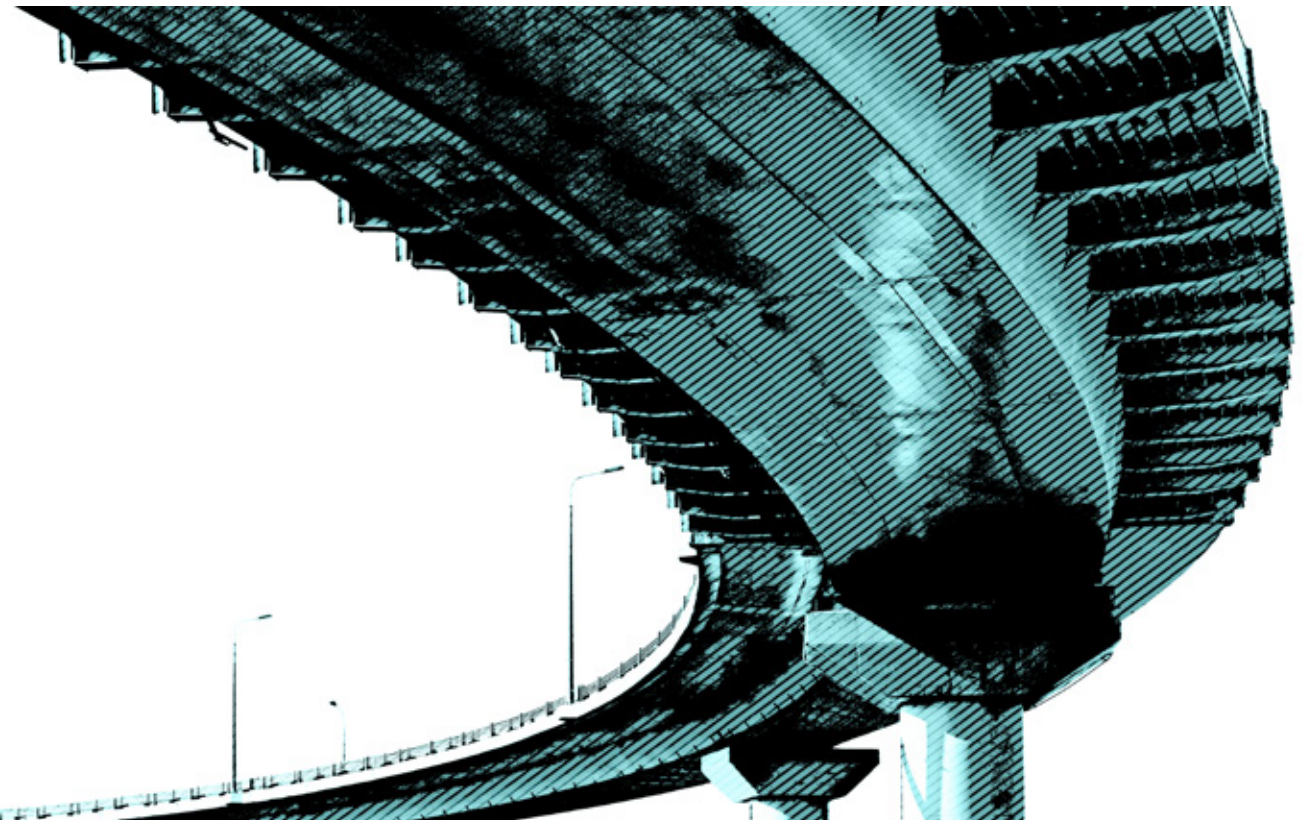# INDUSTRY INSIGHTS

Construction Skills Network
Forecasts 2017–2021

WEST MIDLANDS

About CITB
CITB is the Industrial Training Board (ITB) for the construction industry in Great Britain (England, Scotland and Wales). CITB ensures employers can access the high quality training their workforce needs and supports industry to attract new recruits into successful careers in construction.

Using its evidence base on skills requirements, CITB works with employers to develop standards and qualifications for the skills industry needs now, and in the future. CITB is improving its employer funding to invest in the most needed skills and by making it easier for companies of all sizes to claim grants and support.

About Experian
Experian's Construction Futures team is a leading construction forecasting team in the UK, specialising in the economic analysis of the construction and related industries in the UK and its regions. As such, we have an in-depth understanding of the structure of the construction industry and its drivers of change. The Construction Futures team has collaborated on the Construction Skills Network employment model with the CITB since 2005, manages a monthly survey of contractors' activity as part of the European Commission's harmonised series of business surveys, and a quarterly State-of-Trade survey on behalf of the Federation of Master Builders.

CONTENTS

SUMMARY — WEST MIDLANDS

Construction output in the West Midlands is forecast to grow at an annual average rate of 1.3% between 2017 and 2021. This represents a downgrade from last year's forecast of a 1.7% annual average gain in the 2016 – 2020 period, and lags behind the expected growth of 1.7% annually at the national level. Employment is expected to grow at an average of 0.4% a year in the five years to 2021, also marginally trailing the UK average of 0.6%. The annual average recruitment requirement (ARR) in the region is estimated at 2,800 in the five years to 2021. This represents 1.3% of base 2017 employment.

Growth is expected to focus on the Public non-housing sector in the short term, by

3.6%

Employment is forecast to grow by

0.4%

a year on average

The West Midlands has an ARR of

2,800

KEY FINDINGS

Total construction output in the West Midlands increased by 3% in 2015. This follows growth of 8% in 2013, and 7% in 2014. Output was the highest it has been since 2008. The increase was driven by growth in output of around 20% in the private housing, infrastructure and commercial sectors. There were contractions in all the other new work sectors and repair and maintenance (R&M) output fell by 5%. In the first three quarters of 2016 construction output in the West Midlands came in at £8.1bn in current prices. This represents a 10% increase compared to the same three quarters of 2015.

Total construction output is expected to grow at an annual average rate of 1.3% in 2017–2021, compared to a 0.1% contraction in the short run (2017–2018). The improvement can be attributed mainly to a substantial uplift to growth in the infrastructure sector, from the commencement of the Birmingham branch of High Speed 2 (HS2). Outturns in the commercial sector are also expected to improve compared to the short term, but in most other sectors the outlook is predicted to worsen.

Employment is projected to grow at an annual average rate of 0.4% a year between 2017 and 2021, compared to 0.6% at the national level. In numbers terms this represents an increase from estimated employment of 205,930 in 2016 to 210,190 in 2021. Of the 28 occupational aggregates 16 are set to see growth, while the other 12 are predicted to contract.

The ARR for the West Midlands is projected to be 2,800 for the 2017 to 2021 period. This represents 1.3% of base 2017 employment, a fractionally lower ratio than the UK's 1.4%. Most occupational categories were flagged as having low requirements (ARRs of up to 2.5% of base 2017 employment). No categories were flagged as having a high requirement (over 5%), and just six were highlighted as having a medium requirement (between 2.6% and 5%).

ANNUAL AVERAGE CONSTRUCTION OUTPUT GROWTH 2017–2021 — WEST MIDLANDS
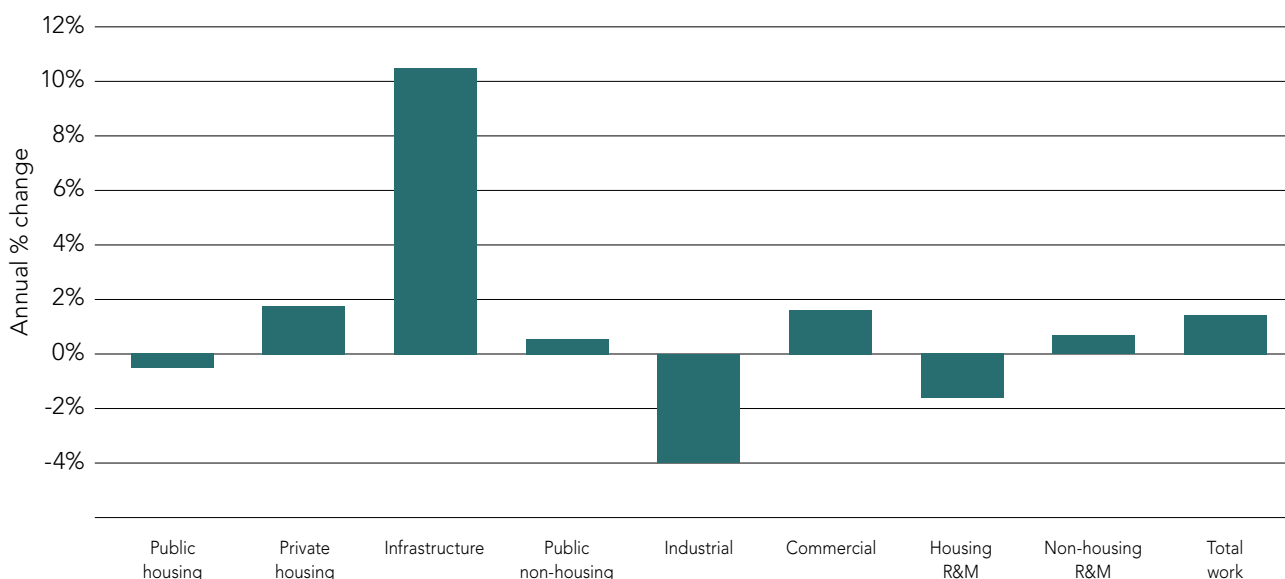
Source: CSN, Experian.
Ref: CSN Explained.

REGIONAL COMPARISON 2017–2021

	Annual average % change in output	Change in total employment	Total ARR
North East	-0.1%	-2,840	1,270
Yorkshire and Humber	0.5%	-1,300	1,860
East Midlands	0.0%	-2,340	1,770
East of England	1.0%	3,230	3,970
Greater London	2.4%	27,110	3,870
South East	2.2%	25,550	3,940
South West	3.1%	8,240	4,180
Wales	6.2%	16,120	3,890
West Midlands	1.3%	4,280	2,800
Northern Ireland	1.6%	1,430	710
North West	2.5%	14,520	5,140
Scotland	-0.4%	-8,420	2,340
UK	**1.7%**	**85,580**	**35,740**

Source: CSN, Experian.
Ref: CSN Explained.

> Construction output in the West Midlands is forecast to grow at an annual average rate of 1.3% between 2017 and 2021.

THE OUTLOOK FOR CONSTRUCTION IN THE WEST MIDLANDS

CONSTRUCTION OUTPUT IN THE WEST MIDLANDS – OVERVIEW

In the West Midlands, total construction output increased by 3% annually in 2015, to nearly £10bn in 2013 prices. This builds on gains of 8% in 2013, and 7% in 2014. Output is now the highest it has been since 2008.

The increase was driven by growth in output of around 20% in the private housing, infrastructure and commercial sectors. There were contractions in all the other sectors. Repair and maintenance output fell by 5%.

INDUSTRY STRUCTURE

The Construction Industry Structure 2015 – UK vs the West Midlands graphic, illustrates the sector breakdown of construction in the West Midlands, compared to that in the UK. Effectively, the percentages for each sector illustrate what proportion of total output each sector accounts for.

Despite infrastructure construction output growth of 20% in 2015, the sector continues to be substantially under-represented in the region compared to the UK average. At the UK level the sector grew by 36% in 2015, to almost £20bn, more than 50% above its pre-recession peak. In the West Midlands the gains have been far milder. The other sector which takes a substantially different share is the non-housing R&M one, more important in the West Midlands (24%) than it is across the UK as a whole (17%). Otherwise the industry structure in the region remains similar to that of the UK as a whole.

ECONOMIC OVERVIEW

The expected performance of a regional or national economy over the forecast period (2017–2021) provides an indication of the construction sectors in which demand is likely to be strongest.

ECONOMIC STRUCTURE

Gross value added (GVA) in the West Midlands grew by 1.6% year-on-year in 2015, to £112bn in 2012 prices. This compares to a gain of 1.7% in 2013, and 1.5% in 2014.

The professional and other private services sector made up the largest share of output in the region in 2015, at 26%. This is up from a share of 23% in 2007, although is below the national average of 28%.

Manufacturing, wholesale and retail, and public services also make up a large share of output in the region, the prior two sectors at 14% and the latter at 20%. This exceeds the national averages of 10%, 12% and 18% respectively. Since 2007, wholesale and retail output as a share of total output has grown by almost 1%, while manufacturing has seen its share fall by a similar amount. Public services share is little changed.

CONSTRUCTION INDUSTRY STRUCTURE 2015 — UK VS WEST MIDLANDS

Public housing	Infrastructure	Industrial	Housing R&M
4% | 3%	15% | 8%	3% | 5%	18% | 16%

Private housing	Public non-housing	Commercial	Non-housing R&M
18% | 17%	7% | 6%	18% | 21%	17% | 24%

Source: ONS, Experian.
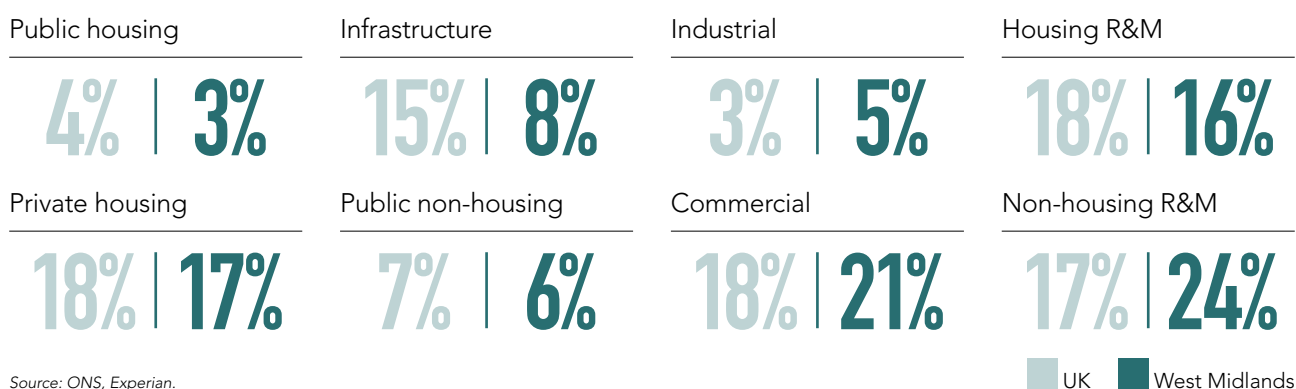
■ UK ■ West Midlands

CONSTRUCTION OUTPUT 1999–2015 — WEST MIDLANDS

Source: ONS.
Ref: CSN Explained.
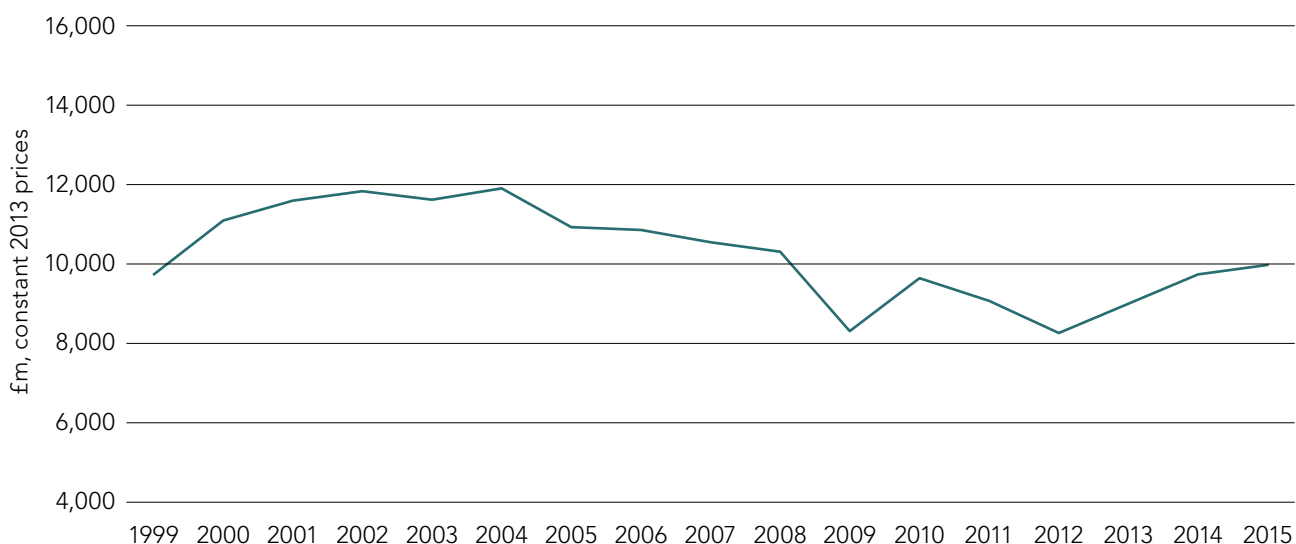
ECONOMIC STRUCTURE — WEST MIDLANDS (£ BILLION, 2012 PRICES)

	Actual	Forecast (Annual % change, real terms)					
	2015	2016	2017	2018	2019	2020	2021
Professional & Other Private Services	28.6	2.5	1.4	1.5	1.8	2.0	2.3
Public Services	22.0	1.1	0.6	09	1.6	2.4	2.5
Wholesale & Retail	15.3	4.3	1.0	1.5	1.9	2.1	2.3
Manufacturing	15.2	0.3	0.1	1.5	1.2	1.3	1.3
Finance & Insurance	5.1	0.6	0.4	0.6	1.1	1.7	2.2
Total Gross Value Added (GVA)	**112.2**	**1.9**	**0.8**	**1.3**	**1.6**	**1.9**	**2.1**

Note: Top 5 sectors, excluding construction.
Source: Experian.
Ref: CSN Explained.

FORWARD LOOKING ECONOMIC INDICATORS

In 2016, annual GVA growth is estimated to have increased to 1.9% from 1.6% in 2015.

GVA is predicted to grow at an annual average rate of 1.6% in the 2017–2021 period, comparing to 1.8% nationally. The GVA outlook generally is weaker than was anticipated a year ago due to global uncertainties, not just as a result of the European Union referendum result in the UK, but also linked to the recent U.S. elections and continuing instability in the Middle East.

In 2016, growth is estimated to be strongest in the information and communication (5.2%) and wholesale and retail (4.3%) sectors. In the 2017–2021 period, the former is predicted to grow at an annual average rate of 2%, exceeding the gains in all other sectors. Wholesale and retail is forecast to grow at 1.8%, exceeding the regional average.

The large professional and other private services sector is also estimated to have grown relatively strongly in 2016, at 2.5%. The sector is predicted to grow at an annual average rate of 1.8% in the 2017–2021 period.

Conversely, the manufacturing and public services sectors are estimated to have grown by 0.3% and 1.1% respectively in 2016, trailing the regional average by a large margin. In the 2017–2021 period, manufacturing output is predicted to grow at an annual average rate of 1.1%, continuing to lag behind the regional average. Public sector output gains are forecast to be roughly in line with the regional average of 1.6%.

In 2015, real household disposable incomes benefited from exceptionally low levels of inflation and decent earnings growth, increasing by a strong 3.6%. This compares to a 0.1% decline in the previous year. In 2016 inflation picked up slightly, though growth remained fairly resilient, estimated at 2.3%. In 2017, as inflation picks up markedly, this is likely to change, and we expect real household disposable incomes to decline by around 0.1%. In the 2017–2021 period, annual increases are forecast to average 1.4%.

The unemployment rate in the West Midlands peaked at over 9% in 2013. It has fallen sharply since then as it has nationally, and came in at 5.9% in 2015. In 2016 it is expected to have remained roughly the same, though from 2017 it is predicted to rise steadily to 6.6% in 2020, and stabilise in 2021.

NEW CONSTRUCTION ORDERS – OVERVIEW

Total construction orders fell by 7.1% in 2015, to £4.1bn in current prices. This follows growth of nearly 9% in 2013 and 18% in 2014. New orders remain well down on their pre-financial crisis high of £6.8bn in 2007.

Large declines in new orders in the public housing, public non-housing and commercial sectors drove the contraction. The falls were offset by increases in the other sectors, notably a 50% gain in the industrial sector.

NEW CONSTRUCTION ORDERS – CURRENT SITUATION

In the first three quarters of 2016 total new construction orders grew by a very strong 46% compared to the same three quarters of 2015. Infrastructure orders were valued at £725m in current prices, a massive 176% increase, and a larger outturn than 2015 as a whole, when they reached £452m. In the public housing and commercial sectors new orders grew by around 70%, while in the private housing and industrial sectors they rose by slightly more than 20%. The public non-housing sector was the only one in which new orders contracted.

ECONOMIC INDICATORS – WEST MIDLANDS (£ BILLION, CURRENT PRICES – UNLESS OTHERWISE STATED)

	Actual	Forecast (Annual % change, real terms)					
	2015	2016	2017	2018	2019	2020	2021
Real household disposable income (2012 prices)	90.4	2.3	-0.1	1.4	1.5	2.0	2.2
Household spending (2012 prices)	89.0	2.5	1.6	0.6	1.5	2.0	2.1
Working age population (000s and as % of all)	3,534	61.7%	61.6%	61.5%	61.6%	62.0%	61.9%
House prices (£)	164,583	4.0	1.0	1.0	2.0	2.4	2.7
LFS unemployment (millions)	0.2	1.7	8.2	2.3	1.4	1.1	0.3

Source: ONS, DCLG, Experian.

NEW CONSTRUCTION ORDERS GROWTH 1999–2015 – WEST MIDLANDS VS GB

Source: ONS.
Ref: CSN Explained.

NEW WORK CONSTRUCTION ORDERS – WEST MIDLANDS (£ MILLION, CURRENT PRICES)

	Actual	Annual % change				
	2015	2011	2012	2013	2014	2015
Public housing	108	26.8	27.1	13.8	-53.5	-19.4
Private housing	1,376	19.1	11.1	29.6	34.4	13.0
Infrastructure	452	107.9	-11.8	-41.9	14.8	0.4
Public non-housing	477	-44.2	-21.1	5.1	-12.0	-22.4
Industrial	677	19.5	28.2	140.9	-27.7	50.1
Commercial	1,047	-21.3	-8.0	-5.3	83.4	-34.0
Total new work	**4,137**	**-9.1**	**-4.5**	**8.8**	**18.0**	**-7.1**

Source: ONS.
Ref: CSN Explained.

CONSTRUCTION OUTPUT – SHORT-TERM FORECASTS (2017–2018)

Regional Office for National Statistics (ONS) output statistics are published in current prices and are thus inclusive of any inflationary effect. At the time of writing, regional ONS construction output statistics were only available for the first three quarters of 2016.

Construction output in the West Midlands came in at £8.1bn in current prices in the first three quarters of 2016. This represents a 10% increase compared to the same three quarters of 2015. The increase was driven by gains of 36% and 21% in the private housing and industrial sectors respectively. In all other sectors output contracted. The largest decline was in the public housing sector, at 12%.

Construction output is predicted to largely stagnate in the 2017–2018 period, largely due to contractions in the industrial and commercial sectors. Annual outturns are expected to be up to £2bn lower in 2013 prices, than in the five years to 2007.

In the public housing sector construction output is expected to grow at an annual average rate of 1.8% between 2017 and 2018. This increase is driven by an expected gain in output of 4% in 2017. According to the ONS, public sector housing starts increased by 5% in 2015, but comparing the first three months of 2016 with the same three months a year earlier, starts fell by 10%. Similarly, the Homes and Communities Agency (HCA) estimates that the number of affordable and social homes for rent started in the region between the 1st of April 2016 and the 30th of September 2016 fell by 8% compared to the same period a year earlier. Despite this, 2016 remains a strong year historically in terms of public sector housing starts, and this should support growth in 2017. Specific projects include the planned construction of 255 homes, worth £28m, by Birmingham Municipal Housing Trust.

In 2018 the sector is expected to see a 1% contraction in construction output. From April 2016 the government has said that housing associations must cut social housing rents by 1% a year for the next four years. Combined with cuts in government funding output in the sector is unlikely to grow.

Output in the private housing sector is also predicted to grow at an annual average rate of 1.8% in the 2017–2018 period. Private housing starts increased by 11% in 2015 and comparing the first three months of 2016 with the same period of 2015 they were up 15.5%. This is expected to support growth of 4% in private housing construction output in 2017. In 2018, growth is forecast to stagnate as buyer demand stutters amidst Brexit uncertainty, worsening in labour market conditions and a slowdown in real earnings growth.

The infrastructure sector is predicted to register average annual growth of 1.6% in the two years to 2018. The sector will benefit from £1.8bn of government spending that has been allocated to Highways England to improve the capacity and conditions of roads in the Midlands. In the West Midlands, this work includes the £335m smart motorway upgrade between junctions 13 and 15 of the M6. Preparatory works will take place this year, with main works commencing in March 2018. A smart motorway worth between £155m and £234m will also be built between junctions two to four of the M6. The project will commence this year, and is due for completion in the spring of 2019.

The public non-housing sector is predicted to be the best performer in terms of construction output growth in the 2017–2018 period, forecast to grow at an annual average rate of 3.6%. A number of large projects will support expansion in the short term. Principal of these is the £500m Birmingham University campus redevelopment. Currently under construction are a collaborative teaching laboratory due to be completed in 2019, a £20m hall of residence on Grange Road that will open in September this year, and the Green Heart landscaping project which follows on from the completion of the new library in September last year. Work has also commenced on a £37m science and health building at Coventry University that is due for completion this year.

In the industrial sector construction output is forecast to decline at an annual average rate of 7.9% from 2017 to 2018. In the manufacturing industry, a key driver of industrial sector construction output, we expect output growth to average 0.8% between 2017 and 2018. This compares to an average gain of over 1% in output as a whole in the region.

Strong growth in new orders in 2015 supported output growth in the industrial sector in 2016, but in the 2017–2018 period growth should slow markedly given a lack of confirmed projects in the pipeline. Work on a 575,000 square feet warehouse distribution centre on Coventry's Imperial Park worth £50m should be completed this year. A similar development on the Prologis Park industrial estate in Fradley is also due for completion in October.

In the commercial sector construction output is predicted to contract at an annual average rate of 1% from 2017 to 2018. Output growth in the industries that drive gains in the commercial sector are expected to moderate markedly from their 2016 outturns. Most stark is the predicted slowdown in growth in the wholesale and retail sector, from 4.3% in 2016 to 1% in 2017. Given the weakness in the industries that drive output in the sector, the deterioration of new orders in 2015 (down 34%) and a dearth of confirmed projects in the pipeline, it is difficult to see how construction output could grow in the 2017–2018 period.

CONSTRUCTION OUTPUT – WEST MIDLANDS (£ MILLION, 2013 PRICES)

	Actual	Forecast annual % change			Annual average
	2015	2016	2017	2018	2017-2018
Public housing	329	-7%	4%	-1%	1.8%
Private housing	1,732	21%	4%	0%	1.8%
Infrastructure	748	-14%	0%	3%	1.6%
Public non-housing	590	-6%	3%	5%	3.6%
Industrial	487	3%	-8%	-8%	-7.9%
Commercial	2,056	-6%	0%	-2%	-1.0%
New work	**5,943**	**2%**	**1%**	**-1%**	**0.3%**
Housing R&M	1,634	-10%	-3%	-2%	-2.2%
Non-housing R&M	2,396	-12%	0%	0%	0.1%
Total R&M	**4,029**	**-11%**	**-1%**	**-1%**	**-0.8%**
Total work	**9,972**	**-4%**	**-0%**	**-1%**	**-0.1%**

Source: Experian.
Ref: CSN Explained.

ANNUAL AVERAGE CONSTRUCTION OUTPUT GROWTH 2017–2018 – WEST MIDLANDS
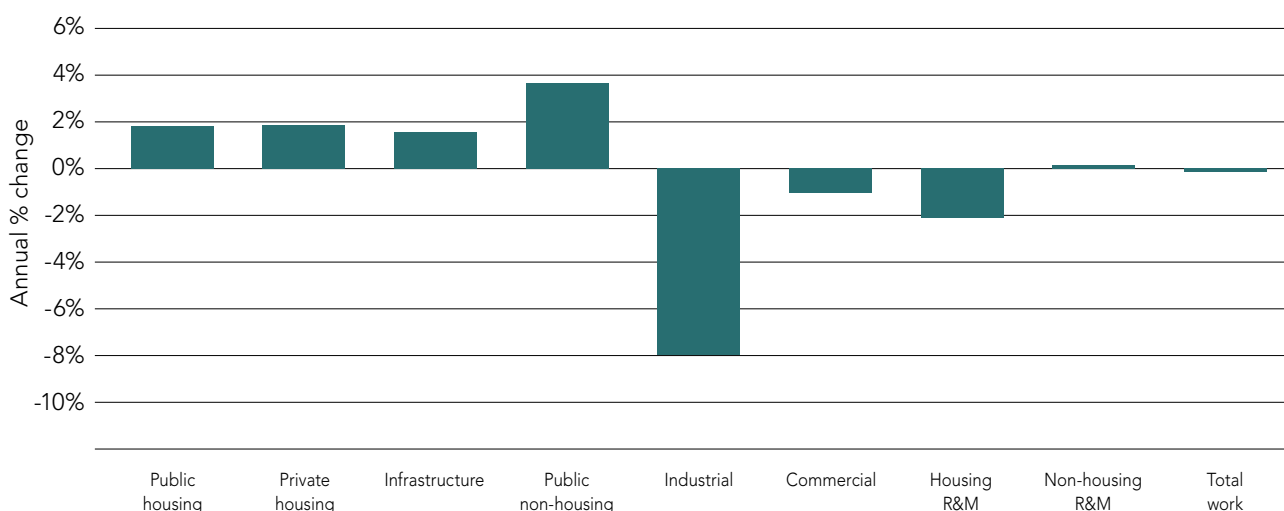
Source: Experian.
Ref: CSN Explained.

❝❝ Employment is projected to grow at an annual average rate of 0.4% a year between 2017 and 2021, compared to 0.6% at the national level.❞❞

CONSTRUCTION OUTPUT — LONG-TERM FORECASTS (2017–2021)

Total construction output is expected to grow at an annual average rate of 1.3% in the 2017–2021 period, compared to a 0.1% contraction in the short run. The improvement can be attributed mainly to a substantial uplift to growth in the infrastructure sector, from the commencement of the Birmingham branch of the High Speed 2 (HS2) rail link in the region. Prospects in the commercial sector are also expected to improve compared to the short term, but in most other sectors the outlook is forecast to worsen.

The infrastructure sector is forecast to grow at an annual average rate of 10.6% in the five years to 2021. The £11.85bn High Speed Rail Link 2 project linking London to Birmingham will make a substantial contribution to the gain. Although the project will only start in earnest in 2018, there is likely to be some preparatory works taking place along its route from this year.

Output in the private housing and commercial sectors should also be fairly supportive, forecast to grow at approximately 1.5% on average a year, in the 2017–2021 period. The former sector will benefit from a £65m project to construct up to 600 homes in Ledbury, Herefordshire between now and 2023. In Sutton Coldfield, plans to build 6,000 homes were put on hold in May 2016 given a disagreement as to the appropriate location of the houses. If the project goes ahead it could add around £450m to output in the sector between 2018 and 2023. The latter sector should benefit from a general improvement in economic conditions as the uncertainty surrounding the Brexit vote unwinds. There is also one big privately-financed hospital project recently started in the region, the new £350m Midland Metropolitan one in Smethwick.

In the public non-housing sector construction output is predicted to grow at a more modest annual average rate of 0.7%. Still tight government spending and a lack of orders should constrain output, and support from the large Birmingham University will fade in the latter years of the forecast period.

The industrial and public housing sectors are expected to be the worst performing, forecast to contract by 4.3% and 0.5% respectively. Growth in the former sector is expected to be constrained by weak output gains in the region's large manufacturing industry. The industry is forecast to grow at an average rate of 1.1% in the 2017–2021 period, as opposed to total output growth in the region of 1.6%. The latter sector will continue to be adversely impacted by the government imposed 1% reduction in housing rents a year out to 2020. Given a dearth in confirmed projects in the pipeline in the long run it seems unlikely that construction output in the sector will grow.

BEYOND 2021

Infrastructure output should account for the lion's share of any construction output growth in the West Midlands beyond 2021. The region should benefit from both phases of the HS2 high speed railway project worth £11.85bn. Phase 1 from London to Birmingham is due to start in 2018/2019, and phase 2 from Birmingham to the North probably sometime in 2023.

A number of Highways England projects could also add to infrastructure construction output beyond 2021. These include an estimated £282m of spending on improvements to junction 6 of the M42, construction of an M54 to M6 link road, new roundabouts on the A50 in Uttoxeter and the widening of the A500 at Etruria, in Stoke-on-Trent.

CONSTRUCTION OUTPUT — WEST MIDLANDS (£ MILLION, 2013 PRICES)

	Estimate	Forecast annual % change					Annual average
	2016	2017	2018	2019	2020	2021	2017-2021
Public housing	307	4%	-1%	3%	-7%	-2%	-0.5%
Private housing	2,099	4%	0%	0%	1%	4%	1.7%
Infrastructure	644	0%	3%	7%	4%	44%	10.6%
Public non-housing	555	3%	5%	-1%	-5%	2%	0.7%
Industrial	503	-8%	-8%	-1%	-2%	-2%	-4.3%
Commercial	1,927	0%	-2%	3%	4%	2%	1.5%
New work	**6,033**	**1%**	**-1%**	**2%**	**1%**	**7%**	**2.1%**
Housing R&M	1,471	-3%	-2%	0%	0%	-3%	-1.5%
Non-housing R&M	2,105	0%	0%	1%	2%	1%	0.9%
R&M	**3,576**	**-1%**	**-1%**	**1%**	**1%**	**0%**	**-0.1%**
Total work	**9,610**	**0%**	**-1%**	**1%**	**1%**	**4%**	**1.3%**

Source: CSN, Experian.
Ref: CSN Explained.

ANNUAL AVERAGE CONSTRUCTION OUTPUT GROWTH 2017–2021 — WEST MIDLANDS
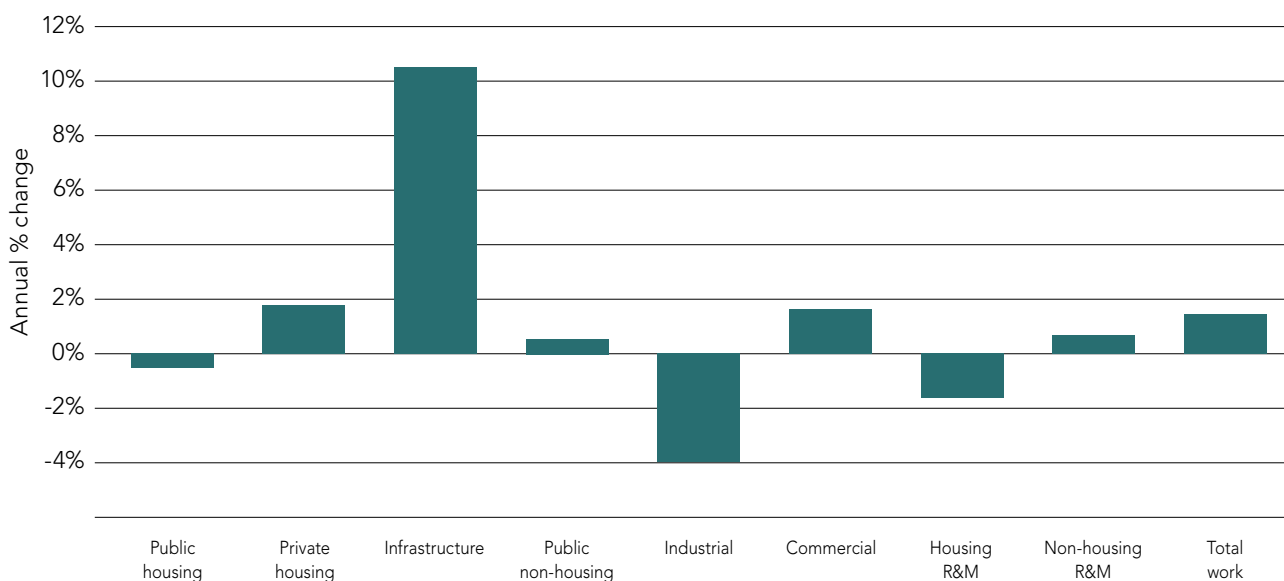
Source: CSN, Experian.
Ref: CSN Explained.

CONSTRUCTION EMPLOYMENT FORECASTS FOR THE WEST MIDLANDS

TOTAL CONSTRUCTION EMPLOYMENT FORECASTS BY OCCUPATION

The table presents actual construction employment (SICs 41-43, 71.1 and 74.9) in the West Midlands for 2015, the estimated total employment across 28 occupational categories in 2016 and forecasts for the industry for 2017 to 2021. A full breakdown of occupational groups is provided in Section 5 of CSN Explained.

Total construction employment in the West Midlands is expected to grow at an annual average rate of 0.4% in the five years to 2021. This compares to a gain of 0.6% at the national level. In numbers terms this equates to an increase in employment from 205,930 in 2016 to 210,190 in 2021.

Of the 28 occupational categories 16 are set to see growth, while the other 12 are predicted to contract. The fastest growing categories are forecast to be labourers nec., (2.8%), other construction professionals and technical staff (2.6%), scaffolders (2.5%) steel erectors/structural fabrication (2.2%) and civil engineers and architects (2.1%). Conversely the worst performing aggregates are expected to be non–construction operatives (-2.9%), plasterers (-2.3%), non-construction professional, technical, IT, and other office-based staff (-1.7%), senior, executive, and business process managers (-1.5%) and logistics personnel (-1.1%).

TOTAL EMPLOYMENT BY OCCUPATION – WEST MIDLANDS

	Actual	Estimate	Forecast	
	2015	2016	2017	2021
Senior, executive, and business process managers	17,240	17,130	16,990	15,920
Construction project managers	2,510	2,610	2,640	2,860
Other construction process managers	18,440	18,660	18,990	20,610
Non-construction professional, technical, IT, and other office-based staff	29,460	29,310	29,020	26,970
Construction trades supervisors	4,030	4,420	4,370	4,570
Wood trades and interior fit-out	16,030	16,100	16,740	17,690
Bricklayers	5,100	5,230	5,300	5,400
Building envelope specialists	7,150	7,120	7,230	7,300
Painters and decorators	6,600	6,860	7,020	7,180
Plasterers	2,320	2,310	2,270	2,060
Roofers	3,350	3,440	3,540	3,720
Floorers	1,690	1,600	1,600	1,540
Glaziers	2,700	2,760	2,790	2,740
Specialist building operatives nec*	3,540	3,440	3,550	3,560
Scaffolders	2,140	2,170	2,270	2,450
Plant operatives	2,070	2,030	2,040	1,940
Plant mechanics/fitters	6,800	7,040	7,040	6,840
Steel erectors/structural fabrication	3,190	3,260	3,390	3,630
Labourers nec*	11,230	11,100	11,610	12,770
Electrical trades and installation	16,600	15,840	15,940	15,210
Plumbing and HVAC Trades	12,140	12,870	12,890	12,460
Logistics	2,780	2,770	2,780	2,620
Civil engineering operatives nec*	1,930	2,050	2,120	2,190
Non–construction operatives	2,740	2,760	2,680	2,380
Civil engineers	2,680	2,680	2,770	2,980
Other construction professionals and technical staff	12,650	13,140	13,480	14,940
Architects	1,520	1,550	1,580	1,720
Surveyors	6,290	5,680	5,770	5,940
Total (SIC 41-43)	**181,780**	**182,880**	**184,810**	**184,610**
Total (SIC 41-43, 71.1, 74.9)	**204,920**	**205,930**	**208,410**	**210,190**

Source: ONS, CSN, Experian.
*Ref: CSN Explained. *Not elsewhere classified.*

ANNUAL RECRUITMENT REQUIREMENT (ARR) BY OCCUPATION

The ARR is a gross requirement that takes into account workforce flows into and out of construction, due to factors such as movements between industries, migration, sickness, and retirement. However, these flows do not include movements into the industry from training, due to the inconsistency and coverage of supply data. Thus, the annual recruitment requirement provides an indication of the number of new employees that would need to be recruited into construction each year in order to realise forecast output.

The ARR for the West Midlands is projected to be 2,800 for the 2017 to 2021 period. This represents 1.3% of base 2017 employment, a fractionally lower ratio than the UK's 1.4%. Most occupational categories were flagged as having low requirements (ARRs up to 2.5% of base 2017 employment). No categories were flagged as having a high requirement, and just six were highlighted as having a medium requirement (ARRs between 2.6% and 5% of base 2017 employment). These categories were wood trades and interior fit-out (4.1%), other construction professionals and technical staff (3.3%), scaffolders (3.1%), labourers nec., (2.8%), surveyors (2.8%), and construction trades supervisors (2.7%). In absolute terms the largest requirements are for wood trades and interior fit-out (690), other construction professionals and technical staff (450), labourers (320), other construction process managers (310), electrical trades and installation (230).

Please note that all of the ARRs presented in this section are employment requirements and not necessarily training requirements. This is because some new entrants to the construction industry, such as skilled migrants or those from other industries where similar skills are already used, will be able to work in the industry without the need for significant retraining.

Non-construction operatives is a diverse occupational group including all of the activities under the SICs 41-43, 71.1, and 74.9 umbrella that cannot be classified elsewhere, such as cleaners, elementary security occupations nec. and routine inspectors and testers. The skills required in these occupations are highly transferable to other industries and forecasting such movement is hazardous given the lack of robust supportive data. Therefore the ARR for non-construction operatives is not published.

ANNUAL RECRUITMENT REQUIREMENT BY OCCUPATION — WEST MIDLANDS

	2017-2021
Senior, executive, and business process managers	–
Construction project managers	50
Other construction process managers	310
Non-construction professional, technical, IT, and other office-based staff	–
Construction trades supervisors	120
Wood trades and interior fit-out	690
Bricklayers	80
Building envelope specialists	<50
Painters and decorators	–
Plasterers	–
Roofers	–
Floorers	–
Glaziers	–
Specialist building operatives nec*	70
Scaffolders	70
Plant operatives	–
Plant mechanics/fitters	–
Steel erectors/structural fabrication	50
Labourers nec*	320
Electrical trades and installation	230
Plumbing and HVAC Trades	–
Logistics	<50
Civil engineering operatives nec*	50
Civil engineers	70
Other construction professionals and technical staff	450
Architects	<50
Surveyors	160
Total (SIC 41-43)	**2,090**
Total (SIC 41-43, 71.1, 74.9)	**2,800**

Source: CSN, Experian.
*Ref: CSN Explained. *Not elsewhere classified.*

COMPARISONS ACROSS THE UK

As is usually the case, the 1.7% annual average output growth rate for the UK as a whole masks considerable differences in the projected rates for individual English regions and the devolved nations, from expansion of over 6% a year on average in Wales to a decline of 0.4% in Scotland on the same measure.

Wales and the South West remain on top of the growth rankings due to the prospective start of new nuclear build at Wylfa Newydd and Hinkley Point respectively in their areas. However, Wales in particular is not necessarily a 'one-hit wonder' with other sizeable projects such as the M4 upgrade around Newport due to start in the forecast period.

The Greater London construction market is more vulnerable than most to a fall in business investment because of the large size of its commercial sector. However, a weak performance here is expected to be more than compensated for by strong growth in infrastructure, driven in part by the start of work on HS2, and private housing, fuelled by strong increases in the capital's population.

The other two regions expected to see annual average output growth in excess of 2% are the North West (2.5%) and the South East (2.2%). Growth in the former will be driven by energy and transport projects, the largest of which is the prospective new nuclear build facility at Moorside. In the latter, new renewable energy facilities should drive growth in the infrastructure sector and the commercial construction sector will benefit from the theme park in north Kent.

For the remainder of the English regions growth is predicted to range between an annual average rate of 1.3% in the West Midlands, which should see some HS2-related work by the end of the forecast period, to a marginal decline of 0.1% in the North East, which will suffer from a dearth of major projects and weak housing demand.

Scotland is projected to be the worst performing of all the regions and devolved nations, with an annual average decline of 0.4%. The primary reason for this is a sharp fall in infrastructure output from its current very high level as a number of large projects, such as the Queensferry Crossing, the M8/M73/M74 motorway upgrade, and the Aberdeen Western Peripheral Route, are completed over the next two years.

Employment growth across the regions and devolved nations tends to mirror that of output, but at a lower level to take account of expected productivity gains and with some minor adjustments depending on whether output growth is in high or low labour-intensive sectors. Annual average 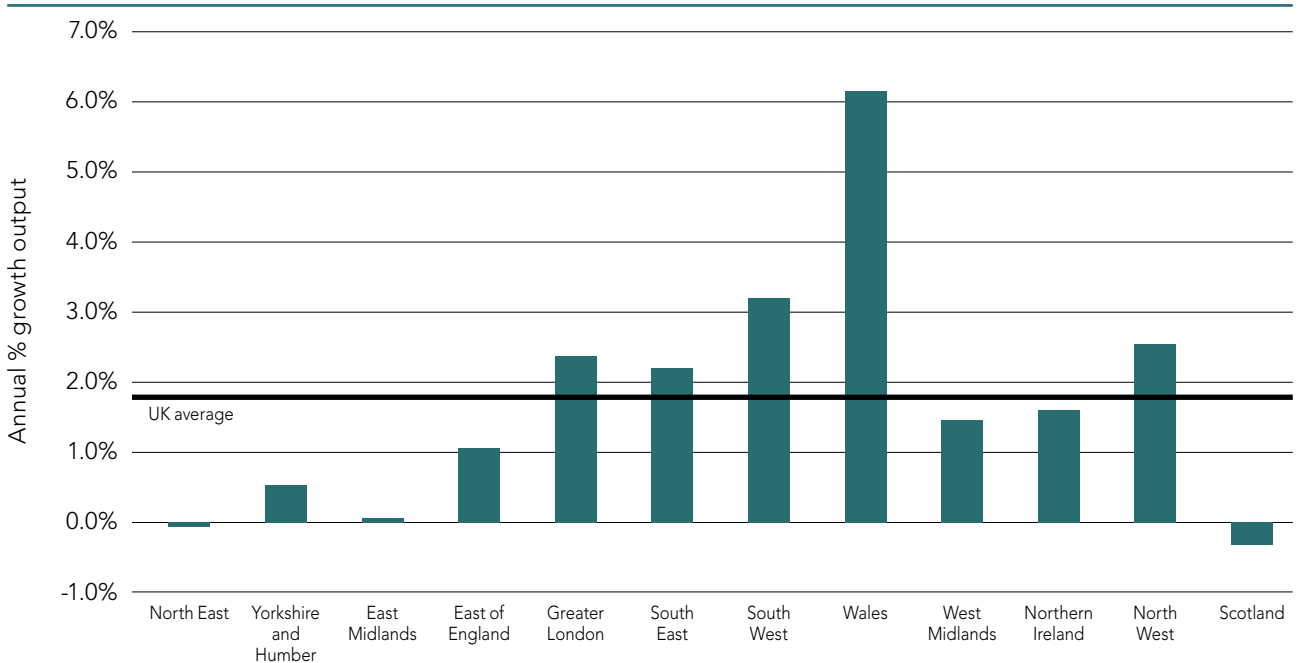employment growth is projected to range from a high of 2.7% in Wales to a low of -0.8% in Scotland, against a UK rate of 0.6%.

The impact of new nuclear build on employment in the regions and devolved nations that will host such projects is much less than on output due to its capital rather than labour-intensive nature. However, it still boosts employment growth in Wales quite considerably as it is a very big project in a small market. The impact is smaller in the South West, which has a bigger construction market, and thus contributes less to overall employment growth, which is expected to be around 0.7% a year on average over the five years to 2021.

Output growth in Scotland, the North East, East Midlands, and Yorkshire and Humber will not be strong enough to drive growth in employment; thus, these are all expected to experience some fall in construction employment between 2017 and 2021.

The pattern of annual recruitment requirements can look significantly different to the profile of output and employment, as some regions and devolved nations have historically strong net inflows and some suffer from large net outflows. Thus, Greater London's ARR represents just 0.9% of base 2017 employment, the lowest ratio along with Yorkshire and Humber, despite being high up the rankings in terms of output and employment growth. This is because the capital naturally acts as a magnet for the construction workforce from other parts of the country and from abroad; thus, its additional requirement is relatively small. At the other end of the scale Wales traditionally suffers strong net outflows, in particular to the North West and South West of England and often has the highest ARR ratio as a result of this. The 2017 to 2021 period is no exception, with buoyant output and employment growth and the strong net outflows leading to an ARR ratio of 3.4% of base 2017 employment. The remaining regions and devolved nations have an ARR ratio of between 1% and 1.9% of base 2017 employment.

ANNUAL AVERAGE OUTPUT GROWTH BY REGION 2017–2021

Annual % growth output

UK average

North East · Yorkshire and Humber · East Midlands · East of England · Greater London · South East · South West · Wales · West Midlands · Northern Ireland · North West · Scotland

Source: CSN, Experian.
Ref: CSN Explained.

ANNUAL RECRUITMENT REQUIREMENT (ARR) BY REGION 2017–2021

Annual requirement - workers

North East · Yorkshire and Humber · East Midlands · East of England · Greater London · South East · South West · Wales · West Midlands · Northern Ireland · North West · Scotland
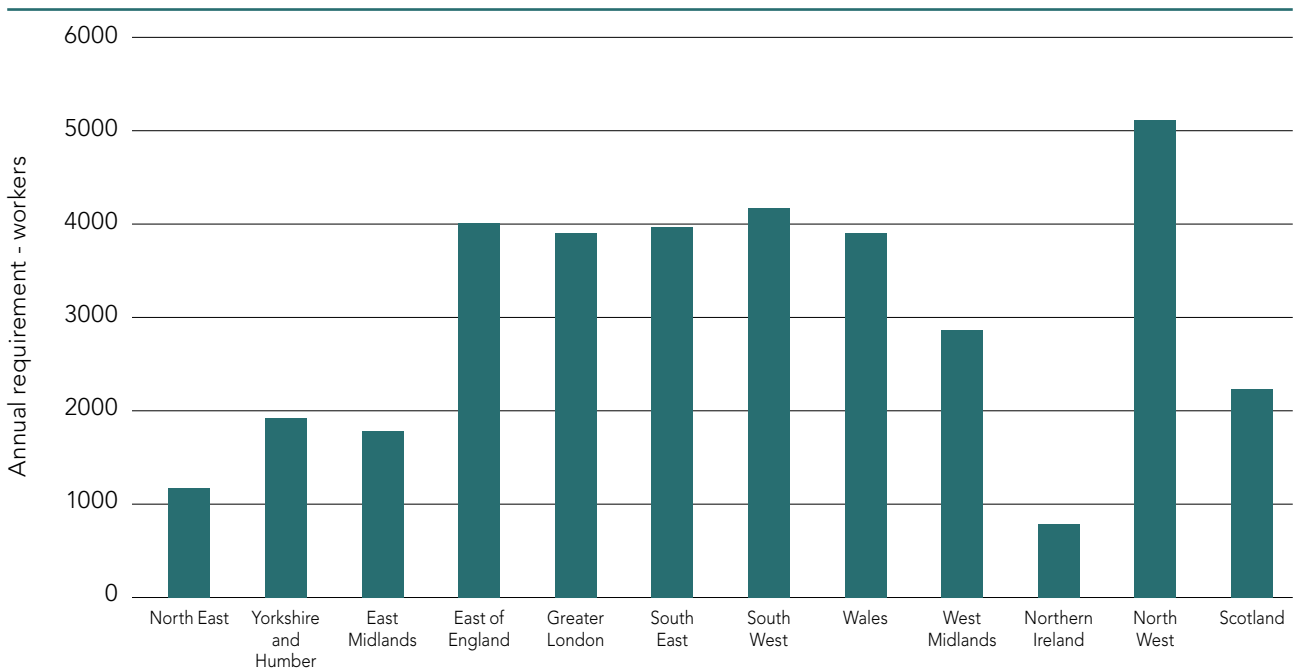
Source: CSN, Experian.

❝❝ The annual average recruitment requirement (ARR) in the region is estimated at 2,800 in the five years to 2021. ❞❞

CSN EXPLAINED

This appendix provides further details and clarification of some of the points covered in the report.

CSN METHODOLOGY gives an overview of the underpinning methods that are used by the CSN, working in partnership with Experian, to produce the suite of reports at a UK, national and regional level.

GLOSSARY provides clarification on some of the terms that are used in the reports.

NOTES has some further information relating to the data sources used for the various charts and tables. This section also outlines what is meant by the term 'footprint', when talking about the areas of responsibility.

DEFINITIONS explains the sector definitions used within the report and provides examples of what is covered in each.

OCCUPATIONAL GROUPS gives a detailed breakdown of the 28 occupational groups into the individual standard occupational classification (SOC) codes that are aggregated to provide the employment and recruitment requirement.

CSN METHODOLOGY

BACKGROUND

The Construction Skills Network has been evolving since its conception in 2005, acting as a vehicle for CITB and CITB Northern Ireland to collect and produce information on the future employment and training needs of the industry.

The CSN functions at both a national and regional level. It comprises a National Group, 12 Observatory groups, a forecasting model for each of the regions and countries, and a Technical Reference Group. An Observatory group currently operates in each of the nine English regions and also in Wales, Scotland and Northern Ireland.

Observatory groups currently meet twice a year and consist of key regional stakeholders invited from industry, Government, education and sector bodies, all of whom contribute their local industry knowledge and views on training, skills, recruitment, qualifications and policy. The National Group also includes the same range of representatives and meets twice per year to set the national scheme, forming a backdrop for the Observatories.

At the heart of the CSN are several models that generate forecasts of employment requirements within the industry for a range of occupational groups. The models are designed and managed by Experian under the independent guidance and validation of the Technical Reference Group, which is comprised of statisticians and modelling experts.

The models have evolved over time and will continue to do so, to ensure that they account for new research as it is published, as well as new and improved modelling techniques.

Future changes to the model will only be made after consultation with the Technical Reference Group.

THE MODEL APPROACH

The model approach relies on a combination of primary research and views from the CSN to facilitate it. National data is used as the basis for the assumptions that augment the models, which are then adjusted with the assistance of the Observatories and National Group. Each English region, Wales, Scotland and Northern Ireland has a separate model (although all models are interrelated due to labour movements) and, in addition, there is one national model that acts as a constraint to the individual models and enables best use to be made of the most robust data (which is available at the national level).

The models work by forecasting demand and supply of skilled workers separately. The difference between demand and supply forms the employment requirement. The forecast total employment levels are derived from expectations about construction output and productivity. Essentially, this is based upon the question 'How many people will be needed to produce forecast output, given the assumptions made about productivity?'.

The annual recruitment requirement (ARR) is a gross requirement that takes into account workforce flows into and out of construction, due to such factors as movements between industries, migration, sickness and retirement. However, these flows do not include movements into the industry from training, although robust data on training provision is being developed by CITB in partnership with public funding agencies, further education, higher

education and employer representatives. The ARR provides an indication of the number of new employees that would need to be recruited into construction each year in order to realise forecast output.

Estimates of demand are based on the results of discussion groups comprising industry experts, a view of construction output and integrated models relating to wider national and regional economic performance. The models are dynamic and reflect the general UK economic climate at any point in time. To generate the labour demand, the models use a set of specific statistics for each major type of work to determine the employment, by trade, needed to produce the predicted levels of construction output. The labour supply for each type of trade or profession is based upon the previous year's supply (the total stock of employment) combined with flows into and out of the labour market.

The key leakages (outflows) that need to be considered are:

- Transfers to other industries
- International/domestic out migration
- Permanent retirements (including permanent sickness)
- Outflow to temporary sickness and home duties.

The main reason for outflow is likely to be transfer to other industries.

Flows into the labour market include:

- Transfers from other industries
- International/domestic immigration
- Inflow from temporary sickness and home duties.

The most significant inflow is likely to be from other industries. A summary of the model is shown in the flow chart.
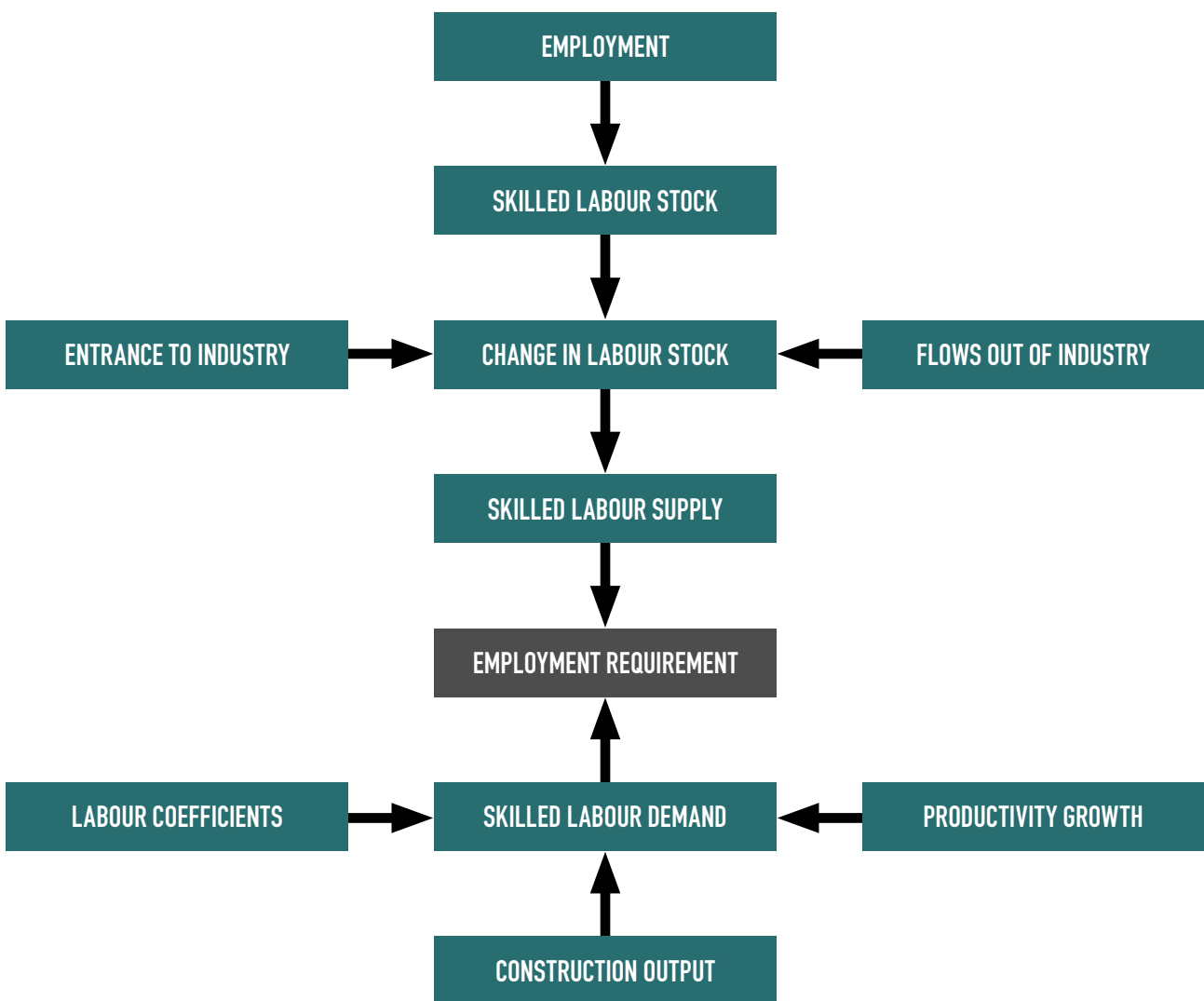
GLOSSARY OF TERMS

Building envelope specialists – any trade involved with the external cladding of a building other than bricklaying, e.g. curtain walling.

Demand – this is calculated using construction output data from the Office for National Statistics (ONS) and the Department of Finance and Personnel Northern Ireland (DFP), along with vacancy data from the National Employer Skills Survey, produced by the Department for Education and Skills. These data sets are translated into labour requirements by trade using a series of coefficients to produce figures for labour demand that relate to forecast output levels.

GDP (gross domestic product) – total market value of all final goods and services produced. A measure of national income. GDP = GVA plus taxes on products minus subsidies on products.

GVA (gross value added) – total output minus the value of inputs used in the production process. GVA measures the contribution of the economy as a difference between gross output and intermediate outputs.

Coefficients – to generate the labour demand, the model makes use of a set of specific statistics for each major type of work, to determine employment by trade or profession, based upon the previous year's supply. In essence, this is the number of workers of each occupation or trade needed to produce £1m of output across each sub-sector.

LFS (Labour Force Survey) – a UK household sample survey that collects information on employment, unemployment, flows between sectors and training. Information is collected from around 53,000 households each quarter (the sample totals more than 100,000 people).

LMI (labour market intelligence) – data that is quantitative (numerical) or qualitative (insights and perceptions) on workers, employers, wages, conditions of work, etc.

Macroeconomics – the study of an economy at a national level, including total employment, investment, imports, exports, production and consumption.

Nec – not elsewhere classified, used as a reference in LFS data.

ONS (Office for National Statistics) – organisation producing official statistics on the economy, population and society at both a national and local level.

Output – total value of all goods and services produced in an economy.

Productivity – output per employee. SIC codes (Standard Industrial Classification codes) – from the United Kingdom Standard Industrial Classification of Economic Activities produced by the ONS.

SOC codes (Standard Occupational Classification codes) – from the United Kingdom Standard Occupational Classification produced by the ONS.

Supply – the total stock of employment in a period of time, plus the flows into and out of the labour market. Supply is usually calculated from LFS data.

NOTES

NOTES

1 Except for Northern Ireland, output data for the English regions, Scotland and Wales is supplied by the Office for National Statistics (ONS) on a current price basis. Thus, national deflators produced by the ONS have been used to deflate prices to a 2005 constant price basis, so that the effects of inflation have been stripped out.

2 The annual average growth rate of output is a compound average growth rate, i.e. the rate at which output would grow each year if it increased steadily over the forecast period.

3 Only selected components of gross value added (GVA) are shown in this table and so do not sum to the total.

4 For new construction orders, comparison is made with Great Britain rather than the UK, owing to the fact that there are no orders data series for Northern Ireland.

5 Employment numbers are rounded to the nearest 10.

6 The tables include data relating to plumbers and electricians. As part of SIC 43, plumbers and electricians working in contracting are an integral part of the construction process.

7 A reporting minimum of 50 is used for the annual recruitment requirement (ARR). As a result, some region and devolved nation ARR forecasts do not sum to the total UK requirement.

8 The Employment and ARR tables show separate totals for SIC 41–43 and SIC 41–43, 71.1 and 74.9. The total for SIC 41–43 covers the first 24 occupational groups on the relevant tables and excludes civil engineers, other construction professionals and technical staff, architects and surveyors. The total for SIC 41–43, 71.1 and 74.9 includes all occupations.

FOOTPRINTS FOR BUILT ENVIRONMENT SECTOR

CITB and CITB Northern Ireland are responsible for SIC 41 Construction of buildings, SIC 42 Civil engineering, SIC 43 Specialised construction activities and SIC 71.1 Architectural and engineering activities and related technical consultancy.

The table summarises the SIC codes (2007) covered by CITB and CITB Northern Ireland:

CITB and CITB Northern Ireland	
SIC Code	Description
41.1	Development of building projects
41.2	Construction of residential and non-residential buildings
42.1	Construction of roads and railways
42.2	Construction of utility projects
42.9	Construction of other civil engineering projects
43.1	Demolition and site preparation
43.3	Building completion and finishing
43.9	Other specialised construction activities nec
71.1	Architectural and engineering activities and related technical consultancy

The CSN's current baseline forecast assumes that a deal between the UK and EU will be agreed within a 4 year time horizon, with some form of trade access to the single market. As it is unlikely that the trade terms will be as favourable as the current situation, the forecast includes a small downgrade to the UK's long term export and investment projections, compared to the pre-Brexit vote baseline. No adjustments have been made to underlying population projections in the base case as it is too early to assess any potential slowdown in EU migration.

DEFINITIONS: TYPES AND EXAMPLES OF CONSTRUCTION WORK

Public sector housing – local authorities and housing associations, new towns and government departments

Housing schemes, care homes for the elderly and the provision within housing sites of roads and services for gas, water, electricity, sewage and drainage.

Private sector housing

All privately owned buildings for residential use, such as houses, flats and maisonettes, bungalows, cottages and the provision of services to new developments.

Infrastructure – public and private

Water
Reservoirs, purification plants, dams, water works, pumping stations, water mains, hydraulic works etc.

Sewerage
Sewage disposal works, laying of sewers and surface drains.

Electricity
Building and civil engineering work for electrical undertakings, such as power stations, dams and other works on hydroelectric schemes, onshore wind farms and decommissioning of nuclear power stations.

Gas, communications, air transport
Gas works, gas mains and gas storage; post offices, sorting offices, telephone exchanges, switching centres etc.; air terminals, runways, hangars, reception halls, radar installations.

Railways
Permanent way, tunnels, bridges, cuttings, stations, engine sheds etc., signalling and other control systems and electrification of both surface and underground railways.

Harbours
All works and buildings directly connected with harbours, wharves, docks, piers, jetties, canals and waterways, sea walls, embankments and water defences.

Roads
Roads, pavements, bridges, footpaths, lighting, tunnels, flyovers, fencing etc.

Public non-residential construction[1]

Factories and warehouses
Publicly owned factories, warehouses, skill centres.

Oil, steel, coal
Now restricted to remedial works for public sector residual bodies.

Schools, colleges, universities
State schools and colleges (including technical colleges and institutes of agriculture); universities, including halls of residence, research establishments etc.

Health
Hospitals including medical schools, clinics, welfare centres, adult training centres.

Offices
Local and central Government offices, including town halls, offices for all public bodies except the armed services, police headquarters.

Entertainment
Theatres, restaurants, public swimming baths, caravan sites at holiday resorts, works and buildings at sports grounds, stadiums, racecourses etc. owned by local authorities or other public bodies.

Garages
Buildings for storage, repair and maintenance of road vehicles, transport workshops, bus depots, road goods transport depots and car parks.

Shops
Municipal shopping developments for which the contract has been let by a Local Authority.

Agriculture
Buildings and work on publicly financed horticultural establishments; fen drainage and agricultural drainage, veterinary clinics.

Miscellaneous
All work not clearly covered by any other headings, such as fire stations, police stations, prisons, reformatories, remand homes, civil defence work, UK Atomic Energy Authority work, council depots, museums, libraries.

Private industrial work

Factories, warehouses, wholesale depots, all other works and buildings for the purpose of industrial production or processing, oil refineries, pipelines and terminals, concrete fixed leg oil production platforms (not rigs); private steel work; all new coal mine construction such as sinking shafts, tunnelling etc.

Private commercial work[1]

Schools and universities
Schools and colleges in the private sector, financed wholly from private funds.

Health
Private hospitals, nursing homes, clinics.

Offices
Office buildings, banks.

Entertainment
Privately owned theatres, concert halls, cinemas, hotels, public houses, restaurants, cafés, holiday camps, swimming pools, works and buildings at sports grounds, stadiums and other places of sport or recreation, youth hostels.

Garages
Repair garages, petrol filling stations, bus depots, goods transport depots and any other works or buildings for the storage, repair or maintenance of road vehicles, car parks.

Shops
All buildings for retail distribution such as shops, department stores, retail markets, showrooms etc.

Agriculture
All buildings and work on farms, horticultural establishments.

Miscellaneous
All work not clearly covered by any other heading, e.g. exhibitions, caravan sites, churches, church halls.

New work
New housing
Construction of new houses, flats, bungalows only.

All other types of work
All new construction work and all work that can be referred to as improvement, renovation or refurbishment and which adds to the value of the property.[2]

Repair and maintenance
Housing
Any conversion of, or extension to, any existing dwelling and all other work such as improvement, renovation, refurbishment, planned maintenance and any other type of expenditure on repairs or maintenance.

All other sectors:
Repair and maintenance work of all types, including planned and contractual maintenance.[3]

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[1] Where contracts for the construction or improvement of non-residential buildings used for public service provision, such as hospitals, are awarded by private sector holders of contracts awarded under the Private Finance Initiative, the work is classified as 'private commercial'.

[2] Contractors reporting work may not always be aware of the distinction between improvement or renovation work and repair and maintenance work in the non-residential sectors.

[3] Except where stated, mixed development schemes are classified to whichever sector provides the largest share of finance.

OCCUPATIONAL GROUPS

Occupational group
Description, SOC (2010) reference.

Senior, executive, and business process managers

Chief executives and senior officials	1115
Financial managers and directors	1131
Marketing and sales directors	1132
Purchasing managers and directors	1133
Human resource managers and directors	1135
Property, housing and estate managers	1251
Information technology and telecommunications directors	1136
Research and development managers	2150
Managers and directors in storage and warehousing	1162
Managers and proprietors in other services nec*	1259
Functional managers and directors nec*	1139
IT specialist managers	2133
IT project and programme managers	2134
Financial accounts managers	3538
Sales accounts and business development managers	3545

Construction project managers

Construction project managers and related professionals	2436

Other construction process managers

Production managers and directors in manufacturing	1121
Production managers and directors in construction	1122
Managers and directors in transport and distribution	1161
Waste disposal and environmental services managers	1255
Health and safety officers	3567
Conservation and environmental associate professionals	3550

Non-construction professional, technical, IT, and other office-based staff (excl. managers)

IT operations technicians	3131
IT user support technicians	3132
Finance and investment analysts and advisers	3534
Taxation experts	3535
Financial and accounting technicians	3537
Vocational and industrial trainers and instructors	3563
Business and related associate professionals nec*	3539
Legal associate professionals	3520
Inspectors of standards and regulations	3565
Programmers and software development professionals	2136
Information technology and telecommunications professionals nec*	2139
Estate agents and auctioneers	3544
Solicitors	2413
Legal professionals nec*	2419
Chartered and certified accountants	2421
Business and financial project management professionals	2424

Management consultants and business analysts	2423
Receptionists	4216
Typists and related keyboard occupations	4217
Business sales executives	3542
Bookkeepers, payroll managers and wages clerks	4122
Records clerks and assistants	4131
Stock control clerks and assistants	4133
Telephonists	7213
Communication operators	7214
Personal assistants and other secretaries	4215
Sales and retail assistants	7111
Telephone salespersons	7113
Buyers and procurement officers	3541
Human resources and industrial relations officers	3562
Credit controllers	4121
Company secretaries	4214
Sales related occupations nec*	7129
Call and contact centre occupations	7211
Customer service occupations nec*	7219
Elementary administration occupations nec*	9219
Chemical scientists	2111
Biological scientists and biochemists	2112
Physical scientists	2113
Laboratory technicians	3111
Graphic designers	3421
Environmental health professionals	2463
IT business analysts, architects and systems designers	2135
Conservation professionals	2141
Environment professionals	2142
Actuaries, economists and statisticians	2425
Business and related research professionals	2426
Finance officers	4124
Financial administrative occupations nec*	4129
Human resources administrative occupations	4138
Sales administrators	4151
Other administrative occupations nec*	4159
Office supervisors	4162
Sales supervisors	7130
Customer service managers and supervisors	7220
Office managers	4161

Construction trades supervisors

Skilled metal, electrical and electronic trades supervisors	5250
Construction and building trades supervisors	5330

Wood trades and interior fit-out

Carpenters and joiners	5315
Paper and wood machine operatives	8121
Furniture makers and other craft woodworkers	5442
Construction and building trades nec* (25%)	5319

Bricklayers

Bricklayers and masons	5312

Building envelope specialists
Construction and building trades nec* (50%)	5319

Painters and decorators
Painters and decorators	5323
Construction and building trades nec* (5%)	5319

Plasterers
Plasterers	5321

Roofers
Roofers, roof tilers and slaters	5313

Floorers
Floorers and wall tilers	5322

Glaziers
Glaziers, window fabricators and fitters	5316
Construction and building trades nec* (5%)	5319

Specialist building operatives not elsewhere classified (nec*)
Construction operatives nec* (100%)	8149
Construction and building trades nec* (5%)	5319
Industrial cleaning process occupations	9132
Other skilled trades nec*	5449

Scaffolders
Scaffolders, stagers and riggers	8141

Plant operatives
Crane drivers	8221
Plant and machine operatives nec*	8129
Fork-lift truck drivers	8222
Mobile machine drivers and operatives nec*	8229

Plant mechanics/fitters
Metalworking production and maintenance fitters	5223
Precision instrument makers and repairers	5224
Vehicle technicians, mechanics and electricians	5231
Elementary process plant occupations nec*	9139
Tool makers, tool fitters and markers-out	5222
Vehicle body builders and repairers	5232

Steel erectors/structural fabrication
Steel erectors	5311
Welding trades	5215
Metal plate workers and riveters	5214
Construction and building trades nec* (5%)	5319
Smiths and forge workers	5211
Metal machining setters and setter-operators	5221

Labourers nec*
Elementary construction occupations (100%)	9120

Electrical trades and installation
Electricians and electrical fitters	5241
Electrical and electronic trades nec*	5249
Telecommunications engineers	5242

Plumbing and heating, ventilation, and air conditioning trades
Plumbers and heating and ventilating engineers	5314
Pipe fitters	5216
Construction and building trades nec* (5%)	5319
Air-conditioning and refrigeration engineers	5225

Logistics
Large goods vehicle drivers	8211
Van drivers	8212
Elementary storage occupations	9260
Buyers and purchasing officers (50%)	3541
Transport and distribution clerks and assistants	4134

Civil engineering operatives not elsewhere classified (nec*)
Road construction operatives	8142
Rail construction and maintenance operatives	8143
Quarry workers and related operatives	8123

Non-construction operatives
Metal making and treating process operatives	8117
Process operatives nec*	8119
Metalworking machine operatives	8125
Water and sewerage plant operatives	8126
Assemblers (vehicles and metal goods)	8132
Routine inspectors and testers	8133
Assemblers and routine operatives nec*	8139
Elementary security occupations nec*	9249
Cleaners and domestics*	9233
Street cleaners	9232
Gardeners and landscape gardeners	5113
Caretakers	6232
Security guards and related occupations	9241
Protective service associate professionals nec*	3319

Civil engineers
Civil engineers	2121

Other construction professionals and technical staff
Mechanical engineers	2122
Electrical engineers	2123
Design and development engineers	2126
Production and process engineers	2127
Quality control and planning engineers	2461
Engineering professionals nec*	2129
Electrical and electronics technicians	3112
Engineering technicians	3113
Building and civil engineering technicians	3114
Science, engineering and production technicians nec*	3119
Architectural and town planning technicians*	3121
Draughtspersons	3122
Quality assurance technicians	3115
Town planning officers	2432
Electronics engineers	2124
Chartered architectural technologists	2435
Estimators, valuers and assessors	3531
Planning, process and production technicians	3116

Architects
Architects	2431

Surveyors
Quantity surveyors	2433
Chartered surveyors	2434

*Not elsewhere classified

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