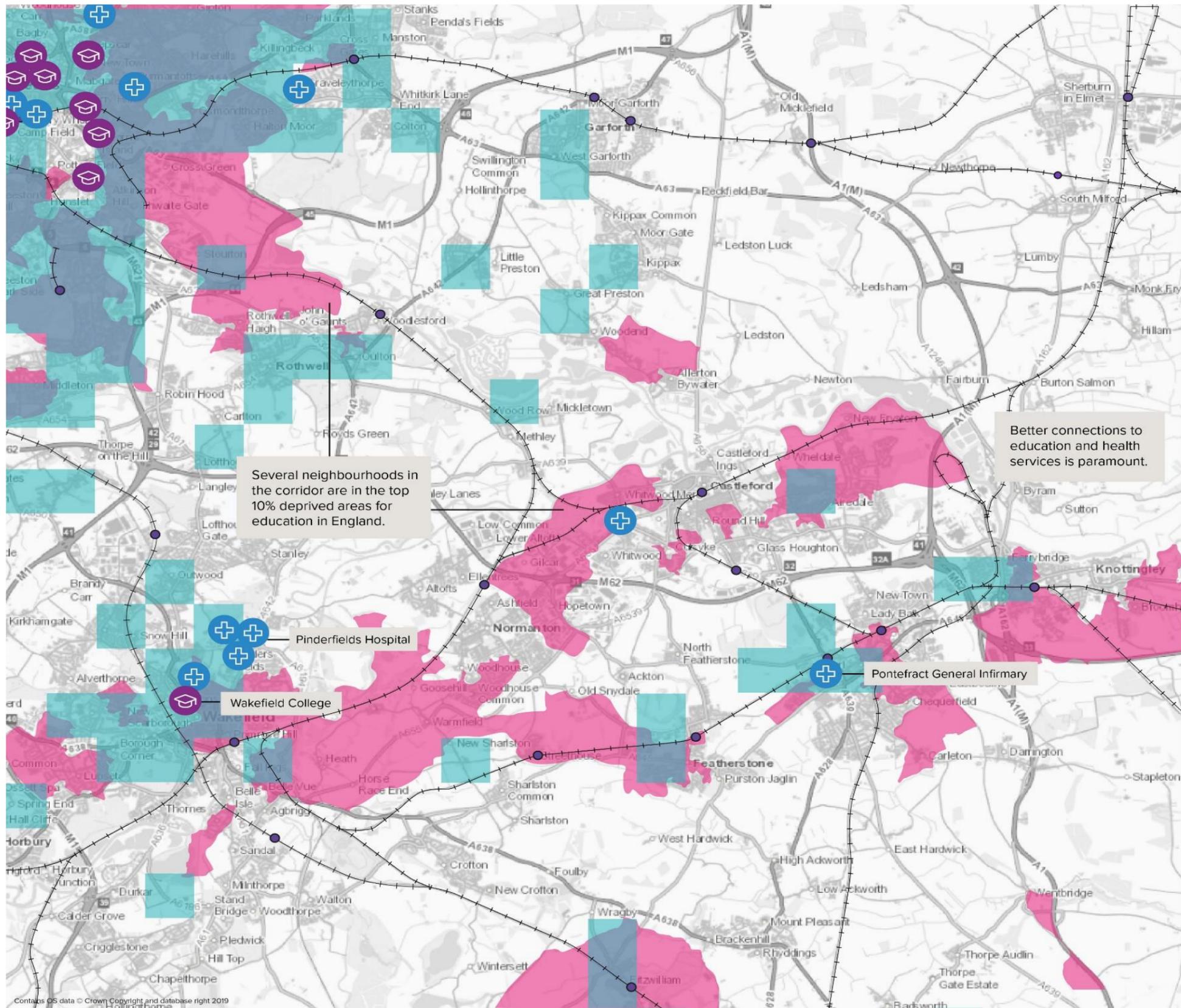
Figure 33: Evidence map for network interventions



## Appendices

A.	Spatial context highlights across the regional priorities	38
B.	Five Towns to Leeds: Investment Case	43

## **A. Spatial context highlights across the regional priorities**



### Enabling inclusive growth

- ++ Rail line
- Rail station
- ⊕ Hospitals
- ⌚ Higher education services
- Top 10% deprived areas for education in England
- Equality, Diversity and Inclusion (EDI) hotspots

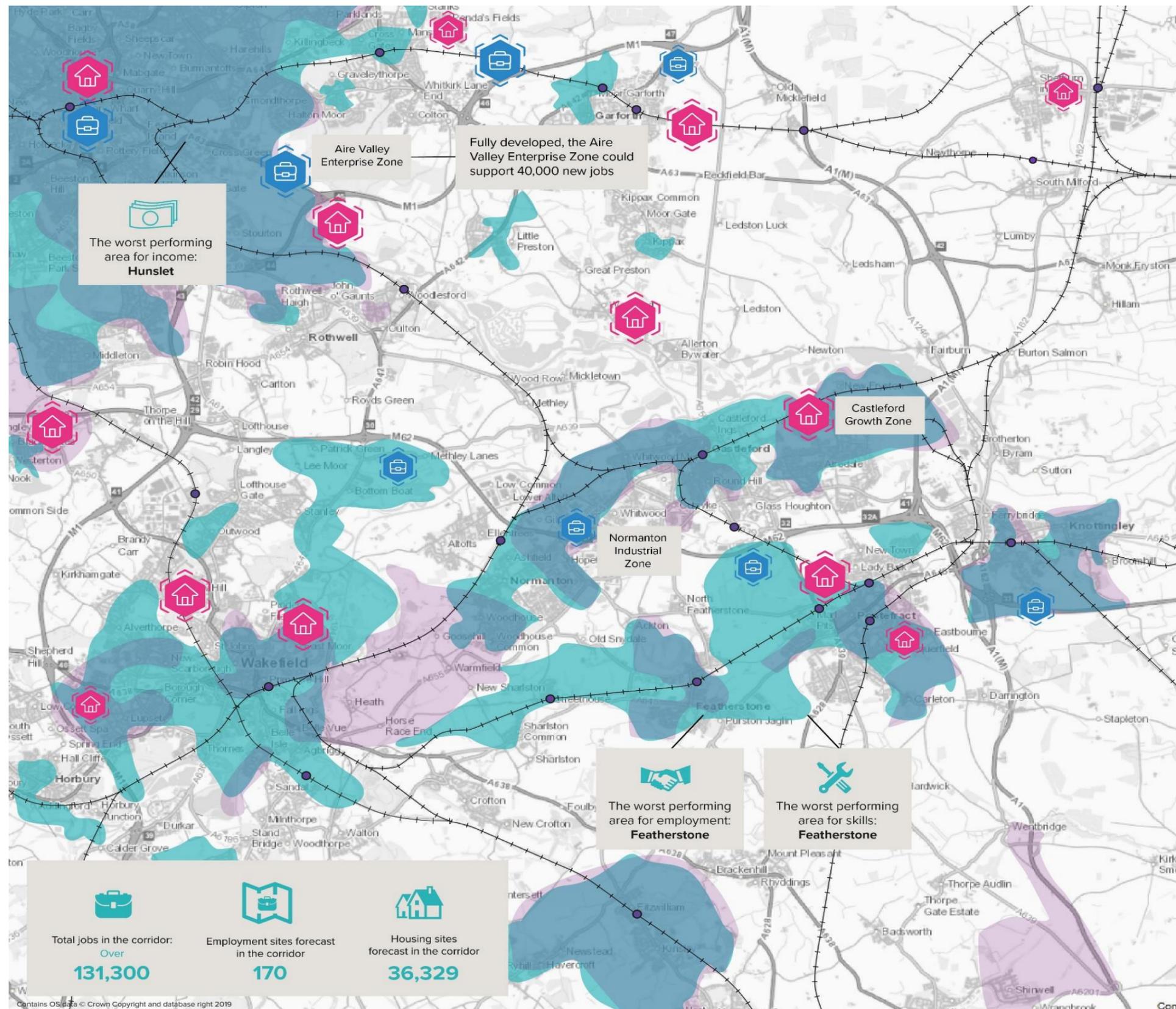
These areas show high concentrations of population, people from "protected characteristic groups" (as defined by the Equality Act 2010, including age, disability, gender reassignment, marriage or civil partnership, pregnancy and maternity, race, religion or belief, sex, sexual orientation), and trip attractor destinations such as schools, hospitals, religious buildings and care homes.

This map shows the inclusivity indicators within the corridor, including education and health services and the spread of Equality, Diversity and Inclusion (EDI) hotspots.

Poor access to education is a prevalent issue according to deprivation statistics, and many people rely on convenient and reliable public transport options to access new growth areas and services. There is a particularly high concentration of health and education services in Leeds in the north west corner of the corridor. Having reliable connections from the Five Towns to these opportunities could benefit the wider corridor.

EDI hotspots are seen in small pockets throughout the corridor. This is particularly evident in Pontefract, where there are many communities with protected characteristics and specific needs. Consideration of these must be made when improving transport services to ensure growth is felt by all, and does not discriminate or divide access between groups of people.





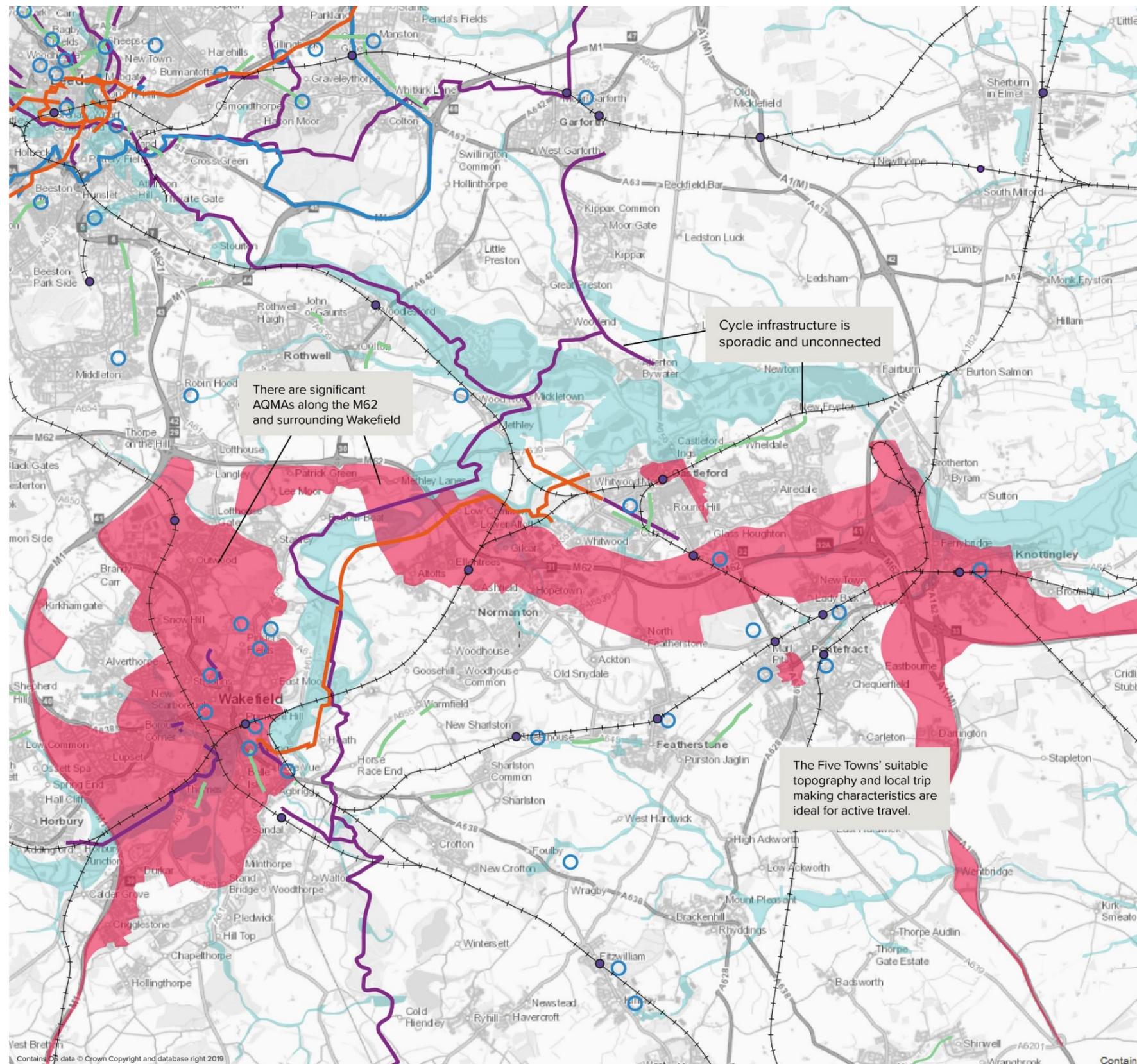
### Boosting productivity

- Future growth sites**
- Housing
- Employment
- Rail line
- Rail station
- Top 20% most deprived in England
- >26% no car ownership

This map shows employment and housing growth opportunities and other economic characteristics to understand the corridor's productivity gap.

The Aire Valley Enterprise Zone adds considerable employment opportunities to the corridor, located to the south east of Leeds. Moreover, there are several areas of employment growth situated along the M62, including the Whitwood Enterprise Park. The majority of future employment sites found here are B2 (general industrial) and B8 (storage and distribution). Providing access to such sites by public transport and active modes of travel outside of peak hours will help improve employment opportunities for those in deprived areas. Housing growth is concentrated in key sites such as the Castleford Growth Zone and in extension to Castleford and Pontefract towards the M62.

High levels of deprivation are prevalent in the corridor and are wrapped around the Five Towns along with high levels of no car ownership. Ensuring that these communities are connected to the above-mentioned growth opportunities is paramount to boost productivity for the corridor.



### Tackling the climate emergency

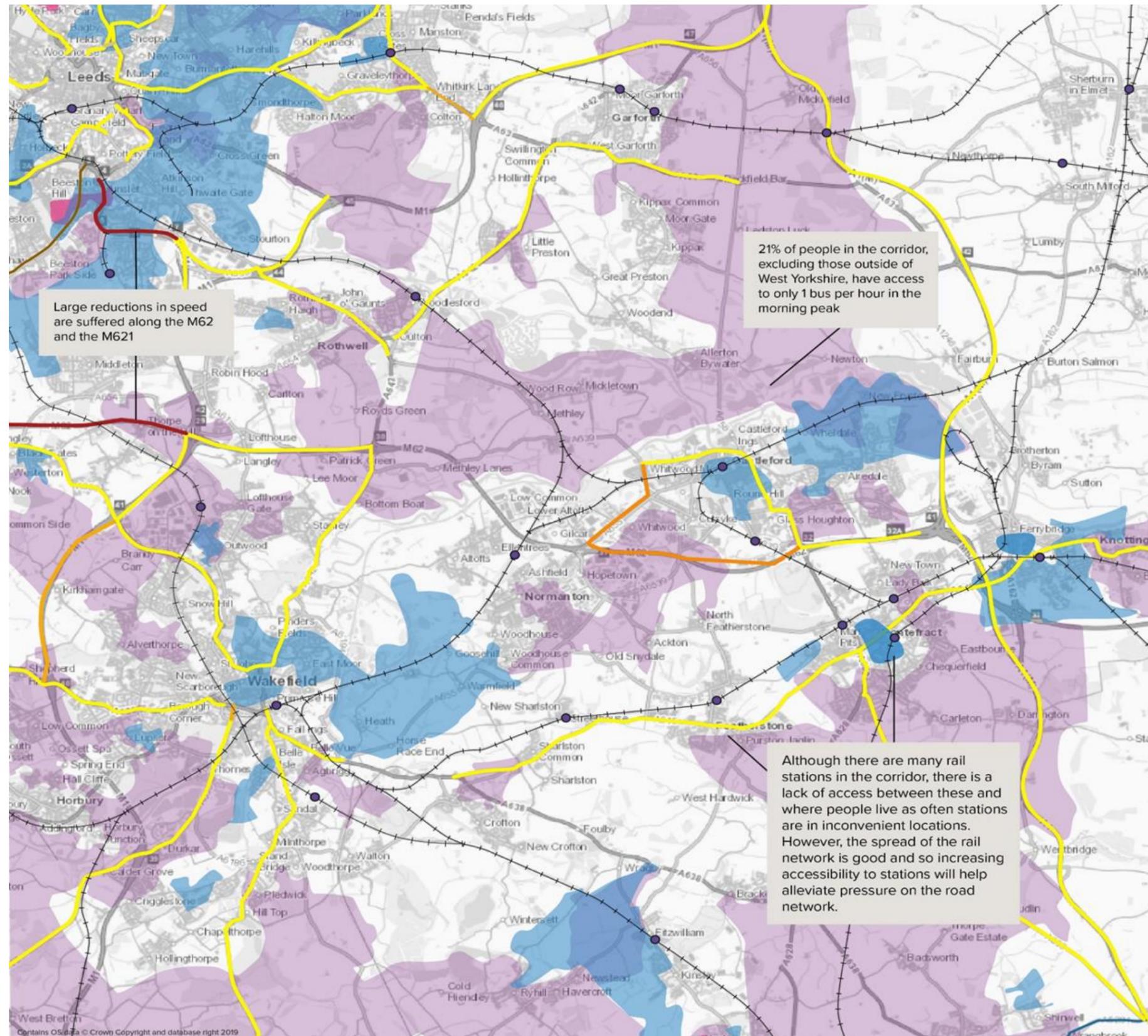
-  Rail line
-  Rail station
-  Clean Air Zone 2025
-  National Cycle Network
-  Cycle City Ambition Grant
-  West Yorkshire National Cycle Lanes
-  Points of interest
-  Air Quality Management Area
-  Flood Zone 3

These areas are assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), as set out in the National Planning Policy Guidance.

This map shows how the corridor currently stands in relation to delivering clean growth, particularly looking at the active travel network and the air quality management areas (AQMA). The geography of the corridor means that some areas are of high flood vulnerability, which any interventions will need to take into consideration.

The AQMAs cover a large portion of this corridor, with a significant focus around the M62. This encompasses large amounts of Pontefract and Knottingley, with these communities suffering directly from air pollution issues.

The active travel network struggles to reach several communities throughout the corridor, with a lack of infrastructure between the Five Towns themselves, presenting a barrier to active travel in these communities. Similarly, the National Cycle Network extends south easterly from Leeds but doesn't connect to all the Five Towns. The local trip making and the flat topography here makes this area suitable for cycling.



## Delivering 21<sup>st</sup> century transport

- ++ Rail line
  - Rail station
  - Isolated communities
- These are areas where the distance travelled to work and the average number of destinations people can reach for journeys to work across the Leeds City Region, are lower than the national average. This is based on the approach adopted for the Joseph Rowntree Foundation for "Tackling transport related barriers to employment in low-income neighbourhoods".
- Bus service provision (in the morning peak)**
- Poor (1 bus per hour)
  - Non-existent (0 buses per hour)
- Congestion: Speed reduction due to peak-time congestion**
- Over 30 kmph
  - Between 20 – 29 kmph
  - Below 10 – 19 kmph

This map shows the existing transport network in the form of the current rail network, highway congestion performance and the bus service provision.

This map shows the existing transport networks, including rail lines and stations, highway congestion and bus service provision. This demonstrates how people will struggle to travel between the Five Towns via public transport and limits many communities' ability to access job opportunities that may be out of peak times. Not only are bus services infrequent in some areas, a further deterrent to bus usage is the congestion across the corridor. East to west connectivity is limited with reductions in speed throughout the corridor, particularly along the M621 into Leeds. Motorway congestion affects communities in Swillington and towards Castleford, due to rat-running.

## B. Five Towns to Leeds: Investment Case

The highest scoring “connectivity concepts” represent the corridor’s spatial priorities. For this corridor these are Brown and Purple lines as these were the best performing concepts for connectivity *to and from* the Five Towns and *between* the Five Towns. These connectivity concepts are used as the framework for developing interventions that will address the Leeds City Region’s future connectivity requirements and improve travel horizons throughout the corridor.

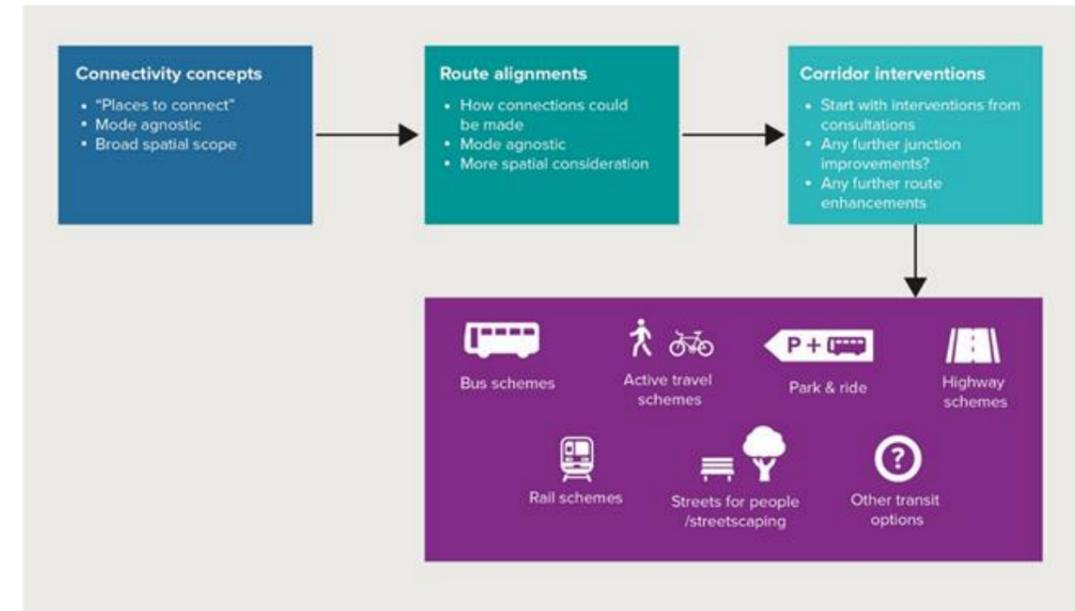
### B.1 Developing interventions

Potential route alignments are identified as ways to provide the connections identified within the “connectivity concepts”. For example, potential route alignments could be road corridors, disused railway lines, canal towpaths, watercourses or public rights of way. The route alignments remain conceptual and mode agnostic, but as they are considered in further detail, can become more mode specific as interventions.

Interventions are identified from stakeholder feedback, consideration of previous feasibility studies, and a detailed desktop gap analysis. The latter looks at existing (current and disused) transport provision and networks and the current pipeline of works in the corridor<sup>16</sup> to identify new interventions that will provide the required connectivity opportunities for the future by giving greater breadth and opportunity to travel and increasing travel horizons. Scheme types include: active travel – walking and cycling (both on and off road), bus corridor treatment (bus priority measures and/or road space reallocation), bus service, masterplanning and “Streets for People”, Park & Ride, rail, highways, transit concepts (e.g. BRT, tram-train etc.).

The longlist excludes schemes that have been developed as part of other workstreams, although it is possible there will be some overlap if options have been identified independently in both this report and other specific studies (e.g. LCWIP). Some of these schemes have also been accelerated as part of West Yorkshire’s Transforming Cities Fund programme.

The following diagram summarises the process for developing interventions.



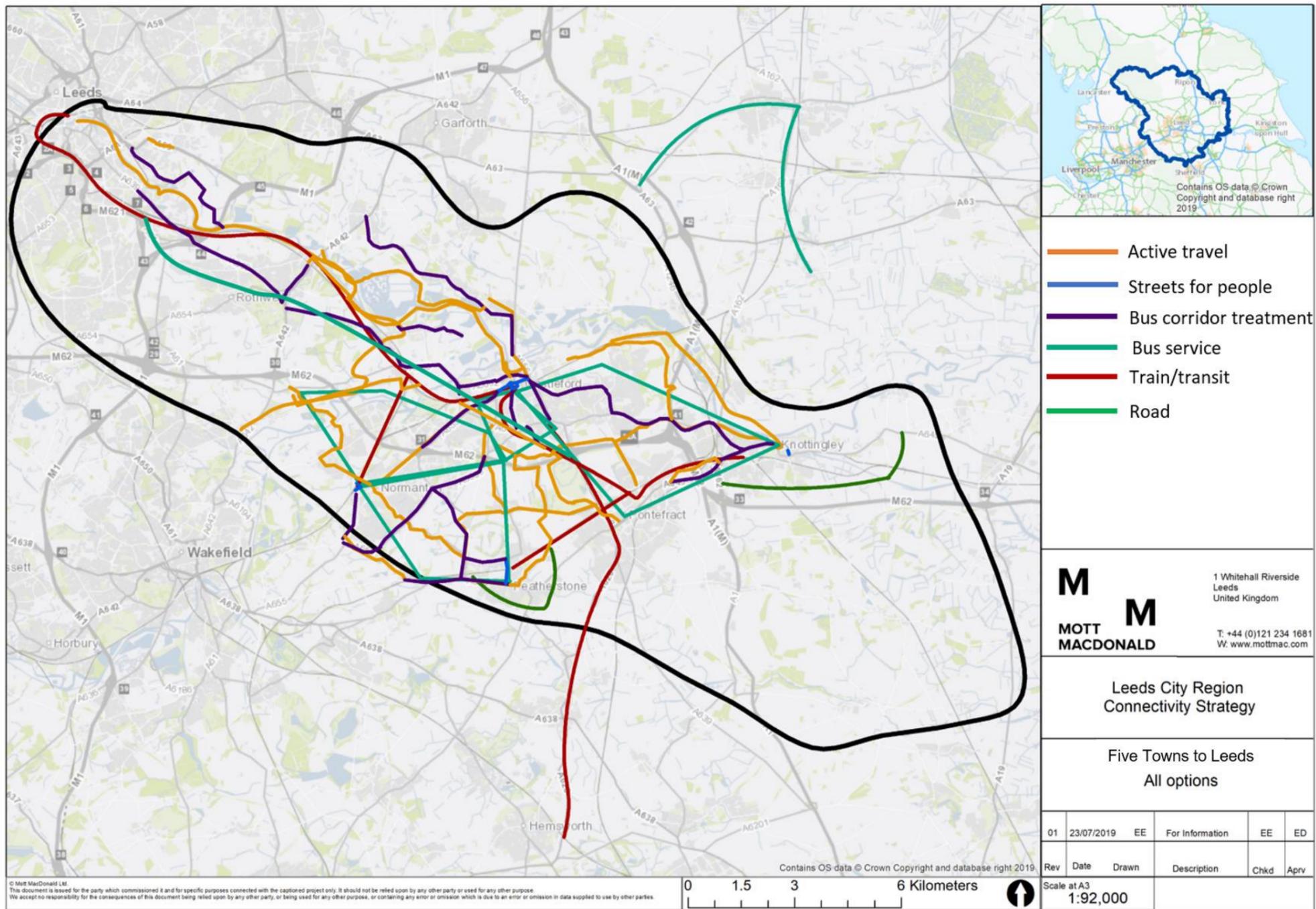
All interventions have been assigned a scheme type, a high-level deliverability and timescale attribute, as follows:

- Scheme types
  - Active travel (on and off-road walking and cycling)
  - Bus corridor treatment (bus priority measures and/or road space reallocation)
  - Bus service
  - Masterplanning / Streets for People - Improved urban realm and accessibility for pedestrians and cyclists
  - Park & Ride
  - Rail
  - Highways
  - Transit concepts (e.g. BRT, tram train etc.)
- Delivery timescales: short, medium, long term.
- Technical complexity: low, medium, high
- Connectivity concept: identifies the connectivity concept each scheme aligns to

The result of the process above is a longlist of 62 interventions for the Five Towns to Leeds corridor. The alignments for these are mapped in Figure 34.

<sup>16</sup> e.g. West Yorkshire Transport Fund, Cycle City Ambition Grant, Leeds Public Transport Investment Programme and the West Yorkshire Local Cycling and Walking Investment Plan

Figure 34: Five Towns to Leeds corridor – alignments for all interventions in the long list



## B.2 Interventions

The initial long-list of options for transport connectivity improvements has been produced by Mott MacDonald consultants. These proposals have been identified through high-level assessment of the evidence. Feasibility work will be required to develop deliverable schemes that best provide the connectivity required. The list has been collated with the long-list outputs of other Case for Change reports and the outputs of aligned workstreams such as the Leeds City Region Rail Vision and Capacity study and the Leeds City Region Emissions Reduction Pathway study to inform the West Yorkshire Connectivity Investment Plan and pipeline. The consolidated initial long-list can be found in Appendix 2 to the WY Connectivity Plan. Programme C - Options for delivery between 2026 – 2040.

