A nighttime photograph of the Leeds city skyline, viewed from an elevated position. The sky is a deep, dark blue with scattered, lighter clouds. The city below is illuminated with various lights, including streetlights and building lights. Several prominent buildings are visible, including a tall, modern skyscraper on the right with a red light on top, and a large, multi-story building in the center with a grid-like facade. The foreground shows the silhouettes of trees and some lower-level buildings.

# Leeds City Region HS2 Growth Strategy

Skills and Supply Chain Workstream

October 2017

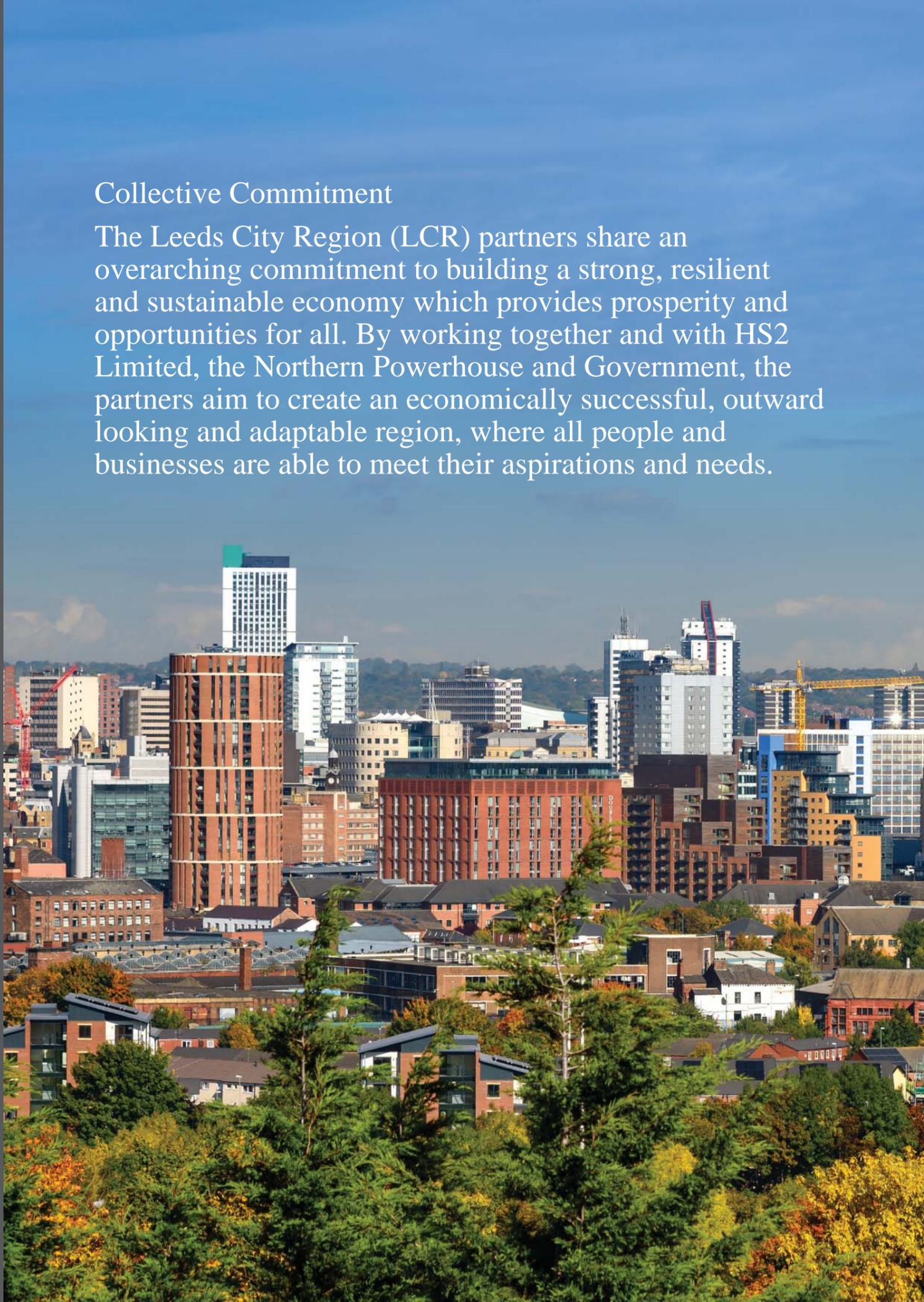
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## Collective Commitment

The Leeds City Region (LCR) partners share an overarching commitment to building a strong, resilient and sustainable economy which provides prosperity and opportunities for all. By working together and with HS2 Limited, the Northern Powerhouse and Government, the partners aim to create an economically successful, outward looking and adaptable region, where all people and businesses are able to meet their aspirations and needs.



# 1.0 Executive Summary

The LCR ambition is to:

- Become the UK centre for high speed rail engineering, with the supply chain achieving a position of international competitiveness, and beyond this, position the city region as the new UK home of transport and transit innovation;
- Develop the skills and industrial capabilities the LCR needs to compete internationally, accelerate growth in the knowledge economy and deliver improved levels of productivity to above the national average in the key sectors contributing to HS2 – construction and infrastructure, manufacturing and engineering, digital;
- Enthuse and excite a new generation of engineers, technicians and other professionals, eradicating the skills gaps and shortages across the key sectors contributing to HS2 – construction and infrastructure, manufacturing and engineering, digital; and to
- Meet our commitment to achieve inclusive economic growth, where all of our residents have the opportunity to increase skills levels, access higher volumes of better opportunities, and progress within the labour market, and deliver record levels of women and BAME representation in the HS2 workforce, and the wider construction/infrastructure/ engineering sectors.

The LCR is one of the most economically successful areas outside the South East region. It generates approximately £60 billion GVA per year, has 120,000 businesses and 1.45 million jobs. In general terms, economic growth has mirrored national trends but like other northern economies at a slower rate. The LCR possesses strong economic assets, including growth in financial and professional services, advanced manufacturing and creative and digital sectors. It is home to a number of internationally renowned and innovative companies including Rockstar Games, Google, Halifax Bank and Aviva alongside a number of leading edge Universities.

Importantly, the LCR:

- Has consistently punched above its weight for several years thanks to strong civic leadership driven by strong track record of partnership working between the private, public, education, Government and community sectors, with successful delivery sustained over many years;
- Is promoting the delivery of inclusive growth;
- Is home to 14 Further Education Colleges and 9 Higher Education Institutions – one of the largest concentrations in Europe;
- Is a net importer of students, as the number of students who studied in Leeds City Region (116,000) is significantly larger than the number of students who grew up here (77,000), giving a net inflow of 39,000;
- Is the third most popular shopping destination in the UK ;
- Is a leading destination for Foreign Direct Investment; and
- Has the fastest rate of private sector jobs growth rate in the UK.

HS2 is the largest infrastructure project in the UK. HS2 will employ a significant volume of people across a number of industrial sectors, over a prolonged period, with major peaks. It will drive demand for skills and employability in a way that few other projects or programmes have ever done.

But HS2 is more than simply an infrastructure project. The transformative effect of the infrastructure, carrying more people to more jobs, more quickly, and better

connected, offers the capacity to catalyse and further transform the city region's economy and places accelerating areas and subsectors of existing strength, such as digital technology and data analytics, fintech and professional services, but also stimulating the growth of new businesses, enterprise and subsectors that we cannot yet predict.

The vision is to ensure that the potential employment, skills, education and supply chain development opportunities that HS2 will bring are maximised for the LCR, its residents and business.

We will achieve this by:

- Building a strong, long term and productive partnership with HS2 Limited, industry, Local Authorities, Leeds City Region Enterprise Partnership (LEP), West Yorkshire Combined Authority (WYCA) and academia to address the skills and supply chain challenges and opportunities in an integrated approach, working to a pan-northern body for rail and transport skills as called for by Transport for the North;
- Building on LCR assets and harnessing what the LCR is good at including nurturing data and data analytics, digital and other Knowledge Intensive Business Services (KIBS) development and growth;
- Working with Leeds University's Institute for High Speed Rail and Systems Integration, National College for High Speed Rail, Universities and other providers to build capabilities of the supply chain and differentiate the LCR from other HS2 related regions; and
- Working with HS2 to take a proactive procurement approach which includes structuring contracts to encourage the participation of SMEs in the tender process. This could be done by dividing larger contracts into smaller 'lots'. The proactive approach would also build on good practice developed by LCR partners and obligate main contractors and their sub-contractors to identify employment, skills, work experience and apprenticeship opportunities, which we would connect to our most disadvantaged communities.

## Challenges

Despite the strong economic progress achieved over recent years, there remain a number of critical challenges which need to be met if the potential benefits of HS2 are to be realised for all residents and businesses in the LCR and increases in productivity achieved. These include:

- Low skills and low pay, progression and productivity, and the undersupply of skilled labour (especially exacerbated through high replacement demand) into key subjects (STEM) and sectors which have the greatest potential to drive economic growth and productivity;
- Mobilising at a time when the precise impact of Brexit on EU workers and the UK labour market remains unclear. The uncertainty, at least in the short/medium term is likely to have a bearing on the supply of labour for HS2 construction and operation (as well as in wider employment impacts of the scheme).

Through targeted stakeholder consultation, 3 key priority themes have been identified for the HS2 Skills and Supply Chain Strategy which are:

- 1 - Building and retaining talent for growth in the LCR;
- 2 - Building the supply chain capacity for success; and
- 3 - Nurturing economic innovation based on LCR strengths in digital, data analytics and academia.

The first tranche of projects driven by the strategy include:

### Priority Theme 1 - Building and retaining talent for growth in the LCR

- Careers Insight Programme – reaching every pupil in the LCR to enthuse and excite the next generation of engineers/infrastructure specialists, and building teacher capacity to engage;
- Careers Pathway Programme – mapping and developing a coherent offer so that young people/career returners can seamlessly access and move across the HS2 career family, and through educational pathways across the city region;
- Catalyst Fund – enabling education providers to develop innovation capacity and curriculum to support our global ambitions;
- Employment Brokerage Plus – ensuring record numbers of LCR residents, including from our most disadvantaged communities, can access the opportunities offered by HS2, and building a more diverse and representative workforce; and the
- Graduate Retention/Bursary Programme – private/public sector collaboration to support work placements during study and improve retention of skilled labour within the city region.

### Priority Theme 2 - Building the supply chain capacity for success

- HS2 Supply Chain Development and Accelerator Programmes building general capacity across the supply chain and identifying potential disruptor/'unicorn' type firms for support.

### Priority Theme 3 - Nurturing economic innovation based on LCR strengths in digital, data analytics and academia

- University Institute of High Speed Rail and System Integration;

Collectively, the projects over the long term will support our ambitions to:

- Make the LCR the UK leader in Light Rail and High Speed Rail engineering and R&D;
- Have a globally competitive supply chain that constantly innovates to meet customer needs, supported by a R&D ecosystem that is second to none;
- Attract the very best UK talent to create a sustainable skills base across both the scheme and our key sectors of construction and infrastructure, manufacturing and engineering, and digital; and
- Over the long term, help to move the LCR from a low skills equilibrium where employment rates and productivity per worker is below the national average to a higher skilled economy, with significantly increased skills levels and qualifications in areas such as STEM, and deliver increased productivity in excess of the national average.

These will support the delivery of the following outcomes:

The Supply Chain
Position the LCR as the UK home of Light Rail and High Speed Rail engineering and R&D
Deliver increased productivity across the key sectors contributing to HS2 – construction and infrastructure, manufacturing and engineering, digital – to national average
Gear up our business supply chain, KIBs in particular, and our key growth sectors to increase investment in physical and human capital, innovation and R&D, and increase productivity, and make our supply chain internationally competitive in the areas of Light Rail and High Speed Rail
The Labour Market
Enthuse and excite a new generation of engineers, technicians and other professionals, eradicating the skills gaps and shortages across the key sectors contributing to HS2 – construction and infrastructure, manufacturing and engineering, digital
Deliver record levels of women and BAME representation in the HS workforce, and the wider construction/ infrastructure/ engineering sector
Create a min. 50,000 job creation on the HS2 scheme and wider economic growth
20% of the total workforce on HS2 (within LCR) to live in the LCR of which 5% will be previously unemployed
Move from a low skills equilibrium where employment rates and productivity per worker is below the national average to a higher skilled economy, with significantly increased skills levels and qualifications in areas such as STEM, and increase productivity to national average

## 2.0 Vision

Maximise the employment, skills, education and supply chain development opportunities associated with HS2 in the LCR.

Through engagement with Local Authorities, industrial partners and academia the skills and supply chain strategy will:

- Attract the best talent, from home and abroad to meet new and leading edge technologies and innovation;
- Raise the rail industry as an exciting career for everyone, with real opportunities for progression in a dynamic sector;
- Boost productivity through workforce upskilling allowing the LCR to address the demand of new technologies and processes;
- Drive investment in leadership, innovation, project management and commercial skills;
- Grow the capacity and capabilities of rail engineering in the LCR. Growth in this sector will allow the LCR to take advantage of international export opportunities and become the UK centre for high speed rail;
- Address LCR ambitions of inclusive economic growth through responsive improvements to support access to jobs and skills; and
- Transform the LCR into an economy based around high skills and higher wages.

HS2 is the largest infrastructure project in the UK, which will employ a significant volume of people across a number of industrial sectors, over a prolonged period, with major peaks. It will drive demand for skills and employability in a way that few other projects or programmes have ever done.

But HS2 is more than simply an infrastructure project. The transformative effect of the infrastructure, carrying more people to more jobs, more quickly, and better connected, offers the capacity to catalyse and transform the city region's economy, accelerating areas and subsectors of existing strength, such as digital technology and data analytics, and fintech and professional services, but also stimulating the growth of new businesses and subsectors that cannot yet be predicted.

Our vision is to ensure that the employment, skills, education and supply chain development opportunities that HS2 will bring are maximised for LCR residents and business. In addition, HS2 will enable the LCR to:

- Become the UK centre for high speed rail engineering, with our supply chain achieving a position of international competitiveness, and beyond this, position the city region as the new UK home of transport and transit innovation;
- Develop the skills and industrial capabilities the LCR needs to compete internationally, accelerate growth in the knowledge economy and deliver improved levels of productivity; and
- Meet our commitment to achieve inclusive economic growth, where all of our residents have the opportunity to increase skills levels, access higher volumes of better opportunities, and progress within the labour market;

The LCR and WYCA have engaged with Local Authorities, industry, industry partners, and academia in preparing this ambitious strategy. Building on an enviable track record of partnership and delivery, the Strategy will:

- Deliver increased productivity, that exceeds the national average, across the key sectors contributing to HS2 – construction and infrastructure, manufacturing and engineering, digital, and move the city region's productivity onto a new trajectory; and
- Gear up our business supply chain, Knowledge Intensive Business Services (KIBS) in particular, and our key growth sectors to increase investment in physical and human capital, innovation and R&D, and increase productivity, and make our supply chain internationally competitive in the areas of light and high speed rail, transport and transit innovation

The arrival of HS2 in the region will raise private sector confidence still further, attract investment and transform the socio-economic landscape of the LCR and the wider Northern Powerhouse. The LCR Skills and Supply Chain Strategy will:

- Attract the best talent, from home and abroad to meet new and leading edge technologies and innovation;
- Raise the rail industry as an exciting career for everyone, with real opportunities for progression in a dynamic sector;
- Boost productivity through workforce upskilling allowing the LCR to address the demands and opportunities offered by new technologies and processes;
- Drive investment in leadership, innovation, project management and commercial skills;
- Place the LCR in a strong position to grow the capacity and capabilities of rail engineering. Growth in this sector will allow the LCR to take advantage of international export opportunities and become the UK centre for high speed rail;
- Address LCR ambitions of inclusive economic growth through responsive improvements to support access to jobs and skills; and
- Transform the LCR into an economy based around high skills and higher wages.

In developing the approach to this strategy, a targeted programme of engagement has taken place with partners, in the public, private, education, Government, community groups and voluntary sectors, alongside a number of industry stakeholders. Their input and recommendations shaped and influenced our approach by providing focus and ensuring our action plan proposals were ambitious, realistic and deliverable. The following steps were undertaken:

- A series of interviews were undertaken with a number of stakeholders in the public, private and education sectors across the LCR and beyond including key national organisations. This provided qualitative information to support the assessment of the current supply of skills and industry demand for skills;
- A robust assessment of current training provision using a range of key data sets. These included data sourced from the Higher Education Statistics Authority and the Skills Funding Agency, as well as that captured from education and training providers through the LEP particularly the LCR Labour Market Analysis 2016/17 and the LCR Strategic Economic Plan 2016-2036;
- Running the REM and CAPEX model for construction skills to forecast demand arising from the South Bank development.

Following the development of key objectives, the emerging strategy and implementation actions were reviewed and discussed with key stakeholders in order to generate consensus on how the strategy should be taken forward. It should be noted that the strategy process should not be treated as a “one-off” but should be reviewed regularly to ensure that the LCR businesses and supply chain has the skilled workforce to compete in a global market place and residents have access to and enjoy sustained, well paid employment.

The next section examines emerging trends in the rail industry both in terms of the opportunities presented by technology and the challenges presented by labour demands and skill shortages.



## 3.0 The Start of our Journey - Rail

The future of rail will be increasingly characterised by how the rail industry can harness the power of digital and automation to face the challenges of passenger mobility, security, and infrastructure maintenance and repair. Technological innovation has the ability to integrate the LCR within itself and the wider UK economy leading to economic growth. However this will only happen if there is a skilled and capable workforce in place to achieve it.

With Government investment in the rail sector set to reach £46.2 billion by 2020 – 2021 the need to train and recruit skilled construction workers and engineers is at the forefront of challenges for the rail industry. Despite a requirement of 100,000 additional workers in a 3 year time period nationally the UK construction sector is facing an annual 2% attrition rate due to primarily to older workforce. Further challenges stem from the lack of representation of women and people from BAME backgrounds in the rail sector.

As a result of these challenges there is an important emphasis on achieving the National Infrastructure Plan for Skills (NIPS) in combination with the significant roles institutions and authorities have in the LCR.

### Future of Rail

According to the International Transport Forum, by 2050 passenger mobility is expected to increase by 200% to 300%<sup>1</sup>. Achieving this level of mobility will mean the rail industry of the future will demand more smart and integrated mobility solutions for moving people seamlessly from one location to another. Cloud based computing linked to smart mobile devices and broadband will enable efficient forms of ticketing, enhanced security and route planning. Journeys will be made on largely automated passenger trains using new alternative power sources with flexible interiors that cater for different passenger needs including smart glazing that automatically responds to changes in heat and glare. Infrastructure maintenance and repair will increasingly rely upon automated systems that monitor for faults and undertake basic repairs.

Collectively, these changes, if exploited offer the opportunity for the LCR to benefit from agglomeration effects arising from the concentration of innovation serving different industries alongside improved connectivity. This will enable the LCR to become wholly integrated into a wider network of city regions that facilitate the exchange of expertise necessary to achieve economic growth and prosperity for all residents. This vision for the future will only be realised, however, if there is a workforce capable of implementing the technologies of the future and using the systems created.

### Continuing Levels of Investment in Rail

The work of the Northern Powerhouse is itself set within the wider context of the National Infrastructure Delivery Plan (NIDP) 2016 - 2021<sup>2</sup>, which has identified over 600 projects, including rail, which total around £425 billion. This is expected to generate demand for over 250,000 construction workers and over 150,000 construction engineers by the year 2020. As things stand this means recruiting and training 100,000 additional workers in a 3 year time period nationally.

Investment in rail is at the forefront of Government infrastructure investment plans. The NIDP highlights three major rail infrastructure projects including HS2, Crossrail, Thameslink. Accordingly, the Government is investing £46.2 billion in the rail sector by 2020 – 2021.

However despite this current projections forecast a contracting construction UK workforce on an assumed attrition rate of 2% p.a. resulting in a drop of 11% by 2020 with parallels in the Yorkshire and Humberside region<sup>3</sup>. This is primarily a result of older workers dominating the sector who are approaching retirement possessing skills (especially craft skills) which are not easily replaced. As a consequence, this places an important emphasis on achieving the National Infrastructure Plan for Skills (NIPS) in combination with the significant roles institutions and authorities have in the LCR.

In light of the UK's decision to leave the European Union, and potential for restrictions on the use of European labour, it is important the risks and challenges to HS2 delivery and operation are identified well in advance of all the planned project developments due to negative impacts on cost and time delivery. Removing the pressures caused by the restrictions on hiring labour and skill shortages will remove threats to project delivery and cost over runs. The LEP has identified the need for a proactive strategy to support skill development in connection with infrastructure projects. WYCA has commissioned research to assess business and skills implications for the LCR employers from a potential reduction in access to EEA migrant workers and the impact on specific sectors and localities.

A key risk identified by the NIDP is the convergence of the key investment programmes resulting in the potential that the projects draw off the same pool of labour. In turn this can result in skill and labour shortages and worsen the benefit-cost ratio which these projects can deliver.



### Skill challenges in the rail industry

Over the last two years the rail sector has experienced 11% growth meaning presently it employs approximately 216,000 people contributing £10.1bn Gross Value Added p.a. The biggest component of that is the rail supply chain with around 124,000 employees generating some £3.88 billion GVA.<sup>4</sup>

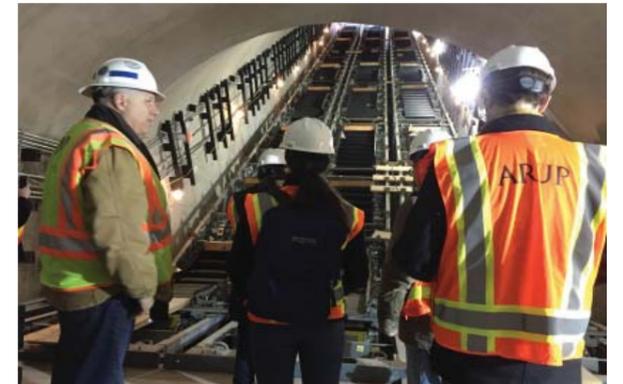
In order to sustain the current growth rate the railway industry needs to face the challenges of an ageing workforce and a changing skill requirement brought about due to digitalisation and the scale of the future projects. In response the Government has identified a need to produce 100,000 engineering graduates every year just to maintain employment levels with shortages predicted in signalling & communications and traction & rolling stock.

Further challenges will addressing the underrepresentation of women in the sector is a significant challenge to the railway industry. Only 23% of managers in the rail industry are women, and overall women represent just 4.4% of rail engineering workers. Moreover, there is a distinct lack of workers from an ethnic minority background represented in the rail sector. So much so only 6% of professional engineers come from BAME backgrounds.

There are skills shortages within the rail sector in the following areas:

- Rail system knowledge;
- Rolling stock manufacturing/maintenance; and
- Train operation and planning.

Section 4 contextualizes the LCR in its relationship with the Northern Powerhouse and Transport for the North (TfN). The section also examines the current economic outlook for the LCR based on its regional economic indicators.



## 4.0 The Start of our Journey - Leeds City Region

The long term economic plan envisioned by the Northern Powerhouse aims to benefit the LCR by increasing its economic growth and competitive rate through investment in the private sector, innovation and R&D. Transport for the North's vision will support this economic plan through investing in the necessary infrastructure to allow for better connectivity and agglomeration.

Fruition of the strategies and visions formulated by LCR partners will allow the region to address its Strategic Economic Plan 2016 – 2036, which has a focus on “good growth”. The plan is essential due to the fact, despite strong growth since the 2008 economic recession, the LCR still lags behind in terms of productivity, GVA per capita and change in employment levels nationally.

### The North of England

The Strategy looks at the LCR in the context of the Northern Powerhouse which is underpinned by a six-point long term economic plan. Achieving this long term economic plan would be worth approximately an additional £44bn to the UK and North of England economy. Specifically the Northern Powerhouse is set to benefit the LCR by:

- Increasing the long term economic growth rate and competitiveness of the LCR achieved through agglomeration effects;
- Raising the employment rate by supporting the private sector, backing business investment and new start-ups in the drive to achieve full employment in the North; and
- Establishing the region as a global centre of outstanding innovation and wider R&D activity.

The benefits of connectivity and agglomeration are fundamental to the Northern Powerhouse vision and high speed rail offers the opportunity to accelerate their delivery.

Similarly the Strategy is set within the context of TfN's vision of “a thriving North of England, where modern transport connections drive economic growth and support an excellent quality of life”<sup>7</sup>.

TfN is a partnership established in 2014 comprising all LEPs, Combined Authorities and Local Transport Authorities in the north, to identify how best to drive economic growth through strategic investment in transport.

TfN supports the ongoing development and implementation of pan-northern plans and major infrastructure programmes to increase economic growth. TfN allows the north to speak with one voice on key infrastructure investment decisions on behalf of the region.

TfN partners share a common vision for the region which has a vibrant and growing economy, acts as a magnet for inward investment, and which capitalises on the strengths of the northern cities to build a Northern Powerhouse. TfN has published an integrated, multi-modal Strategic Transport Plan (STP) for the region. The STP sets out the long-term sequenced investment priorities and how it will develop both the major road network for the region and an integrated rail plan that includes Northern Powerhouse Rail. The STP aims to enable the growth of the economy by £97 billion by 2050. HS2 is a fundamental part of helping TfN to achieve this vision, and has been aligned with the emerging Northern Transport Skills Strategy.



Leeds City Region is the largest outside of London

£64.6 Billion



Economic Output



3 Million Population



1.5 Million Jobs



14 further education colleges  
8 higher education institutions



119,000 Businesses

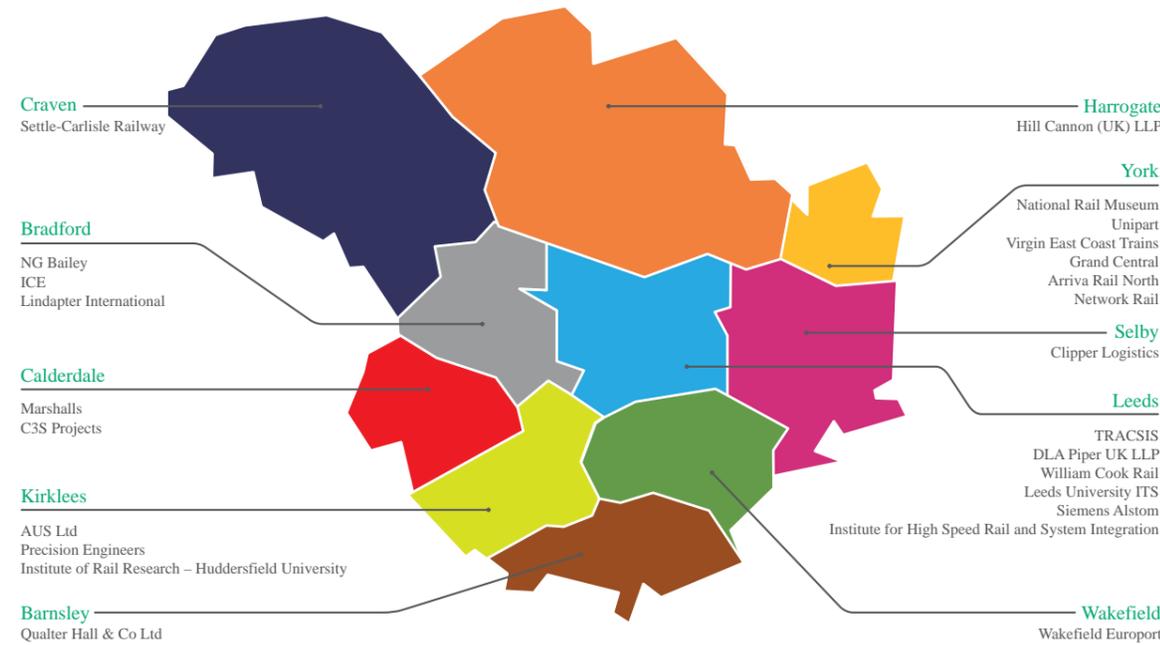
### Leeds City Region (LCR)

The Leeds City Region Enterprise Partnership (LEP) published its Strategic Economic Plan 2016 - 2036 with a focus on “good growth”, aiming to unlock the region’s vast economic potential by enabling businesses and enterprise to thrive. The LCR aims to deliver upwards of 35,000 additional jobs and an additional £3.7 billion of annual economic output by 2036. This extra growth, added to expected national trends means that the City Region is on track to become a near £100 billion economy in 20 years’ time<sup>8</sup>.

The LCR economy has emerged from the 2008 economic recession into a buoyant economy, featuring:

- Strong employment growth with the fastest rate of private sector jobs growth rate in the UK, at six per cent. There are more people employed in the LCR than ever before;
- Economy (private sector in particular) very effective at creating new jobs –Leeds saw the strongest private sector growth of all cities in 2014-15;

- Structure of the LCR economy means the economy should be more resilient to a downturn in any single industry –because of the broad business base and relatively large proportion of SMEs;
- Largest manufacturing workforce of any LEP; largest centre of financial and professional services outside London; digital sector growth;
- Yorkshire & Humber has grown Foreign Direct Investment market share strongly in 2015 and 2016. The 64 FDI projects in LCR in 2016 created 2,028 jobs, with the US our largest single market;
- Whilst the city region is aging, it’s not as imbalanced as elsewhere; and has
- Experienced strong growth in knowledge-based sectors, particularly within Leeds, growing at a faster rate than anywhere else.



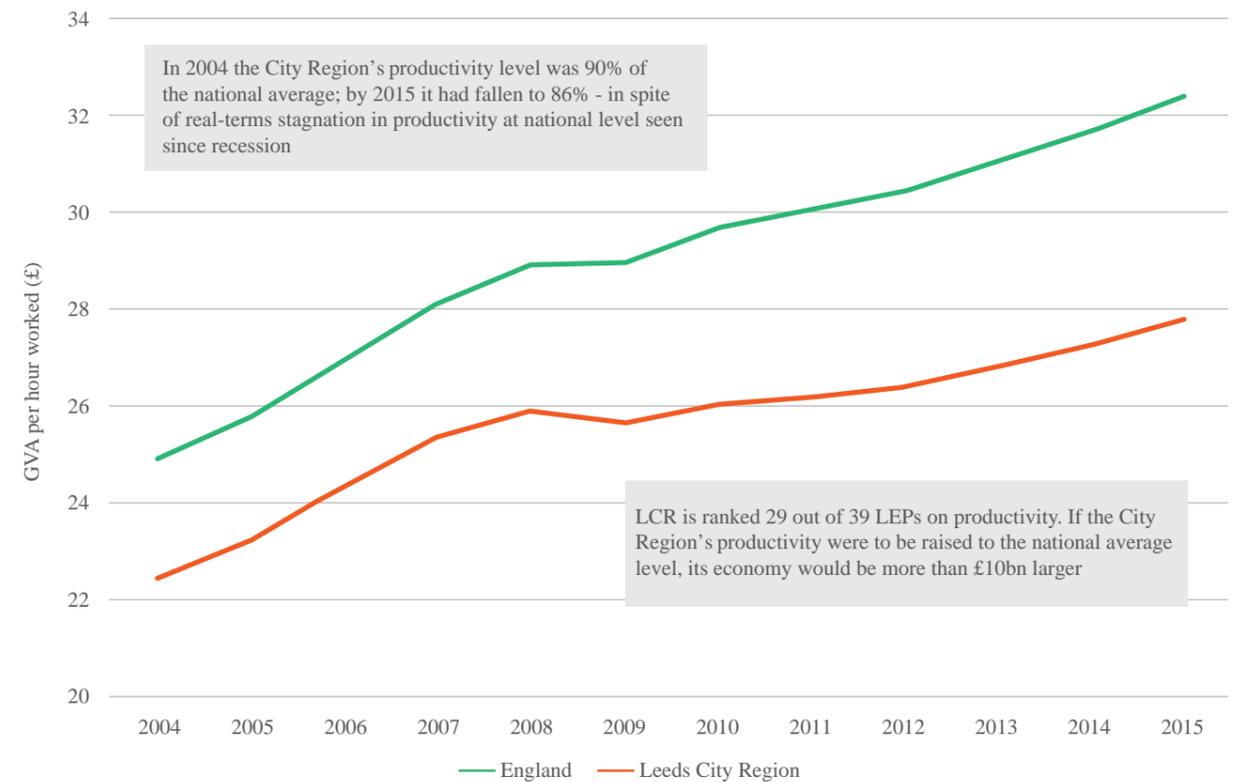
Key regional economic indicators largely echo national economic trends in recent years but the LCR (in common with other industrialised northern city regions) lags behind in terms of productivity, GVA per capita and change in employment levels. There are challenges around low skills and low pay, progression and productivity, and the undersupply of skilled labour (especially exacerbated through high replacement demand) into key subjects (STEM) and sectors which have the greatest potential to drive economic growth and productivity. The LCR continues to see stubborn levels of deprivation.

Key indicators include:

- There are 215,000 jobs in West Yorkshire that pay below the living wage;
- Wages in WY continue to lag behind national average (7.3% lower);

- While unemployment has halved since 2011 (to 73,000), the number of people unable to work because of ill-health has remained at ~100k;
- Poor skills profile is proving stubborn – over the last 4yrs, the proportion of the population with high skills (31%) and basic qualifications (27%) haven’t changed, and progression is an increasing challenge;
- 25% of vacancies are hard to fill due to a lack of candidates with the right skills;
- LCR has an estimated external trade deficit of £5 billion; and
- Productivity in the city region is 18% below the national average –and the national average is below most developed economies. This is by far the most important challenge to creating an effective market economy that grows effectively and fairly, and one which HS2 has a significant capacity to address.

The following graph illustrate the productivity challenge in the LCR<sup>9</sup>.



## 5.0 Demand for labour

Construction of the HS2 project is estimated to generate between 15,900 and 27,800 workplace construction related jobs between 2026 and 2033. Of that LCR resident Jobs could attribute between 13,300 and 23,000. Once completed, physical development around Leeds station is expected to stimulate the creation of between an additional 10,800 and 21,400 local resident jobs in high value knowledge based jobs within professional, information technology and financial services.

This section examines the future demand for workers arising through the HS2 project in the wider context of the LCR labour market.

### LCR Labour Market

The UK is currently experiencing both a major skills shortage in key sectors alongside significant productivity challenges. For example, the Royal Academy of Engineering estimates that the UK will need more than a million new engineers and technicians by 2020 to meet industry demand. In construction, it has been estimated that the UK will require 100,000 new workers every year until 2021, regardless of post-Brexit immigration issues, to meet predicted demand. The rail sector will require at least 7,000 more Level 4 Advanced Technicians (undergraduate equivalent) across the sector over the next five years<sup>10</sup>.

Research by CITB/WLC for the LEP into the LCR construction labour and skills industry reported that demand for labour would peak in 2016 at an average of 86,000 workers based upon 'known projects' in the pipeline (those with planning consent and a value of £250,000 or more)<sup>11</sup>. The reality is that the likely labour demand figure could be as high as 120,000 workers. With the continued investment in and transformation of Leeds City Centre it is expected that planning applications will continue to grow and that demand for skills will grow accordingly from 2017 and beyond.

The report also indicated that LCR can expect a shortfall in a number of construction trades and professions including: plant operatives, logistics, labourers, civil engineers, specialist building operatives, non-construction operatives and glaziers. Whilst labourers and specialist building operatives could be trained and brought into the workforce through local initiatives, critically the training of engineers has a long lead time so there will be a need to plan, promote and start training now.

Across other sectors there will also be a cumulative need for plant operatives and logistics professions, however both of these have the potential to be developed locally.

In terms of construction, demand exists across all types of skills. The biggest growth is predicted to be for professional/ managerial white collar skills associated with the type of planning, digital and management skills required for example, to implement techniques such as "Building Information Management (BIM)". Importantly, this suggests a demand for people with a different skill set from the traditional craft worker that has featured so heavily in the sector in the recent past. Some of this demand might be met from movements across traditional sector boundaries where generic skills in programme management, information technology count more than knowledge of construction. Nevertheless, these trends suggest a need for conversion courses from the skills providers and require a higher level of skill with 60% of the qualifications required are NVQ3 and above and 37% are Level 4 or above.

Skills demand has been examined in terms of the HS2 construction and operation phase and the broader associated catalytic impacts.

### HS2 Construction phase

HS2 will represent one of the biggest construction projects taking place in the LCR over the next generation. It will have an impact on the overall size of the construction workforce (which currently stands at 90,900<sup>12</sup>) and create opportunities for LCR resident and local business participation within it.

Table 1 shows the workplace employment implications of spending between £5.32 billion and £5.67 billion within the LCR economy with high and low scenarios based on the level of expenditure captured locally.

	Low Scenario	High Scenario
HS2 Construction Phase related only (2026-2033)	9,900	14,970
Total Construction phase related (2018-2050)- Workplace based (HS2 plus South Bank)	15,880	27,780

**Table 1: Workplace jobs by activity description<sup>13</sup>**

The HS2 project construction phase is expected to generate between 15,880 and 27,780 workplace construction related jobs between 2026 and 2033.

A dynamic labour market will involve construction companies recruiting labour on the basis of anticipated growth in demand and to replace people who move out of the workforce due to retirement/ migration. The annual recruitment requirement (growth plus replacements) for construction in the LCR suggests that around 4,600 people will be needed each year<sup>14</sup>. Replacement demand arising through retirements are a major factor for both construction and rail systems engineering with an ageing workforce especially in traditional crafts<sup>15</sup> within construction.

Demand ranges across all types of skills, nevertheless, there is a bias towards professional/ managerial white collar skills. This suggests a demand for people with a different skillset compared to the recent past. Some of this demand might be met from movements across traditional sector boundaries where generic skills in programme management, information technology and so forth count more than knowledge of construction per se. Nevertheless, these trends would at least highlight a need for conversion courses from the skills providers and require a higher level of skill (e.g. NVQ3 onwards), something the LCR is already addressing through the current LCR Skills Plan

In addition to replacement demand from within the existing workforce, demand is expected to come through growth in the construction sector as a whole over the period 2022 to 2032 resulting in a potential expansion of around 11% without HS2.

Table 2 shows the expectations concerning jobs for residents in the LCR (less workers securing employment who are resident outside the LCR). The jobs are shown for Leeds and the rest of the LCR:

	Low Scenario	High Scenario
Leeds Residents Jobs	6,750	12,240
Rest of LCR Residents Jobs	6,520	10,720
Total LCR Residents Jobs	13,270	22,960

**Table 2: Residents Job 2026 – 2033<sup>16</sup>**

Part of this calculation includes rail systems which covers a broad range of activities including design of signalling systems, maintaining the existing rail network/ replacing and the design, management and construction of rail power requirements. This type is expected to account for around 17% of all jobs on the HS2 project (from the jobs generated by expenditure of £2.47 billion). A key characteristic of the railway systems (in common with a more general description of the rail industry) is that short term recruitment needs are being driven by replacement demand (similar to mainstream construction but more so) which is the consequence of having an ageing workforce. In other words, the supply of new skills to the market are being absorbed by the industry just to stand still rather than boosting growth. The HS2 project is therefore likely to place additional stresses on the labour market.

HS2 can also be expected to run at a peak level at a certain point over the period, this is most likely to occur in a single year as the programme scales up after the completion of enabling works. It is difficult to predict what the characteristics of the peak might be in advance of a lead contractor being appointed however it could mean the uplift ranges from around 1,615 to 2,545 resident jobs based on a 55% uplift.

Overall, while the additional demand created by HS2 is less than the annual recruitment requirement, it does however reveal a stress point as HS2 will stimulate a demand for higher level skills at the same time that the core construction sector moves towards a similar skills set requirement. The emphasis on capabilities in BIM within the HS2 project underlines this factor. Based on the non-peak average this represents an uplift of between 23% and 36%.

The HS2 project will create longer term opportunities for local people associated with its direct operation and maintenance. A key component of the longer term legacy are jobs associated with the station and depot which is expected to generate around 900 permanent job opportunities for local residents.

### Wider Catalytic Opportunities

Jobs associated with the wider stimulus to the local economy also have a longer term significance. A large proportion of net growth across the LCR is expected to occur in private sector services<sup>17</sup>. Some of these service sectors are primarily lower skilled (such as accommodation and food) and some higher skilled like professional services.

Significant growth is expected for higher level occupations, including managers, all professional occupations and most associate professional occupations. Projections suggest that high skilled occupations will see a combined growth rate of 12%, three times the average rate for all occupations. In the decade to 2024 the number of high skilled jobs in the City Region is expected to increase by approximately 71,000<sup>18</sup>. From an HS2 perspective, the service jobs of most relevance are those requiring office space as this represents the type of development most likely to be stimulated as a result of the HS2 service.

	2017	2031	% Change <sup>20</sup>
Administrative & Supportive Service Activities	130,640	143,660	10%
Computing & Information Services	18,280	19,220	5%
Finance & Insurance (Broad Sector)	57,020	61,650	8%
Professional Services	123,230	135,120	10%
Total	329,170	359,650	9%

**Table 3: Expected growth in office user sectors of the LCR economy 2017 to 2031<sup>19</sup>**

Table 3 shows the expected growth in jobs anticipated for the LCR between now and 2031 across all sectors using office floorspace of around 9%. Overall, over 30,000 jobs are expected to emerge as a result of growth. HS2 is expected to catalyse development around the South Bank and contribute to the attraction of Leeds and the LCR as business location. The office development associated with HS2 can provide high quality business accommodation needed to attract the types of prestigious office tenants looking for a quality location for their businesses.



These businesses are likely to value the connectivity provided by the HS2 services to maintain contacts with clients and attract highly skilled workers looking for city centre life style in particular.

Particular opportunities might emerge around the capture of new development opportunities around emergent hybrid sectors such as financial technology (Fintech) which use information technology applications to provide financial services. As disruptors to the existing providers of financial services, the LCR has an opportunity to improve its overall position in the provision of these services and realise growth aspirations for both information technology and financial services at the same time. More generally, information technology, which is of interest from a digital skills perspective, is currently a medium sized sector that has one of the fastest forecast rates of growth of around 15% or 4,000 additional jobs.

Table 4 shows job impacts range from between an additional 10,830 and 21,430 local resident jobs dependent upon the level of new development stimulated by the presence of HS2.

	Low Scenario	High Scenario
HS2 Operation jobs – Station 2033 onwards workplace based	500	500
HS2 Operation jobs – Rolling Stock Depot – 2033 onwards workplace based	400	400
South Bank - (2018 to 2048) – Permanent Workplace based	12,960	25,930

**Table 4:** Longer term jobs associated with HS2<sup>21</sup>

Leeds city centre boasts the UK’s third largest retail centre outside London employing almost 70,000 people and home to over 6,000 businesses and growing, driven in part by growing levels of confidence, boosted by the opening of the new Victoria Gate shopping centre and flagship John Lewis store in 2016 and the planned arrival of HS2. Research into the skill needs of the future<sup>23</sup> identified the need for retailers to develop both the retail and “e-tail” offer and further understand a digital technologies and the skills required to maximise social media opportunities for business growth and development.

As the South Bank is rejuvenated, and the retail offer continues to grow alongside leisure and tourism, improved connectivity and infrastructure, the transformation will spread offering more opportunities for enterprise and jobs throughout the LCR.

The next section identifies what is driving skills supply overall, examining the different current skill provision trends prevalent in the UK and the LCR. The section then goes on to examine High Speed Rail skill provision more specially with general focus on Higher Education, Further Education, careers advice and guidance, apprenticeships and private training provision.



**HS2 Opportunities Diagram**

## 6.0 Skills Supply – Policy Context

In 2014/15, Higher Education produced around 3,000<sup>24</sup> graduates in relevant subjects whilst around 23,000 “starts”<sup>25</sup> on relevant Further Education courses over the same period. Around 64% of starts in Further Education courses were for courses below NVQ3. This output has to serve the needs of all industries and sub sectors requiring STEM relevant skills.

The UK’s Industrial Strategy Green Paper has put the skills agenda centre stage and reaffirmed the importance of developing and enhancing skills and education to improve Britain’s productivity, drive economic growth and competitiveness.

The LCR has an ambitious European Structural and Investment Funds Strategy (ESIF) 2014 – 2020 and programme to support transformational change.

The focus of the ESIF is on widening participation in the labour market through higher skill development, addressing barriers to employment, promoting enterprise in young people and promoting better careers-led business engagement in schools.

The skills required for HSR and the South Bank mean there will be demand for a range individuals with different education and training backgrounds. Figures show that the LCR has strong numbers of people studying STEM related courses with good growth around “construction, planning and the built environment” and “engineering and manufacturing” apprenticeships. However challenges still persistent around the attractiveness of STEM careers for people joining the workforce and encouraging individuals to attain higher training levels which is particularly associated with further education and apprenticeships.

The Industrial Strategy Green Paper has put the skills agenda centre stage and reaffirmed the importance of developing and enhancing skills and education to improve Britain’s productivity, drive economic growth and competitiveness. It is imperative that the rail sector invests in people to ensure it has the skilled workforce to compete internationally. HS2 offers a unique opportunity to invest in training, research and development to build the skills necessary for Britain to be successful globally. Whilst HS2 will generate 25,000 jobs, it is essential that this opportunity is used to build a strong legacy of specialist skills and expertise in a competitive post-Brexit world. Investing in home-grown talent will help to build a more skilled and resilient workforce of the future.

### Drivers of Supply

Engineering, like construction, is facing a number of critical challenges including major skill shortages, difficulties in attracting talent, changing skills requirements and an aging workforce. A key driver in the supply of skills is a change in the working age population seeking work which is itself a product of the general population growth. Whilst the population is expected to grow by 7.5% over the period 2017 - 2033, the working age population is expected to grow by a much lower rate – only 1.5% over the same period. After allowing for the economically inactive, around 20,000 more people will be joining the general LCR labour force over the construction programme for HS2. Based on resident workforce characteristics, around 1,600 people<sup>26</sup> might be expected to enter the construction workforce. This figure would be insufficient to meet the most extreme peak scenario for additional construction employment. Most of this labour force growth is expected to be concentrated in the cities of Leeds and York.

Two major trends which are forecast to continue over the next decade which will influence the pattern of employment and the supply (and demand) for skills. According to Regional Economic Model (REM)<sup>27</sup> forecasts, manufacturing employment will continue to decrease and service sector jobs will continue to rise.

The second trend to continue is the polarisation of the workforce, with an increase in higher skilled and lower skilled occupations at the expense of middle skilled employment)<sup>28</sup>.

The balance of employment will continue to move towards high skilled and professional occupations. However, with an ageing workforce, replacement demand - job openings created by people leaving the labour force - for technicians, there will be a need to supply both high-level and mid-level skills<sup>29</sup> Yorkshire and Humberside is expected to suffer the largest decline in employment share (percentage of the workforce in manufacturing over the next decade)<sup>30</sup>.

The Government’s 2017 Spring Budget set out a range of proposals to develop and deliver technical and professional education including the introduction of 15 new technical education pathways (T-levels) including construction, digital, engineering and manufacturing. The first two year college based T-levels will come into effect in the 2018/19 academic year and are a response to the shortage of high-skilled technicians below graduate level. The Government also proposed to invest £300m in science, technology engineering and mathematics (STEM) in recognition of the importance of STEM to the UK economy.

The Industrial Strategy Green Paper also highlighted other areas of skill development and education relevant to the LCR including the need to promote lifelong learning; closing the skills gaps through enhancing pre-school education, the retention and attraction of graduates; measures to increase apprenticeship take-up, and improve the quality criteria for apprenticeship standards.

At present, there is a range of key policy trends which are recognised as being important to the development and delivery of education, training and skills in the LCR.

These include:

- **Industry demand-led provision:**  
Employers are best placed to define their skill needs and with a greater involvement from employers, more industry led provision will enable closer alignment to the labour market. There is evidence that employers in the rail industry are increasingly relying on this industry led provision;
- **Low pay and progression:**  
High paid - high skill jobs, and low paid - low skill jobs are forecast to increase in Leeds<sup>31</sup> despite the recent economic success of the LCR. Research undertaken by the Joseph Rowntree Foundation into improving progression from low paid jobs suggested that the solution is long term and devolving funding to local areas to support economic growth including the European Social Fund (ESF), provides opportunities to develop innovative employment and skills initiatives with a focus on progression<sup>32</sup>. JRF made a number of recommendations including careers information, advice and guidance service for low-paid workers to support progression; an in-work advancement service with a dual focus on individuals and employers, focusing on employer-led training linked to career advancement; and a business support service aimed at enhancing opportunities for part-time workers. The challenge of addressing low paid low skilled jobs is subject to consultation as part of the Leeds Inclusive Growth Strategy<sup>33</sup>. The findings will need to be embedded in the development of future HS2 related initiatives in due course;
- **SME Engagement:**  
Increasing the numbers of SMEs engaged in skills development as they are seen as central to establishing sustainable and balanced economic growth. SMEs make-up the majority of firms in the LCR and are known to be facing barriers in influencing the skill agenda. Several successful relationship building programmes are already operational in the LCR and are run by a variety of education and training institutions, individual SMEs and industry / sector groups. The attraction and retention of graduates in the LCR could be improved through the development of more formal interaction

and information exchanges between local providers, colleges, Universities and SMEs at the LCR level, to better match available graduates with employers;

- **Apprenticeships:**  
Apprenticeships form an important and increasing arm of Government strategy to reduce youth unemployment and promote the creation of on-the-job skills. Following the Richard Review (2012), the Government set out a number of reforms to the Apprenticeship frameworks and a move towards employer-defined standards. Recent Government policy has sought to improve both the quantity and quality of vocational skills that best meets the needs of sectors and occupations through apprenticeships in the UK. This combines with the aim of increasing employers' influence over apprenticeships and standards to ensure that they are more responsive to business needs;
- **Degree Apprenticeships:**  
Recent additions include the Degree Apprenticeship which brings together higher and vocational training enabling learners to achieve a Bachelor or Master's degree whilst training. CITB Shared Apprenticeship Scheme for example enables employers to benefit from having an apprentice, without the direct employment responsibility as this is taken up by the scheme. The scheme aims to encourage employers involved to make a commitment to a young person, even though their contract on site may only be for a short period. Procurement is pooled and the apprentice moves from one contractor to another, until they have completed their full Apprenticeship framework at Level 2 or 3. An apprentice who completes the full three-year Apprenticeship will gain an NVQ Level 3 in their chosen trade. Currently, around 90% of apprentices who completed the three years have secured full time employment in their chosen trade;
- **STEM:**  
STEM skills remain as an important focus for both Government and the business community. The abilities and analytical skills associated with STEM study are in high demand across most sectors. Increasing the supply of STEM skills in the labour market and enhancing STEM choices to students are seen as a key element in driving productivity growth.

Low attainment and progression in STEM has hampered the supply of individuals into engineering occupations and with ageing workforce the supply of engineers and skilled technicians is not keeping pace with demand. This is due to a number of factors including poor perceptions about engineering held by young people and often parents and teachers who can influence career choices in young people's formative years; under representation of specific groups, patchy careers advice, and guidance and counselling;

- **LCR:**  
LCR in common with other northern city regions, faces challenges to retaining and attracting graduates to work in the labour market. Within engineering as a profession, around 30% of engineering graduates (following a full time degree) do not enter the engineering profession, a significant attrition rate. Encouraging more graduates to stay or join the LCR labour market, especially in engineering, but also in our other growth sectors that support the HS2 ecosystem, will be critical to achieving the growth ambitions in this strategy.

The LCR's European Structural and Investment Funds Strategy 2014 – 2020 (ESIF) is aligned to the Leeds City Region Strategic Economic Plan and plays an important role in supporting the delivery of SEP and the LCR's economic growth, employment, training, equalities, social inclusion and capacity building agendas<sup>34</sup>. The range of ESIF programmes are tailored to local needs and opportunities. The LEP in collaboration with Government, has identified the key priority areas aligned with the LEP Skills Plan for European Funding support in partnership with local partners. Initiatives are wide ranging and include widening participation in the labour market through higher skill development, addressing barriers to employment, promoting enterprise in young people and promoting better careers-led business engagement in schools.

Importantly, ESIF projects provide important pathways to employment, learning and training and play a key role in supporting residents, particularly from disadvantaged communities to gain the skills and confidence to enter and progress in the labour market.

### High Speed Rail skills provision

The wide range of occupations and associated skills requirements likely to form future demand arising from HSR and the South Bank were outlined above. These skills will be acquired from a range of different education and training providers representing different entry points for individuals on the skills system in order to meet the full range of skills which will be in demand. Importantly, the LCR has 14 Colleges, over 60 private training providers and 9 Universities all of which deliver courses of relevance to HSR.

The supply chain starts with the schools. In 2015/6 there were around 16,300 students who qualified with 5+ GCSEs (A\*-C including English & Mathematics)<sup>35</sup> across the LCR. With the exception of Barnsley and Bradford, all Local Authorities in the LCR showed a decline in the proportion of students attaining this standard (comparison of attainment rates between 2014/15 and 2015/16)<sup>36</sup>.

In addition to this, there are 10,000<sup>37</sup> student achievements (marginally down on the previous year by 1.8%) in A level (A\* to E grades) in STEM subjects<sup>38</sup> representing 32% of all A level achievements in 2015/16.

STEM A-Level achievements in the LCR suggest that scope exists to increase the supply of STEM students may be required. As the Royal Academy of Engineering has pointed out<sup>39</sup>, a disconnect exists between the recognised value and interest in science and engineering and the number of young people pursuing subjects and pathways suitable for careers in these fields. The factors influencing the numbers of young people studying STEM subjects leading to careers in engineering are complex and varied including perceptions towards engineering (students, parents and teachers), quality of careers advice and the involvement of business in education. These influences will need to be addressed if potential of home grown talent is to be encouraged to progress into engineering occupations in key sectors including the railway industry.

The assessment indicates that the current provision of school level skills supply would meet requirements of the railway and related sectors as they are at the moment. However, in meeting future need driven by investment in HSR, a notable increase in the supply of STEM<sup>40</sup> and other key subjects will be required. The University Technical College Leeds (UTC) is an academy providing education for 14 – 19 year olds with a focus on technical skills and STEM subjects. Opened in 2016, with the aim of training more engineers and technicians in response to skill shortages in the LCR, the UTC will play a vital role in meeting future skill needs associated with HS2.

On leaving school, the next stage in the supply chain becomes more focused on the ultimate destination with choices being made over specific vocational or discipline outcomes. Whilst not wishing to preclude the role played by a variety of provision in developing generic skills, this assessment has necessarily focused upon those disciplines of greatest relevance to the construction phase particularly construction, engineering and information technology.

### Higher Education (HE)

In terms of HE provision, the mapping of provision has highlighted relevant graduate qualifiers in the following subject groupings. Around 885 graduates were on courses relevant to the consenting/ built environment or design process. A further 1,465 graduates were undertaking courses relevant to engineering and 690 were engaged on courses concerned with software engineering and artificial intelligence in 2014/15. Whilst the latter two groups are not sector specific their role in facilitating the greater use of digitalisation and the wide spread deployment of communications and sensors inherent in HSR systems is likely to be highly relevant. The Institute of Transport Studies and the Faculty of Engineering at Leeds University are two LCR providers offering engineering and related courses.

HE in the LCR is delivered by FE colleges as well as Universities themselves. HE delivered through colleges is highly valuable to local employers with courses such as foundation degrees, higher level apprenticeships and HNC/HNDs seen as advantageous to many. This is due to the flexibility in course structure and ability to influence the content of these, thereby providing bespoke higher level skills of central importance to business competitiveness. These types of HE courses are particularly suitable and relevant to the rail industry and should provide an important source of future skills supply in the LCR.

	2012/13	2013/14	2014/15	% change
All consenting/ design and environment	895	855	885	-1%
All "Engineering" disciplines	1,440	1,375	1,465	+2%
All digitalisation and communications and sensors relevant discipline	860	780	690	-20%
ALL subjects relevant to HS2 skills requirements	3,195	3,010	3,040	-5%

**Table 5: HE Sector – Graduate Qualifiers 2012/13 to 2014/15<sup>41</sup>**

Retention of graduates is considered to be an important element in supporting economic growth in the LCR. To ensure that there is a skilled labour market that can take advantage of the economic opportunities presented by HSR, the LCR needs to continue to highlight its vibrancy and quality of life benefits to graduates and prospective students alongside sustainable career opportunities.

A key issue for the retention of graduates is whether the job opportunities will exist for STEM graduates to take up in particular on completion of studies. Engineering and technology graduates typically move into STEM related sectors with around 66% of engineering and technology graduates move into directly relevant industries with 2% going into other STEM reliant sectors. The remainder (32%) do, however, pursue careers in non-STEM sectors. The loss of STEM graduates to non-STEM sectors could be regarded as a loss to the LCR at a time when such skills are demanded. In planning for the long term supply of STEM skills into the railway industry will require improved articulation of the pathways to a relevant and rewarding career.

Better ‘selling’ of the railway sector should be complemented by collaboration between sectors which share a common requirement for engineering and related skills.

The Institute of Railway Research (IRR) at the University of Huddersfield officially opened in 2013 and has since become a world class centre of excellence in the field of railway vehicle dynamics, engineering and risk. In partnership with industry and academic partners, IRR work has led to a number of tools and techniques being developed which are now used to predict deterioration of railway wheels and rails, to optimise the vehicle track interface, to increase safety and reliability levels, reduce cost and improve performance of the railway system. HS2 will require innovation and leading edge design and the IRR will play an important role in supporting these aims.

While the city region can already point to a strong R&D/innovation asset base, including the IRR, the University of Leeds proposal for an Institute for High Speed Railways and System Integration could significantly scale up the city region’s offer to supply chain businesses and support our ambition to be the global centre for new high-speed rolling stock technologies, as well as taking a global lead in digital engineering technologies and systems including transportation robotic technologies, all of which are closely aligned to the Government’s Industrial Strategy.

Situated at the proposed Leeds Engineering Technology Campus (LETec) development the proposed Institute will incorporate an infrastructure test facility, vehicle test facility and digital engineering laboratory. The estimated overall cost of the scheme; once land and primary infrastructure, buildings and installations, and initial research equipment has been taken into account; is in the region of £20m.

### Further Education (FE)

The LEP and WYCA have developed and endorsed Delivery Agreements (DA) with seven FE Colleges in West Yorkshire which sets out tailored and measurable aspirations of how FE Colleges contribute to LEP and WYCA priorities for the LCR. The DAs will influence the full range of college provision and are an important next step in strengthening broader relationships with providers.

The DAs also set out the college ‘district’ level baseline position and the actions the FE Colleges will take to align their development plans with LEP and WYCA Employment and Skills Plan priorities and how the colleges will contribute to meeting the needs of the LCR economy. The pioneering DA approach is strategically driven, underpinned by evidence and predicated on partnership including the alignment of business plans to LCR business, skills and sector priorities. The approach has a clear role to play in maximising employment, skills and supply chain opportunities from HS2.

At the FE level, approximately 9,890 LCR resident student starts were recorded in construction, planning and built environment in LCR colleges e.g. Leeds College of Building. Of these “starts”, Level 2 or below accounted for 74% of the total with only 3% of starts were at Level 4+. The number of starts had declined by almost 20% between 2014/15 and 2015/16. Engineering and Manufacturing Technology courses accounted for 9,150 starts in 2014/15. Only 29% of starts were achieved at Level 3 or above. Only 5% were started at Level 4 or above. The number of starts in engineering and manufacturing technologies showed a steep decline of 27% compared to the previous year. Around 4,040 LCR residents completed “ICT practitioner” courses were recorded in 2014/15. A large proportion of these (78 %) were delivered at above level 3. Very few courses are on offer at Level 4 and above (4%). In 2015/16, there were therefore 23,080 resident starts in relevant disciplines<sup>42</sup>.

The National College for High Speed Rail (NCHSR) located at Doncaster’s Lakeside Campus opened in September 2017 and aims to ensure that there is a pool of locally trained, skilled employees. The NCHSR provides a range of apprenticeships and higher education certificates for 1000+ students. The College comprises teaching and workshop space alongside specialist leading-edge facilities, rail equipment such as 150m of external track and catenary. The College will primarily focus on teaching courses connected to rolling stock, track systems and power. The specialist training at the College is a combination of class based learning and on site work experience to Level 4 and above. The NCHSR will bridge the gap in provision at Level 4 and above be part of a network of other providers based on a ‘hub and spoke’ model which will deliver the leading edge training needed for the sector<sup>43</sup>.

### Careers Advice and Guidance

The railway industry offers sustainable employment and career opportunities for young people. However, to support decision making in study choices at every stage of education there is a need for effective careers advice which will include the identification of clear pathways to employment and demonstration of sustainable long term careers. There is a perceived gap in careers advice delivery, with the lack of a coherent framework for schools and career guidance agencies to follow. Despite this, an increasing number and range of organisations across the LCR are being active in delivering careers advice to support young people's decision making.

The Enterprise Adviser Network should be seen in this context. Established by the Careers Enterprise Company and supported by the LEP, the initiative aims to improve the employability skills and career aspirations of young people by connecting senior leaders in business to senior leaders in schools, to influence and develop the school's career and enterprise strategy, giving students regular and relevant access to employers.

Enterprise Adviser initiative is on track to facilitate 26,000 interactions between employers and young people from September 2016 to July 2017.

The Engineering Project Academy at the University of Leeds is another example of enhancing careers advice. The project seeks to bring together a sustained and growing interest in engineering education and professional practise from Government, industry and professional and higher education institutions. Effective careers advice forms an important ingredient in successfully planning for, and positioning, the HSR opportunity in the North LCR.

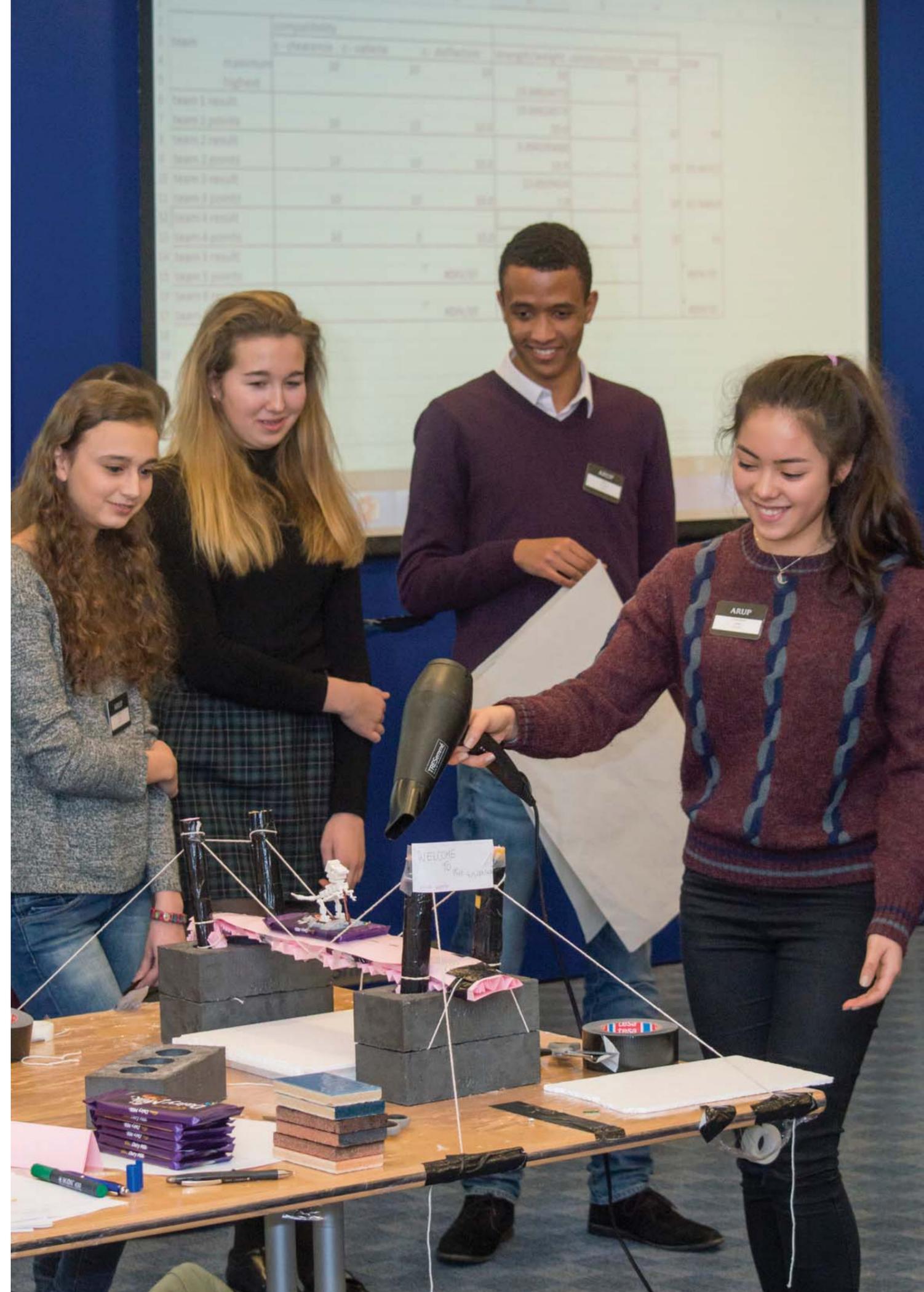
For the supply of STEM skills to increase there needs to be the resource to educate and train people. Consultations with key industry stakeholders in the region indicates that there is an existing shortage of specialist STEM educators (e.g. teachers, lecturers) particularly at a higher level within FE institutions and the private training sector. Where they do exist, it is often in the private sector which has the resources to offer more remunerative packages. This is particularly the case in engineering, physics, chemistry, and mathematics and computer science. This represents an obvious constraint to expanding the supply of STEM skills.

### Apprenticeships

National policy strongly advocates apprenticeships as a career pathway in a range of sectors and at different levels of qualification. Indeed, the number of apprenticeships starts have almost tripled since 2005/06. DfT is also seeking to address the current skills gap by delivering 30,000 apprenticeships in road and rail by 2020 across the UK. Within this they are aiming for 20% of new entrants to technical and engineering apprenticeships to be women by 2020 and to support Government's target of a 20% increase in the number of BAME candidates undertaking apprenticeships by 2020 (DfT, 2016)<sup>44</sup>.

The LCR has a strong apprenticeship culture. This is demonstrated by the 1,770 apprentice starts in construction and 4,840 in engineering and manufacturing technologies in 2015/16<sup>45</sup>. Of the construction, planning and built environment apprenticeship starts, 73% were at Level 2. Engineering and manufacturing apprenticeship starts were also dominated by Level 2 which accounted for around 61% of all starts under this category. In contrast to the position on general FE starts, apprenticeships have increased by 18% and 17% for "construction, planning and the built environment" and "engineering and manufacturing" apprenticeships respectively<sup>46</sup>.

There is significant potential to increase the region's apprenticeship capacity across the engineering, manufacturing and construction sectors. The benefits of apprenticeships for businesses and the economy were acknowledged by all stakeholders, employers and education and training providers consulted as part of this study. There was a consensus that the number of apprentices in STEM and related areas in particular needs to be improved. In raising the number taking up apprenticeships in the construction and engineering sectors, there may be scope to transfer some aspects of the approach taken in other sectors. This may include the way in which pathways to employment are defined and disseminated, particularly to young people.



Challenges exist in expanding provision including higher costs in delivering STEM apprenticeships, although many stakeholders considered that successful models could be replicated across other industries. This includes models which see Tier 1 firms using their supply framework or other agreements with the supply chain to support apprenticeship growth. This approach is also being required by Government in relation to the procurement of major infrastructure projects. Furthermore, the majority of rail relevant apprenticeships that are currently being undertaken are at Levels 2 and 3. Several frameworks exist but those which are approved by the National Skills Academy for Railway Engineering (NSARE) are established as the standard. Through the research, it was clear that there is also a desire from industry and bodies like NSARE to see the take-up of additional higher level apprenticeships (for example, the Advanced Manufacturing Engineering Framework).

Higher level apprenticeships are seen as particularly important because of the anticipated changes in technology and working practices in rail in the future. There is also an appreciation from businesses that higher level apprenticeships provide a strong pathway for individuals to upskill and support business productivity. However, there are fewer than 5% of all starts at a higher level in relevant disciplines. As part of their programme to transform skills provision in the rail sector, the NIDP highlighted the need for an aggressive profile raising of the role that multi-skill level apprenticeships will play in delivering future skills resources in line with employer needs and in the generation of fulfilling careers for young people.

HSR will generate the need for at least 1,800 new apprenticeship training opportunities in the Yorkshire and Humberside Region in the period up to 2035. This will require a step-change in the supply of relevant STEM based apprenticeships to the market.

To support apprenticeship take up and pathways into apprentices some stakeholders suggested that an introductory path could support the main apprenticeship pipeline and help to move more people into apprenticeships and promote to apprenticeships to employers.

The Apprenticeship Levy which came into effect in April 2017 provides a new opportunity to attract new talent or enable the up-skilling of the workforce. Whilst the Apprenticeship Levy will require employers to pay the Levy based on their PAYE bill, it can be used to pay the training costs of apprentices to meet skill gaps within a business.

The Levy could be used to benefit not only SMEs for example, but also communities by targeting and supporting apprentices from disadvantaged communities where progression to University study has been historically low. This could be achieved by a group of businesses working with a University to develop a Degree Apprenticeship and using a proportion of the funds to support the target group. Such an approach would provide a new pathway to training and potentially employment and extend the 'reach' of HS2 to the wider LCR.

### Private Training Provision

There is no single, consistent source of information on education and training provision delivered by private training providers. The LCR has 135 private sector firms<sup>47</sup> involved with education and training providers across all sectors of the economy. Some of these will be providing training for activities highly relevant to the railway industry. In addition, there are likely to be many more involved in providing health & safety training which is of fundamental importance to the railway industry.

Private Training Providers are highly important in the delivery of apprenticeships. They deliver a range of courses and apprenticeships in length, mode and structure. There will be some overlap with apprenticeships as the data includes completions on courses which will form part of apprenticeship frameworks.

Private training provision also plays a key role in matching apprentices with employers therefore responding to the specific needs of the industry. Private training providers can be adaptable to the requirements of firms due to their ability to establish courses rapidly and offer short training modules. Many are already meeting existing skills gaps and shortages in the rail industry which include rail engineering technicians, health & safety and signalling. Our analysis indicates that the LCR has a well-established supply of health and safety training provision and that current demand is largely being met.

A significant proportion of private training provision is delivered directly by employers (e.g. on-the-job, company owned training academies, in-house trainers etc.). This activity is largely concentrated on larger firms (e.g. Tier 1s) who consider it financially viable to invest directly in training operations. SMEs require support in accessing training with finance and personnel limiting the amount of training that they can realistically deliver themselves. The LEP has established a skills service to support SMEs to access training and support linked to their business growth objectives. Approximately 7,500 people across LCR have benefitted from a programme to upskill staff and support small and medium sized businesses (SMEs) to grow. The LEP's skills service has provided support and funding to more than 3,000 businesses to enable them to develop the skills of their employees. Despite this, 36% of the workforce in the LCR received no training by employers and the average amount of training received in a year was only 6.4 days, lower than the England average of 6.7 days.<sup>48</sup> It is vital that the private sector commits to the training necessary to meet new opportunities associated with HS2. The LEP aims to encourage more employers to invest in training to address the skills gaps and overcome the hard to fill vacancies.

The skills service is already making a difference. Almost 7,500 people across the LCR have benefitted from a programme to upskill staff and support SMEs to grow. The LEP's skills service has provided support and funding to more than 3,000 businesses to enable them to develop the skills of their employees by July 2017.<sup>49</sup>

### Findings from stakeholder engagement

As a result of engagement with a number of key stakeholders in the public and private sectors, further insights were gained during the development of this strategy. The findings indicated that the majority of those surveyed want HS2 to take a proactive approach to skill provision. Providing advice and information to schools and colleges about the associated employment benefits was highlighted as main area in which HS2 could operate. However, some of those consulted suggested due to the fragmentation of the school system e.g. free schools, LA schools, academies means distributing information to teachers and students is a potentially complex process.

Raising awareness about the HS2 project, timescales and opportunities was considered to be important along with regular and timely progress reports and success stories promoting the project must be held to generate interest and maintain momentum. Keeping HS2 at the forefront of career considerations and possibilities was considered to be important, bearing in mind the wide range of opportunities available.

Generating support amongst parents due to their importance in their child's career aspirations was also a finding from the consultation. Following on from this there was a universal response that school engagement needed to be more coordinated and targeted. In regards to the coordination, consultation responses inferred there needs to be a more joined up approach between the different companies and organisations in order to make school visits more effective and less repetitive. Targeting school students through using data on deprivation factors, gender and academic attainment could further enhance school engagement and lead to a better understanding of the impact of their outreach activities.

This feedback has underpinned the approach to developing practical projects to support the objectives of this strategy.

Section 7 will examine the impacts and opportunities for the supply chain associated with the arrival of HS2 in the LCR.

## 7.0 Supply Chain

HS2 will help to transform the LCR economy and boost economic growth through improving productivity, generating jobs in the supply chain, construction and longer term opportunities associated with its operation. Building on the strong Research & Development (R&D) and University presence e.g. Universities of Leeds, Bradford, Huddersfield, York, Leeds Beckett and the nearby National College for High Speed Rail in Doncaster, the LCR is well placed to become a global centre for high speed rail R & D and innovation which will drive the development of the supply chain with new skills, innovation and technology. In turn, this will enable the supply chain to unlock further opportunities overseas – important in a post Brexit world.

The LCR has a significant supply chain including Siemens Alstom, Unipart Rail, William Cook Rail Limited, Tracsis, NG Bailey, Marshalls and it is expected that the range and number will increase as firms look to become more competitive by taking advantage of the expanding leading edge research and innovation and expertise in high speed rail research available in the LCR.

The procurement of the HS2 project will be a complex, multi billion pound undertaking involving major contractors who will then push their requirements through a range of smaller companies supplying goods and services to strict quality, cost and delivery requirements. These goods and services range from bespoke IT systems to run the rail system through to building materials and craft labour only suppliers. The eastern leg of HS2 is estimated to cost £12.9bn of which approximately 19% is to be spent within the LCR (£2.47bn)

Key findings are that:

- There appears to be a mixed understanding of the opportunities that will arise when HS2 goes to construction stage;
- Fairly universal acceptance that SMEs face barriers accessing and competing for procurement opportunities;
- The supply chain sector appears currently buoyant. All those consulted were in the process of recruiting more staff with some demonstrating strong job growth. There appeared to an emphasis on increasing the number of apprentices within the sector with plans in place to recruit more over the coming years; and
- Few plans had been formulated on the potential impacts the UK leaving the EU will have on their business capabilities.

How works and services are procured will largely influence the composition of the corresponding supply chain. Larger value and more complex contract specifications are more likely to deter SMEs competing for contracts. In view of this it would be beneficial for the LCR to encourage HS2 to divide large contracts into smaller ‘lots’ thus assisting SME development, growth and employment.

The connectivity provided by HS2 will further enhance the agglomeration potential for the LCR with a particular emphasis on financial and professional services, and digital and technology. This will allow supply chain companies to access this labour market to utilise their digital capabilities to enhance and exploit new emerging technologies related to, for example, Intelligent Transport Systems as well as powering growth in the wider ecosystem.

The construction supply chain is dominated by a small number of companies with the capabilities to integrate all the complex elements of a project like high speed rail. These companies tend to compete internationally and rely on bringing together supply chains that have a wider capability. Very few companies own the means to deliver an entire solution to these projects because of the immense risks involved rather their competitive advantage is built upon project management skills and knowledge of who can deliver different requirements to required standard enabling risk to be dispersed over a wider range of actors. The process is led by the client commissioning work through the appointment of a first tier (lead contractor).

The global rail market is characterised by an international network of suppliers and many leading global suppliers are active in the UK as manufacturers, component suppliers, operators or advisors. This provides both an opportunity and a challenge to building a resilient, competitive world-leading rail supply chain in the UK<sup>50</sup>. The LCR has a significant supply chain including Siemens Alstom, Unipart Rail, William Cook Rail Limited, NG Bailey, Tracsis, Marshalls which reflects the wide range of activities and size of firms that make up the supply chain. In addition, Unipart Rail has repair facilities in York (track systems) and Doncaster (rolling stock).

The rail sector has also become increasingly complex, with some segments of the supply chain unique to rail e.g. signalling and rolling stock. As a result, there is a range of businesses from multinationals to SME component suppliers and niche technology companies integral to the supply chain. The rail supply chain covers a range of manufacturing, engineering, digital, material technologies and services. Network Rail for example, estimate that 40% of its expenditure benefits SMEs and in 2015, Network Rail worked with over 4,000 suppliers 2,500 of which were SMEs.

The LCR is strongly represented by key growth sectors such as digital, professional, scientific and technical and other knowledge intensive business services. With first class Universities of Leeds, Bradford, Huddersfield, Leeds Beckett, York and the nearby National College for High Speed Rail in Doncaster the LCR has the assets and expertise to catalyse the development and adoption of innovative rail technology as well driving R&D, innovation and the development of regional supply chain more widely.

Based on a review of capabilities in the LCR opportunities may exist for the LCR to exploit the following:

- Specialist equipment and systems providers;
- Data and data analytics;
- Raw materials & components; and
- Equipment/ systems manufacturers.

Many of these business opportunities concern activities that are not likely to be solely focused on rail rather rail will be one product/material market amongst many. It may be the case that access and engagement with companies is heavily mediated by the companies occupying the higher tiers of the supply which appear to be under represented as a whole in the LCR.

Analysis suggests that the construction supply chain represents a further source of employment opportunities of around 224 to 383 jobs for each year of the HS2 construction programme (thereafter dropping to between 74 and 157 jobs based on floorspace development in the South Bank – both occupied and construction related) but this is dependent upon the level of local engagement with LCR companies.

HS2 will be procuring supplies and services to operate and maintain the service equivalent to around 137 jobs per annum within the supply chain from 2033 onwards.

From our engagement of a number of supply chain companies, there would appear to be a mixed understanding of the opportunities that will arise from HS2 for example from the construction phase. A minority of those consulted claimed to be very well informed and knowledgeable about HS2, and were in the process of or planning to bid for different construction phases of the project. However, a number of companies professed to being uninformed about HS2 specifically about how the project will be procured and the details of the work. Furthermore, responses from engaging with some rail SMEs suggest there is an apparent feeling HS2 will bring no tangible opportunities for their businesses. Moreover some of the SMEs expressed the feeling the opportunities surrounding HS2 would be aimed primarily at Tier 1 sized companies due to the size of the potential procurement tenders and the associated cost.

Secondly, the findings of the consultations indicated there was a fairly universal acceptance that SMEs face barriers accessing and competing for procurement opportunities. Issues relating to acquiring the right accreditations, skill gaps, and nationally based companies having the advantage due to economies of scale.

Thirdly, the findings suggest the supply chain sector appears currently buoyant. All those consulted were in the process of recruiting more staff with some demonstrating strong job growth. There appeared to be an emphasis on increasing the number of apprentices within the sector with plans in place to recruit more over the coming years. A challenge which the majority of those consulted identified was recruiting employees with particular skills for technical roles. As a result the companies were relying on third party contractors or leaving roles unfilled.

Fourthly, it became clear from the responses that few plans had been formulated on the potential impacts the UK leaving the EU will have on their business capabilities.

### Procurement

How works and services are procured by HS2 will influence the level of supply chain opportunity and growth, employment and skills in the LCR. As the NAO has pointed out, SMEs face a range of barriers when bidding for contracts<sup>51</sup> including overly burdensome pre-qualification requirements, lack of visibility of opportunity, fragmented support, limited capacity to prepare lengthy bids and building relationships or deliver large contracts. Large contract specifications in particular are a significant barrier to SMEs competing for contracts. Importantly, the early understanding of what the HS2 procurement strategy and approach is and what HS2 will be buying will enable the supply chain to take informed decisions about the opportunities and to assess the level of business development support that may be required in order to meet the accreditation/assessment requirements and become 'tender ready'. It would also enable LCR partners to engage prospective supply chain companies and develop tailored support

In view of the large number of SMEs in the LCR economy, encouraging HS2 to divide large contracts into smaller 'lots' would assist SME development, growth and employment.

A transparent procurement strategy should encourage collaborative tendering and co-operation requiring contractors to identify the employment, training, work experience and apprenticeship offer should be embedded in the procurement process. Applying this principle will enable LCR to maximise local business and employment opportunities

On a previous phase, HS2 had produced a "Supplier Guide" which set out what HS2 Ltd will be buying, its strategic aims, culture etc. An engagement programme was undertaken which included briefing days, road shows and meet the contractor days. This is likely to be repeated for the LCR and interested companies will be required to register their interest and competences, capacity and suitability will be assessed. This will allow LCR partners to engage the supply chain, particularly rail to develop business development support.

Based on Phase 1 of the HS2 route, discrete geographic packages of "civils" work were commissioned along the route alongside a contractor for rail systems effectively joining up the various geographical packages. Given the scale of the packages, most of the civils packages were let to consortia of major civil engineering businesses.

Each tier in the supply chain has to trade off the certainty of dealing with a partner on the next level in the supply chain with a known capability versus the uncertainty of bringing in new partners. A significant factor in rail related projects is also the need for certain quality assurance standards to be in place as a basis for qualifying to do the work in the first place. These quality assurance standards tend to have a high level of rigour due to the health and safety implications of this work

In addition, there will be further opportunities to grow both the HS2 supply chain as a result of the expansion of the already strong LCR business services ecosystem. A combination of local networks for business support, graduate talent and commercial property makes the city region an attractive location for businesses to locate, and this will be enhanced as new companies are attracted to the city region through the increase in connectivity HS2 offers.

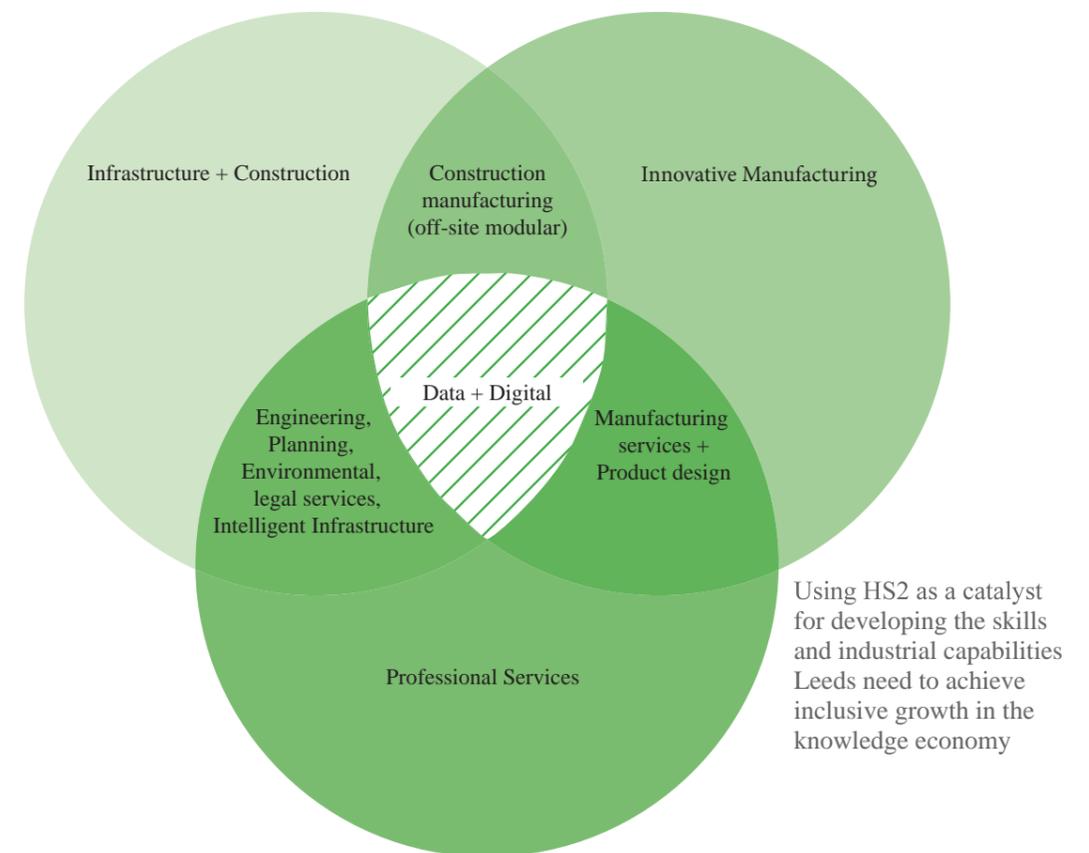
Looking across key business services such as financial and professional services, and digital and technology, key players already in this business community include DLA Piper (the third largest legal practice in the world, whose shared services hub is based in Leeds), KPMG (who host their technology centre in the city), private equity firms including Endless and North Edge, and a range of other business to business services.

A key benefit of this agglomeration has been the rise of digital and technology companies in the LCR. The technology and innovation sector has become an integral part of the LCR economy totalling £671m GVA in 2016 with a 7% employment growth between 2011 and 2014. Some of the companies include Google, Sky Betting and Gaming, NHS Digital, AQL, Hitachi Capital and Tracsis.

The increasing agglomeration of technology related businesses means there is now a significant concentration of digitally skilled workers within the LCR<sup>52</sup>. Consequently, supply chain companies can now access this labour market to utilise their digital capabilities to enhance and exploit new emerging technologies related to, for example, Intelligent Transport Systems. HS2 will facilitate similar agglomeration effects (although it is not possible to predict the full extent of these opportunities) across a range of sectors.

Section 8 focuses on the expected job number growth in the LCR and the associated skill profile required.

### Leeds HS2 Growth Strategy - Supply Chain EcoSystem



### Institute of High Speed Rail and Systems Integration (IHSRSI)

The Leeds City Region already has a significant asset base of research and development and innovation expertise with a direct bearing on rail and transport infrastructure, with key assets including the University of Huddersfield's Institute for Railway Research and the University of Leeds' Institute for Transport Studies, as just two examples.

A further proposition for investment has emerged, focused on high speed rail and complementary to the existing provision in the city region, in the shape of the Institute of High Speed Rail and Systems Integration (IHSRSI), to be based at the University of Leeds. The facility will comprise 40,000m<sup>2</sup> of world class high speed rail infrastructure test & R&D facilities, including:

- a full-scale 400 km/h capable high-speed rail infrastructure systems test facility which will be able to test full-scale railway track structures, including embankments, preformed systems and full-depth ground stabilization technologies;
- a full-scale high-speed 400 km/h capable vehicle systems test facility capable of testing full-scale rolling stock and pantographs and their interaction (behaviour) with different catenary systems; and
- a digital command and control system integration facility able to replicate the railway electrical and electronic (digital) control systems

The facility will be world leading with the only other similar facility in the Far East. Therefore it positions the city region as a global centre for high speed rail R&D & innovation, and a centre of expertise that the high speed supply chain can access, both locally in the context of the development of the HS2 line, the Yorkshire Hub, and the HS2 Rolling Stock Depot.

The development of the Institute will:

- Position the City Region as a global centre and lead for high speed rail R&D & innovation whilst maximising the benefits and impact of HS2/Northern Powerhouse Rail
- Establish the City Region as the go to place for industry in areas of high-speed track infrastructure and dynamics, rolling stock technology and system integration
- Create a global High Speed Rail Growth Zone with strong links to the wealth of strategically important rail-related education and research assets located in the City Region and beyond, including Network Rail Campus in York, the High Speed Rail College in Doncaster and the Rail Research Group at Huddersfield University.

The University is seeking to establish the technology park within or close to the Leeds Enterprise Zone. The facility will house the IHSRSI, the UKCRIC funded National Centre for Infrastructure Materials, including a new Multiple Axis Shaking Table; and the planned further growth of the University's £4.3m Robotic and Autonomous Systems research centre. The aspiration is for the technology park to facilitate inward investment from complimentary rail sector and advanced manufacturing users, drawn to the site by the opportunity to utilise the state of the art facilities brought forward by the IHSRSI and wider University of Leeds investment, but also the R&D & innovation/skills opportunities that co-location can facilitate.

The identified site is within the Aire Valley, Leeds which includes the Leeds Enterprise Zone. The HS2 Eastern Leg Rolling Stock Depot has been proposed for this area, further enhancing the potential for the Enterprise Zone and wider Aire Valley to become a focus for rail related and advanced manufacturing companies.

The University of Leeds has been approached by HS2 to explore the formation of a HS2 Innovation Hub through which, testing and validation of new and emerging high-speed technologies for the HS2 line can be undertaken using the specialist equipment within the IHSRSI. In particular HS2 has expressed an interest in the Innovation Hub at Leeds providing a mechanism to fully engage the HS2 supply chain to develop, commercialise and export new UK technology on the international stage.

In summary, the University's technology park, IHSRSI and HS2 Innovation Hub represent an unprecedented economic opportunity for the Leeds City Region to create a global high speed railways growth zone where all the necessary equipment, expertise and testing facilities are co-located. Significant economies of scale are possible given that the rolling stock maintenance depot for the HS2 trains will be directly adjacent to the Institutes testing facilities providing a complete 'full-circle' opportunity for technology development, testing and immediate application. This will generate significant future investment as companies co-locate within the technology park providing the catalyst and mechanism for international exports in future rail technologies. Alongside the city region's existing asset base and expertise in rail, it represents a significant opportunity to meet the ambition of positioning the city region as a global centre of excellence in supply chain opportunities.

**“HS2 is delighted that the University of Leeds is launching the UK's first Institute dedicated to high speed rail and system integration. The creation of world-leading facilities so close to the HS2 depot in Leeds will accelerate the vehicle and systems integration testing process, and advance the UK's vision of creating a high speed railway that will support regional growth, create jobs and rebalance the economy.”**

Iain Roche, Head Of Innovation, Hs2 Ltd

## 8.0 Balance of Supply and Demand

An additional 1,000 to 1,600 job opportunities could be created in each year of the eight year construction programme needed to build and commission HS2.

These jobs will be over and above the estimated annual recruitment demand for the whole of the construction sector of around 4,600 at a time when many craft workers are retiring.

The skills composition is changing in favour of higher level management/ professional occupations at a time when the supply of young people entering the labour market is expected to diminish.

These challenges emphasise a need to achieve a fundamental change in the trajectory of the industry making it a desirable destination for entrants to the labour market over the medium and longer term.

Transformative actions will be needed on the supply side if the growth in high level skills demand is to meet the expected level of demand when an estimated 68% of the growth will be for NQF Level 3 and above. This suggests that the project will drive a requirement for higher level skills development across the LCR. In 2014/15, only 36% of course starts in the Further Education sector courses related to construction and STEM type provision<sup>53</sup> across the LCR related to NQF level 3 of above.

This imbalance on skills supply provision suggests a need to define clear progression routes for those willing and capable of pursuing higher qualifications to access opportunities created by HS2 and associated development.

The opportunity cost of not intervening to create clear progression routes is that higher level skills will be taken by people outside the LCR either on a temporary or permanent basis. Around 36% of HS1 job opportunities went to residents of Kent despite the proximity of the work to urban comm

As a result it was deemed beneficial that a course was formulated which taught general engineering students in how rail systems work/ design and maintenance. This training would be with a University/ Manufacturer and Network operator.

In regards to catalytic opportunities the biggest growth in jobs in the LCR will be those requiring QCF6 First degrees.

A key issue for the LCR is the degree to which the additional demand for labour triggered by the HS2 project and associated development will have on the supply of skills within the LCR. Of particular interest is the degree to which existing training provision will need to be scaled up to meet the challenge.

One of the many challenges with understanding the balance between supply and demand is that training provision focuses on measures linked to training interventions (e.g. enrolment on courses) whilst demand tends to be based around jobs. The holder of a job could enrol on multiple courses within the same year similarly a job could be held by either one individual or multiple persons.

What follows is a snap shot in time and a look ahead over a 8 year period. As technology develops and providers bring forward responses to demand, the situation will evolve, this needs to be reevaluated on a regular basis.

### HS2 Construction

Section does however suggest that the various elements of the HS2 project is likely to generate a requirement for around an additional 1,042 to 1,642 local resident jobs per annum over an eight year period (2026 – 2033) dependent upon the level of optimism adopted. With respect to the LCR's ability to capture benefit, estimates suggest that these jobs will be distributed across the skills/ competency requirements as shown below:

	Low	High
Below NQF Level 2	124	189
No qualifications	14	16
NQF Level 2	196	309
NQF Level 3	213	340
NQF Level 4 and above	410	650
Other qualifications	46	76
Trade Apprenticeships	41	63
Total Qualifications/ jobs	1,042	1,642

Table 6: Skills/ Competency requirements<sup>54</sup>

Estimates suggest that 68% of the growth will be for NQF level 3 and above (52% of the current LCR workforce is currently classed as Level 3 plus<sup>55</sup>) suggesting that the project will drive a requirement for higher level skills development across the LCR. This prediction is reflective of wider changes in the construction sector and across the labour market generally as labour demand shifts towards higher skilled work (e.g. the greater adoption of techniques such as BIM). The analysis also predicts between 328 and 504 trade apprenticeships over the life of the project.

The additional growth anticipated in relation to HS2 would represent between 23% and 36% uplift on the current annual recruitment requirement down to the LCR.



### The Rail Sector

The current route into the rail sector has traditionally come from the following sectors: general engineering capabilities in civil / mechanical / electrical / electronic / computers. Employment and skills provision within the LCR could reinforce these transmission routes locally by establishing mechanisms that encourage progression. This could be supported through post graduate training with a University/ Manufacturer and Network operator. Within the rail sector the alignment of these subjects – creating a ‘System Engineer’ would be beneficial.

A rail course may include the following;

- Modules in Rail Engineering – covering design principles/maintenance- including mechanised;
- Material degradation as a system;
- System design – alignment/linkage of track/ signalling/OHLE. This would allow the academics to link a civil/mechanical and electrical students together;
- Requirements –the ability to understand the fundamental need for good requirements that can then be linked back to a systems and validation process;
- System maintenance –asset maintenance;
- Rail operation – Providing engineers with an understanding how trains run; understanding timetables and stock movement;
- Development of Remote condition monitoring (rcm). Research to work with industry to develop monitoring systems that support the asset. Rail industry has growing need for RCM if it is to operate 24 hrs a day with minimal disruption; and
- Rail materials/components and development.

The role of a System Engineer could be in two core groups:

- An individual who’s ability is towards designing and implementing a scheme that is a combination of systems; and
- An individual who’s ability is in managing and maintaining the system.

This could therefore present a mix of training from an apprentice (might align with long term maintenance) to formal academia.

### Catalytic Opportunities

In addition to the construction phase, there is a longer term, more sustainable impact as catalytic development opportunities are seized upon by developers to create investment opportunities for companies in the IT, support services, professional services and finance sectors in the South Bank area. The skills profile for these jobs are estimated as shown below:

This would represent an uplift of between 2% and 4% on the current annual recruitment requirement for all the relevant sectors in the LCR.

The modelling of skills/ competency requirements does not imply that each job demanded will result in a training action. A dynamic labour market will mean that employers will seek to address skills deficits within the LCR by recruiting migrant labour on either a permanent or temporary basis. The history of large infrastructure projects is that this can mean a substantial leakage of value outside the local economy especially with regard to higher level skills. A key issue is to ensure that leakage is kept to a minimum by priming course provision and job finding capabilities.

Section 9 focuses on the proposed first tranche of projects and corresponding actions.

	Low	High
QCF8 Doctorate	3	5
QCF7 Other higher degree	32	63
QCF6 First degree	99	195
QCF5 Foundation degree; Nursing; Teaching	19	37
QCF4 HE below degree level	23	46
QCF3 A level & equivalent	48	96
QCF2 GCSE(A-C) & equivalent	57	113
QCF1 GCSE(below grade C) & equivalent	52	103
No Qualification	16	32
Total	349	691

**Table 7: Qualifications and Credit Framework (QCF) Skill Profiles for Estimated Jobs<sup>56</sup>**

## 9.0 Accelerating Transformation – First Tranche Projects and Actions

Priority Theme 1 - Building and retaining talent for growth in the LCR

- Career Insight Programme;
- Careers Family Programme;
- Employment Brokerage Plus;and
- Graduate Retention/ Bursary Programme.

Priority Theme 2 - Building the supply chain capacity for success

- HS2 Supply Chain Development and Accelerator Programmes

Priority Theme 3 - Nurturing economic innovation based on LCR strengths in digital, data analytics and academia

- Institute for High Speed Railways and System Integration;
- Catalyst Fund;
- Collectively, the projects will help us to:
  - Make the LCR the UK leader in Light Rail and High Speed Rail engineering and R&D;
  - Have an globally competitive supply;
  - Attract the very best UK talent to create a sustainable skills base; and
  - Move the LCR from a low skills equilibrium to a higher skilled economy, with significantly increased skills levels and qualifications in areas such as STEM.

It is recognised that the LCR faces stiff competition from other regions. The LCR's ambition for its subregion is driven by strong track record of partnership working between the private, public, education, government and community sectors, with successful delivery over many years. This will continue based upon the strategic and delivery arrangements in place to deliver the wider vision.

The projects included in the first tranche have been developed in response to gaps, barriers and opportunities identified in the evidence base review and relevant LCR and Government Strategies including the emerging LCR HS2 Growth Strategy. The proposals have been refined and shaped through engagement with key LCR stakeholders and Local Authority partners. In addition, experience from previous HS2 and other major infrastructure project related work has been drawn upon to enable realistic and deliverable projects to be brought forward which fit strategically with the LCR HS2 Growth Strategy.

It is recognised that many of the projects will be developed prior to the arrival of HS2. This is particularly important in terms of investing in people and skills and developing supportive pathways to employment and training. Key principles adopted in the development of the Action Plan included looking for opportunities to:

- Build on what works – particularly where local initiatives have delivered successful results e.g. the HS2 Schools Ambassador programme is an initiative which has worked well elsewhere which could be tailored to the LCR;
- Extend the 'reach' of successful projects;
- Learn the lessons from pilot or unsuccessful projects and applying the lessons learnt to improve impact and outcomes;
- Integrate initiatives – important in addressing personal and other barriers affecting certain groups of residents from participating in training, work experience, learning and entering and progressing in the labour market. Integration is considered important to improve the effectiveness of the initiatives and provide a more 'seamless' journey into work or improved business support and development;

- Build capacity and competences of the supply chain so that local businesses that aspire to be part of the HS2 project are in a prime position to be 'tender ready' and win work;
- Develop pilot initiatives; and
- Raise awareness about the opportunities and support associated with the HS2 investment through linked portals and consistent messages and information on which informed decisions can be made.

The key priority themes for the HS2 Skills and Supply Chain Strategy are:

1. Building and retaining talent for growth in the LCR;
2. Building the supply chain capacity for success; and
3. Nurturing economic innovation based on LCR strengths in digital, data analytics and academia.

The first tranche of projects driven by the strategy include:

### Priority Theme 1 - Building and retaining talent for growth in the LCR

- Careers Insight Programme – reaching every pupil in the LCR to enthuse and excite the next generation of engineers/infrastructure specialists, and building teacher capacity to engage;
- Careers Family Programme – mapping and developing a coherent offer so that young people/ career returners can seamlessly access and move across the HS2 career family, and through educational pathways across the city region;
- Employment Brokerage Plus – ensuring record numbers of LCR residents employed on the project as new entrants from our most disadvantaged communities; and
- Graduate Retention/Bursary Programme – private/ public sector collaboration to support work placements during study and improve retention of skilled labour within the city region.

### Priority Theme 2 - Building the supply chain capacity for success

- HS2 Supply Chain Development and Accelerator Programmes building general capacity across the supply chain and identifying potential disruptor/'unicorn' type firms for support.

### Priority Theme 3 - Nurturing economic innovation based on LCR strengths in digital, data analytics and academia

- Catalyst Fund – enabling education providers to develop innovation capacity and curriculum to support our global ambitions;
- Institute for High Speed Railways and System Integration
- Collectively, the projects over the long term will support our ambitions to:
- Make the LCR the UK leader in Light Rail and High Speed Rail engineering and R&D;
- Have an globally competitive supply chain that constantly innovates to meet customer needs, supported by an R&D ecosystem that is second to none;
- Attract the very best UK talent to create a sustainable skills base across both the scheme and our key sectors of construction and infrastructure, manufacturing and engineering, and digital;
- Move the LCR from a low skills equilibrium where employment rates and productivity per worker is below the national average to a higher skilled economy, with significantly increased skills levels and qualifications in areas such as STEM, and deliver increased productivity in excess of the national average.

And support the delivery of the following outcomes:

The Supply Chain
Position the Leeds CR as the UK home of Light Rail and High Speed Rail engineering and R&D
Deliver increased productivity across the key sectors contributing to HS2 – construction and infrastructure, manufacturing and engineering, digital – to national average
Gear up our business supply chain, KIBs in particular, and our key growth sectors to increase investment in physical and human capital, innovation and R&D, and increase productivity, and make our supply chain internationally competitive in the areas of light and high speed rail

The Labour Market
Enthuse and excite a new generation of engineers, technicians and other professionals, eradicating the skills gaps and shortages across the key sectors contributing to HS2 – construction and infrastructure, manufacturing and engineering, digital
Deliver record levels of women and BAME representation in the HS workforce, and the wider construction/infrastructure/engineering sector
min.50,000 job creation on the HS2 scheme and wider economic growth
20% of the total workforce on HS2 (within LCR) to live in the LCR of which 5% will be previously unemployed
Move from a low skills equilibrium where employment rates and productivity per worker is below the national average to a higher skilled economy, with significantly increased skills levels and qualifications in areas such as STEM, and increase productivity to national average

### End Notes

- 1 - Arup (2014) Future of Rail 2050 (Foresight)
- 2 - HM Treasury (2016) National Infrastructure Delivery Plan 2016-2021
- 3 - CITB (2015) Workforce Mobility and Skills in the UK Construction Sector
- 4 - UKITB (2016) The UK Rail Sector A showcase of world-class expertise
- 5 - Department for Transport (2016) Transport infrastructure skills strategy: building sustainable skills
- 6 - The Northern Powerhouse Economic Review (2016) Final Executive Summary Report
- 7 - Transport for the North (2017) Strategic Transport Plan Position Statement
- 8 - Leeds City Region Enterprise Partnership (2016) Strategic Economic Plan 2016 - 2036
- 9 - Arup (2017) Leeds City Region Connectivity Study
- 10 - Royal Academy of Engineering (2016) UK Engineering 2016: An Independent review led by Prof John Uff CBE, QC, FREng
- 11 - CITB/WLC (2016) Leeds City Region: The Construction, Labour and Skills report
- 12 - Based on REM at 2017 – Source: WYCA
- 13 - Arup Research (2017)
- 14 - Based on Working Futures 2014 to 2024 forecasts for the LCR
- 15 - Traditional craft skills would include bricklaying, plumbing, carpentry, etc
- 16 - Arup Research (2017)
- 17 - [https://www.the-lep.com/LEP/media/New/Research%20and%20publications/Leeds-City-Region-Labour-Market-Analysis-2016-2017\\_1.pdf](https://www.the-lep.com/LEP/media/New/Research%20and%20publications/Leeds-City-Region-Labour-Market-Analysis-2016-2017_1.pdf)
- 18 - [https://www.the-lep.com/LEP/media/New/Research%20and%20publications/Leeds-City-Region-Labour-Market-Analysis-2016-2017\\_1.pdf](https://www.the-lep.com/LEP/media/New/Research%20and%20publications/Leeds-City-Region-Labour-Market-Analysis-2016-2017_1.pdf)
- 19 - REM output – Accessed by WYCA June 2017
- 20 - Rounding applied
- 21 - Arup Research (2017)
- 22 - Based on estimates of additional floorspace growth supplied by Cushman's in May 2017
- 23 - Local Response Fund Emerging Skills Needs in the LCR, June 2015
- 24 - Based on Higher Education qualifiers falling under the following categories: (H1) General engineering; (H2) Civil engineering; (H3) Mechanical engineering; (H6) Electronic & electrical engineering; (H8) Chemical, process & energy engineering and (H9) Others in engineering
- 25 - Based on FE provision for courses in the Built Environment; Engineering and Manufacturing and ICT Practitioners in 2014/15 – Accessed by WYCA, 2017
- 26 - Based on calculating the proportion of people in the resident workforce of the LCR working in construction in 2011 (KS605EW to KS607EW - Industry by gender) as a % of all resident workers and assuming this remains unchanged.
- 27 - The Regional Economic Model is an econometric model developed by Experian for use by WYCA
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- 35 - Based on apportionment of students in North Yorkshire in accordance with share of population aged 15 applied to Craven, Harrogate and Selby.
- 36 - Table LA6: Achievement of 5+ A\*-C grades including English and mathematics GCSEs of pupils at the end of key stage 4 for each local authority1 and region
- 37 - Based on assuming that 52% of North Yorkshire's students are in the LCR representing the 16-18 year cohort percentage share of all 16-18 years old in North Yorkshire.
- 38 - STEM subjects are defined here as: Biological Sciences; Chemistry; Physics; Other Science; Mathematics; Further Mathematics; Design and Technology; Computing; ICT from Table 10: Number of A level examination entries1, A\*-A grades and A\*-E grades by state-funded students by subject, local authority and region
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