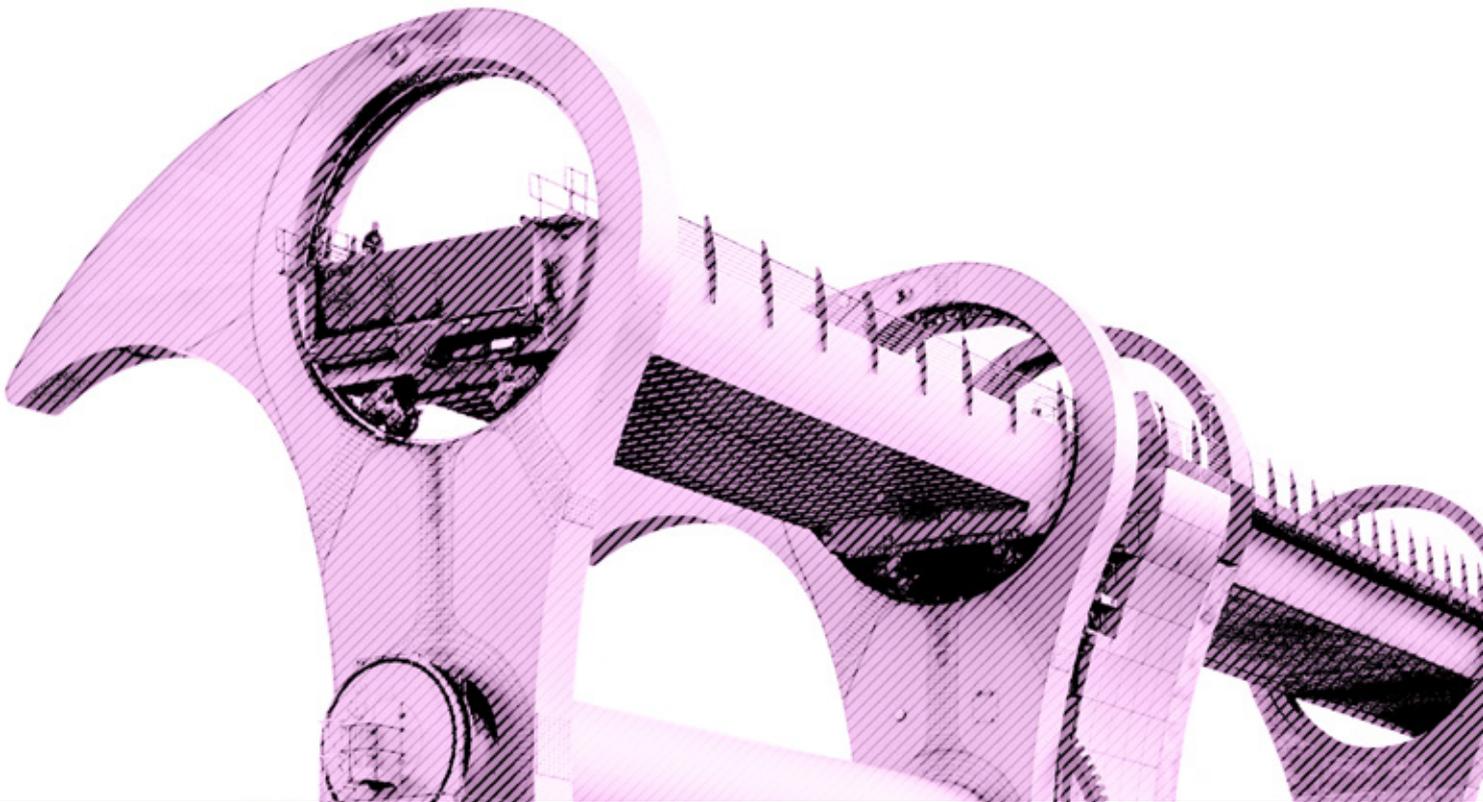


INDUSTRY INSIGHTS

Construction Skills Network
Forecasts 2017–2021



SCOTLAND

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.

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SUMMARY – SCOTLAND

Construction output in Scotland is projected to contract by 0.4% a year on average in the five years to 2021, one of only two regions/devolved nations in which it is expected to fall. The decline in output will lead to a drop in construction employment, put at 0.8% a year on average over the forecast period. However, there will still be a need to attract new recruits to the industry. Scotland's annual recruitment requirement (ARR) is currently estimated at 2,340, representing 1% of base 2017 employment.

Growth is expected to focus on the Private housing sector in the short term, by

5.7%

Employment is forecast to decline by

0.8%

a year on average

Scotland has an ARR of

2,340

KEY FINDINGS

After three years of growth which took output in Scotland to a new high in 2015, activity is estimated to have subsided in 2016. Weak outturns for the public housing, industrial and, in particular, the infrastructure sector impacted overall performance.

What happens to infrastructure will continue to affect the overall growth of construction in Scotland during the course of the forecast period. Infrastructure output hit an estimated £3.9bn (2013 prices) in 2015, around three times its long-term average (1990–2014), driven by a host of major transport projects, such as the Queensferry Crossing. A lot of these schemes are due to be completed over the next couple of years, leading to sharp declines in output, of over 6% a year on average, in the sector over the five years to 2021.

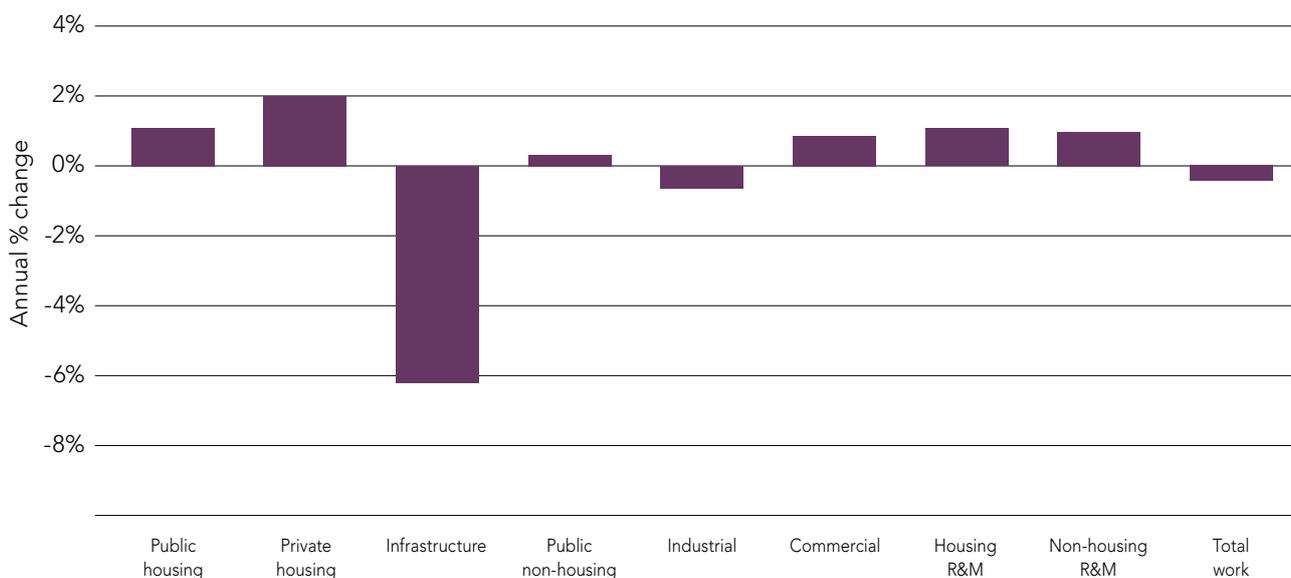
This decline in infrastructure activity will drag down overall construction performance and the industry in Scotland is projected to contract by around 0.4% a year on average between 2017 and 2021. Most of the other sectors are expected to experience growth, with the exception of the industrial sector, and if infrastructure was excluded then output would average growth of 1.0% a year.

The housing sector in particular should be boosted by the Scottish Government's aspiration for 50,000 new affordable homes by 2020/21, 35,000 of which would be for social rent. While a cautious position has been taken on the fulfilment of this aspiration, the drive to reach this target should provide the impetus for growth in new house building.

A decline in output inevitably means a fall in employment, which is projected to contract by 0.8% a year on average in the five years to 2021. The lagged effect between output and employment means that employment is likely to grow in 2017 before declining thereafter. Construction employment is projected to total around 215,000 in 2021, some 8,400 below the estimated 2016 level and over 37,000 below its 2008 peak. The main trades are expected to take the brunt of the falls with the managerial/supervisory and professional occupational categories faring better.

Despite the projected falls in employment, the need to replace those leaving the industry means that Scotland still has an annual recruitment requirement (ARR), estimated at 2,340 a year to 2021. This represents 1% of base projected 2017 employment, a lower ratio than the UK's, at 1.4%.

ANNUAL AVERAGE CONSTRUCTION OUTPUT GROWTH 2017-2021 – SCOTLAND



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 forecast to decline by an average rate of -0.4%.

THE OUTLOOK FOR CONSTRUCTION IN SCOTLAND

CONSTRUCTION OUTPUT IN SCOTLAND – OVERVIEW

Construction output in Scotland reached an estimated £13.6bn in 2013 prices in 2015, a new high and 21% up on the previous year. Growth in recent years has largely been driven by exponential expansion in the infrastructure sector, which was over three times as large in 2015 than in 2012 in output terms. However, 2015 was a good year across the Scottish construction industry, with only the industrial sector suffering a decline.

INDUSTRY STRUCTURE

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

Scotland's construction industry became more skewed towards the new work sector between 2014 and 2015, with its share of total output rising from 70% to 73%. In the UK it went up by 2% from 62% to 64%. The primary reason for this was the very strong growth in infrastructure output, which has made the sector proportionally nearly twice as important in Scotland compared with the UK as a whole (29% vs 15%). The public non-housing sector also takes a larger share of output: 10% in Scotland compared with 7% in the UK.

Conversely, the private housing sector is proportionally smaller in Scotland, accounting for only 11% of output compared with 18% across the UK as a whole, as is the housing R&M sector (12% vs 18%).

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.

Gross value added (GVA) totalled £119.9bn in 2012 prices in Scotland in 2015. This represented growth of just 0.8% on the previous year, which compared poorly with the UK rate of 2.3%. While information and communication (6%), and wholesale and retail (4.4%) saw good growth, the finance and insurance (-1.1%) and public services (-0.1%) sectors suffered declines. As the finance and insurance and public services sectors account for nearly twice as much GVA as the former two (28.5% vs 15%), overall economic performance is impacted more strongly by them.

Scotland's unemployment rate rose above that in the UK (5.8% vs 5.4%) as workforce jobs growth turned marginally negative in Scotland in 2015, compared to overall growth in the UK (1.3%).

ECONOMIC STRUCTURE

Professional and other private services constitute the biggest share of the region's GVA at 22%. It has been by far the strongest sector of the Scottish economy and will continue to see reasonably good growth in both the short term and the long term.

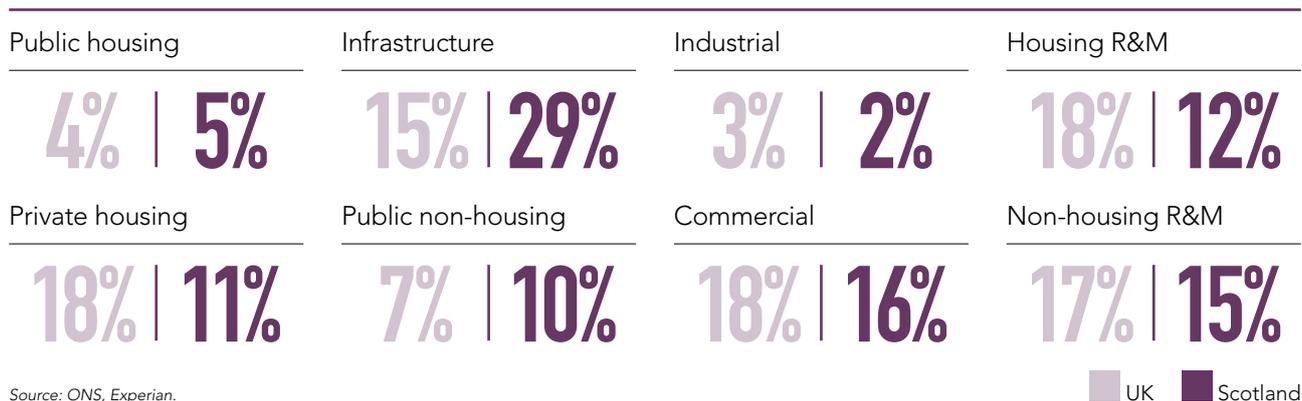
The public sector, which also accounts for 22% of the GVA, higher than the UK average of 18%, will offset some of the gain from professional & private services, with growth remaining subdued for most of the rest of this decade.

Scotland also has a proportionally slightly larger manufacturing sector than the UK as a whole (11% vs 10%), which has suffered in recent years amid weak demand even with a favourable sterling exchange rate for exporters.

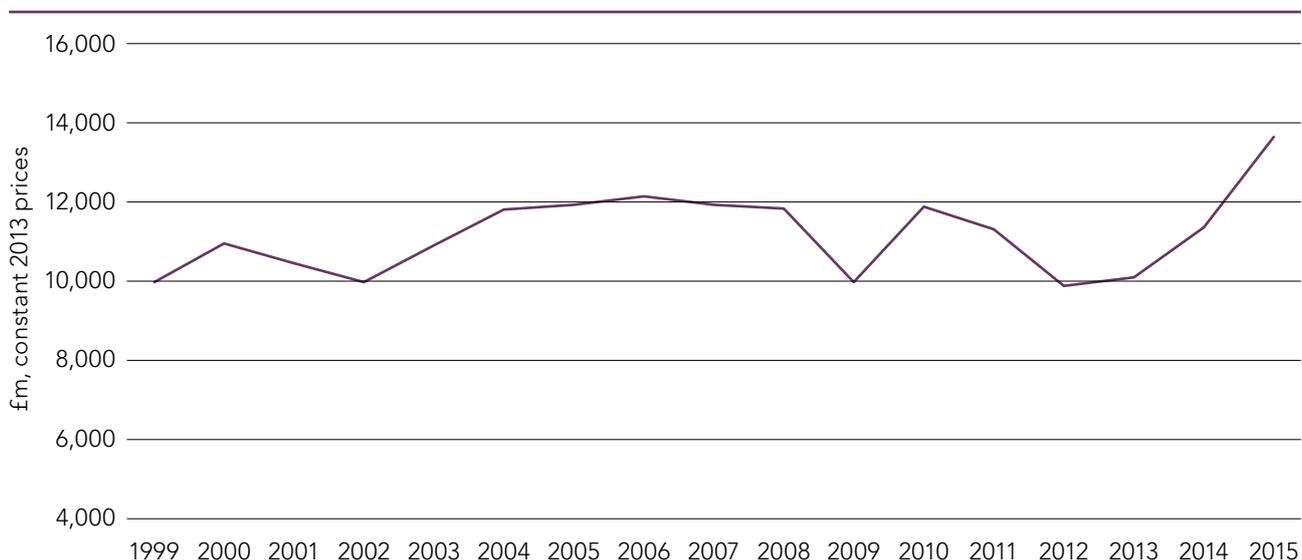
Scotland's economy has a higher exposure to the finance and insurance sector than any other part of the UK except London and it was hit badly by the recession and the failure of RBS. The sector is estimated to have contracted in 2014 and will make a more modest contribution to growth in the future than it did in the pre-recessionary 2000s.



CONSTRUCTION INDUSTRY STRUCTURE 2015 – UK VS SCOTLAND



CONSTRUCTION OUTPUT 1999–2015 – SCOTLAND



ECONOMIC STRUCTURE – SCOTLAND (£ BILLION, 2012 PRICES)

	Actual	Forecast (Annual % change, real terms)					
	2015	2016	2017	2018	2019	2020	2021
Professional & Other Private Services	26.9	2.1	1.2	1.3	1.8	2.1	2.1
Public Services	26.2	0.2	0.2	0.6	1.6	2.3	2.3
Wholesale & Retail	13.4	2.8	0.7	1.1	1.8	2.0	2.1
Manufacturing	12.9	-1.1	-0.4	1.0	1.0	0.8	0.8
Finance & Insurance	8.0	-0.1	0.0	0.1	0.8	1.5	1.8
Total Gross Value Added (GVA)	119.9	1.1	0.7	1.0	1.5	1.8	1.9

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

FORWARD LOOKING ECONOMIC INDICATORS

GVA growth in Scotland in 2016 is estimated to have been around 1.1%, again lower than the UK rate (2.0%). Relatively poor performances in the manufacturing, transport and storage, and finance and insurance sectors were the main contributing factors to weak overall growth.

Scotland's economy is projected to continue to grow more slowly at an annual average increase of 1.4% compared to the UK at 1.8%, over the five years to 2021. The differential is largely due to two factors, Scotland's different sector mix and lower population growth.

As has already been mentioned, Scotland's economy is more reliant on relatively slow growing sectors such as manufacturing and public services and has a proportionally smaller professional and other private services sector than the UK as a whole. Manufacturing output is projected to grow at an annual average rate of just 0.7% in the five years to 2021, and public services by 1.4%, while professional and other private services are expected to expand by 1.7% a year on average. The strongest sectors are predicted to be transport and storage, and information and communications, both with growth rates of 2.0% a year on average; however, they only account for around 8% of total Scottish GVA combined.

Long-term potential growth is undermined by an ageing population, especially in rural areas where the number of people of working age is projected to fall. Population growth in Scotland is expected to lag the UK quite substantially over the next five years, with an annual average rate of 0.3% in Scotland and 0.7% in the UK.

Economic growth across the UK is projected to be slower than predicted a year ago due to increasing global uncertainty, 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.

NEW CONSTRUCTION ORDERS – OVERVIEW

After three years of good growth, new construction orders in Scotland declined in 2015, by over 18% to £6.06bn in current prices. A significant proportion of the expansion in the 2012 to 2014 period was accounted for by infrastructure, but in 2015 new orders in the sector dropped by nearly a third. In fact, falls were seen across most sectors, the only exceptions being public housing, which experienced a 9% rise, and the commercial sector, where they were largely static.

NEW CONSTRUCTION ORDERS – CURRENT SITUATION

In the first three quarters of 2016, the value of new orders in Scotland totalled £5.29bn, 16% up on the corresponding period of 2015. On an annualised basis they reached just under £6.8bn in the third quarter of last year, 12% higher than at the end of 2015. New orders rose strongly in the private housing, public non-housing, industrial and commercial sectors, were largely static in the infrastructure sector, and fell for public housing.

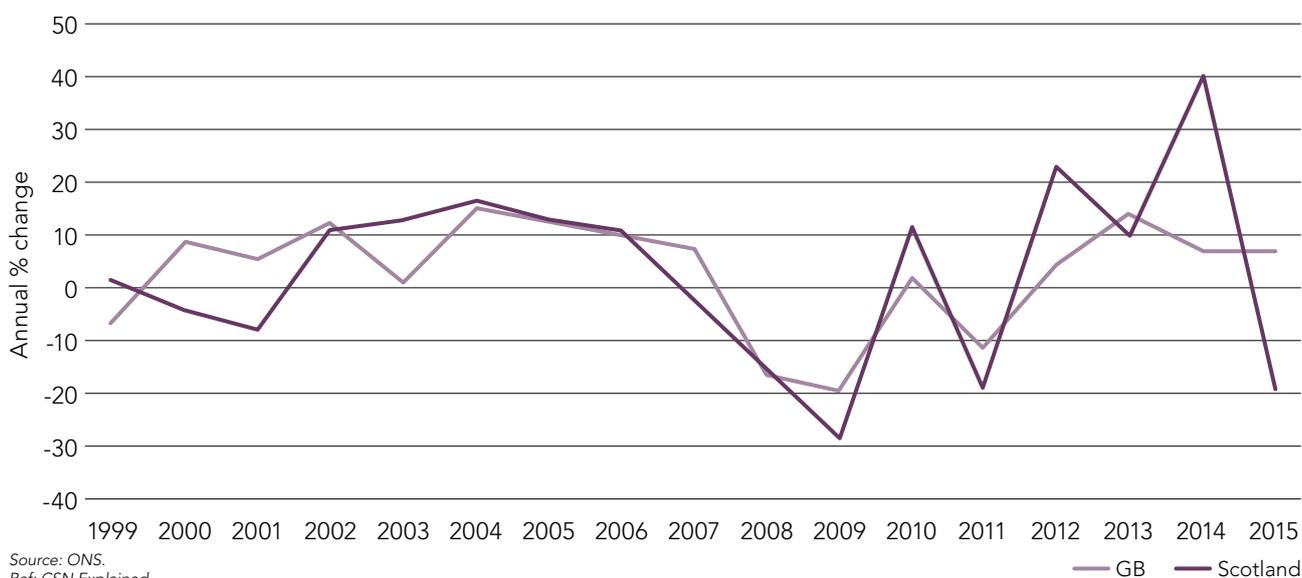


ECONOMIC INDICATORS – SCOTLAND (£ BILLION, CURRENT PRICES – UNLESS OTHERWISE STATED)

	Actual	Forecast (Annual % change, real terms)					
	2015	2016	2017	2018	2019	2020	2021
Real household disposable income (2012 prices)	92.4	2.0	-0.6	0.9	1.1	1.6	1.8
Household spending (2012 prices)	94.7	2.0	0.8	0.3	1.2	1.8	1.9
Working age population (000s and as % of all)	3,419.4	64.0%	63.9%	63.9%	63.9%	64.3%	64.2%
House prices (£)	137,000	0.5	0.4	1.1	2.0	2.4	2.6
LFS unemployment (millions)	0.2	-7.1	7.5	4.1	1.1	0.2	-0.8

Source: ONS, DCLG, Experian.

NEW CONSTRUCTION ORDERS GROWTH 1999-2015 – SCOTLAND VS GB



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

	Actual	Annual % change				
	2015	2011	2012	2013	2014	2015
Public housing	256	-31.7	-13.3	-9.4	-13.3	8.9
Private housing	1055	27.7	-16.6	1.8	31.3	-3.7
Infrastructure	1933	-27.1	138.9	5.7	75.5	-31.8
Public non-housing	1107	-42.5	-6.1	49.5	24.6	-17.8
Industrial	244	-11.1	26.0	2.1	18.1	-45.8
Commercial	1464	-10.2	26.3	4.6	30.9	-0.2
Total new work	6,059	-18.6	24.0	10.2	40.1	-18.5

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.

Total construction output in Scotland reached £10.87bn (current prices) in the first three quarters of 2016, a marginal decline on the same period of 2015. On an annualised basis it reached £14.64bn in the third quarter of last year, about half a percent down on the end of 2015. The main reason for this relative stagnation is a large fall in infrastructure output, which is counteracting growth in most other sectors except the industrial one.

It was almost inevitable that infrastructure output would start to contract sharply from the very high level seen in 2015, as some of the large projects driving recent growth are completed or start to wind down. In nominal terms output in the sector has dropped by 27% in the first three quarters of 2016 compared with the corresponding period of 2015. The decline was expected to have continued into the final quarter of last year, leading to the first fall in total construction output in Scotland since 2012.

Construction output is projected to fall by an annual average of 1.6% over the next two years, primarily as a result of further declines in infrastructure output. There has been very significant investment in major transport projects in Scotland in recent years, such as the Queensferry Crossing, the M8/M73/M74 upgrades, the Borders Railway, the Edinburgh Tram project and the Aberdeen Western Peripheral Route, to name but a few. However, some of these have recently been completed or are due to do so over the next couple of years. While there are large programmes of work coming into the pipeline, such as A9 dualling and Aberdeen to Inverness rail upgrades, these are quite long-term and unlikely to deliver the same levels of output year-on-year as the completing projects. Therefore, infrastructure output is expected to continue to contract sharply by around 11% a year on average in 2017 and 2018.

Public housing output is also expected to subside gently over the next two years even with the Scottish Government's draft capital budget for housing for 2017/18 showing a 1.7% uplift to £693.5m. As these figures are in current prices, taking inflation into account probably represents a slight fall and, according to the Scottish Government, the number of affordable new housing units completed in 2015/16 was 4,418, which is 18% down on the previous financial year and the lowest level since 2007/08.

It looks like the private housing sector had a pretty good year in output terms in 2016 and growth is expected to continue, albeit at the more moderate rate of close to 6% a year on average in 2017 and 2018. One of the largest residential-led developments being taken forward in Scotland is the £800m scheme for a new community at Countesswells in

Aberdeen. The project will include up to 3,000 new homes over the next 15 years. The planning application for the first tranche of 239 units was submitted in April 2016 and work began on the first phase of infrastructure works in May.

According to the September 2016 'hub' pipeline from the Scottish Futures Trust, there were £1.1bn of education, health and community projects in construction, and a further £550m in development. Of those in development, the largest health one is the East Lothian Community Hospital, valued at just under £69m and due to be completed in 2019, while the biggest education one is Madras College in Fife, worth £40m and due to be completed at the end of 2017. While the Scottish Government's draft budget shows a fall in capital expenditure in the health and education sectors from around £624m in 2016/17 to £579m in 2017/18, overall public non-housing output is expected to remain largely stable in the short term, as projects already started continue to deliver output streams.

Given Scotland's geographical position, it is no real surprise that Scotland accounts for a very small share of the logistics property market, taking just a 3% share of UK take-up in the first half of this year – the West Midlands accounted for the lion's share at 42%, according to CBRE. Scotland and Wales combined only took 2% of investment volumes over the same period. This would suggest that overall the industrial construction market is skewed towards factories rather than warehouses in Scotland.

The £100m Macallan distillery project is still ongoing but is due to be completed and open to the public in spring next year. The government confirmed in November that cutting steel for the first of eight Type 26 global combat ships will begin in summer 2017, guaranteeing a 20-year long programme for the Govan shipyard. It is unclear at present how this will affect the proposed upgrade of facilities at the site. Modest growth, put at around 1.2% a year on average, is projected for industrial construction in the short term.

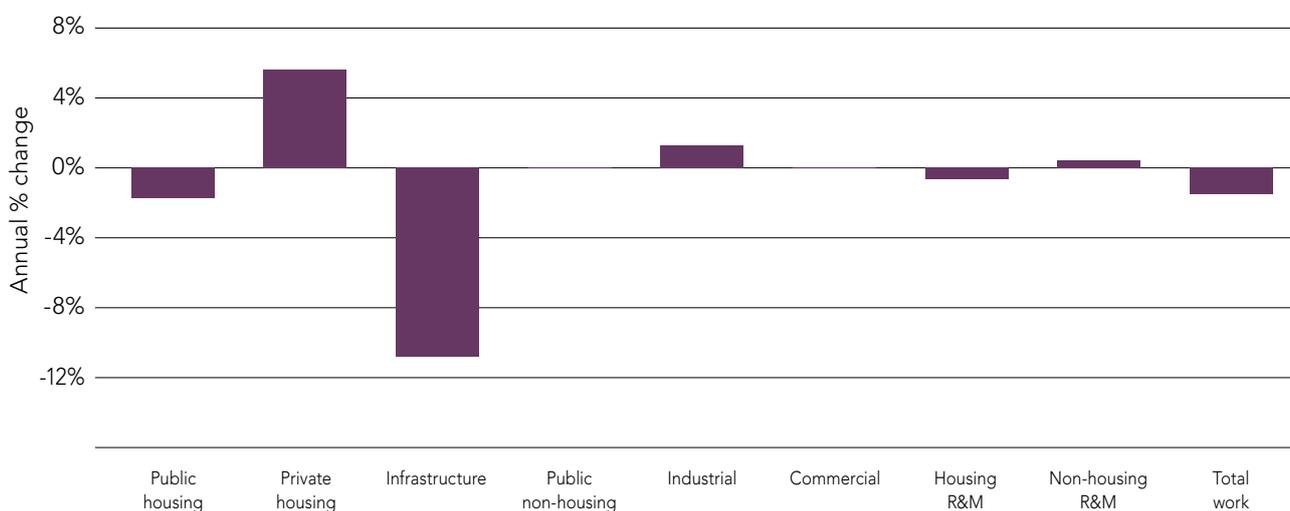
The commercial construction sector is another in which activity is expected to remain fairly static over the next couple of years. As has already been mentioned, the financial services sector was quite badly hit in Scotland during the recession and it has struggled since to show any sustained increase, holding back growth in demand for office space. However, there have been signs of increasing development in recent quarters. Work is now underway on 150,000 square feet of Grade A space in central Glasgow, already pre-let to Morgan Stanley. Main works are expected to be completed towards the end of 2017 with fit-out following. The project is being taken forward by the HFD group, which has an even bigger scheme in the pipeline: 215,000 square feet of new space at 177 Bothwell Street, which gained planning consent last March.

CONSTRUCTION OUTPUT – SCOTLAND (£ MILLION, 2013 PRICES)

	Actual	Forecast annual % change			Annual average
	2015	2016	2017	2018	2017-2018
Public housing	597	-7%	-3%	-1%	-1.8%
Private housing	1,509	15%	7%	5%	5.7%
Infrastructure	3,891	-24%	-14%	-8%	-11.1%
Public non-housing	1,404	14%	4%	-3%	0.0%
Industrial	281	-27%	2%	0%	1.2%
Commercial	2,190	1%	-2%	1%	-0.1%
New work	9,872	-6%	-3%	-2%	-2.4%
Housing R&M	1,654	1%	0%	-2%	-0.7%
Non-housing R&M	2,070	8%	1%	0%	0.6%
Total R&M	3,724	5%	1%	-1%	0.0%
Total work	13,596	-3%	-2%	-1%	-1.6%

Source: Experian.
Ref: CSN Explained.

ANNUAL AVERAGE CONSTRUCTION OUTPUT GROWTH 2017-2018 – SCOTLAND



Source: Experian.
Ref: CSN Explained.

■ ■ Employment forecast to drop to just under 215,000 by 2021. ■ ■

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

Construction output in Scotland is projected to fall at an annual average rate of 0.4% over the five years to 2021, almost entirely due to the expected decline in infrastructure activity. There are programmes of infrastructure work coming into the equation such as the £3bn dualling of the A9 between Perth and Inverness, and the Aberdeen to Inverness rail upgrade. However, with the A9 work not due to be completed until at least 2025 and rail upgrade around 2030, the amount of output they will generate in any one year will be relatively limited compared to the recent levels of infrastructure spend. Having said that, we still see infrastructure output in 2021 exceeding £2bn in 2013 prices, well over 50% above its 2004 to 2013 average before the recent very strong growth period began.

Excluding infrastructure, construction output in Scotland is projected to grow at around 1.0% a year on average over the forecast period. Moderate growth rates of 1.1% and 2.0% a year on average are projected for the public and private housing sectors respectively, reflecting the fact that local authorities in Scotland still contribute to new house building on a scale no longer seen in England, and general housing market strength.

The Scottish Government has recently announced an aspirational target of 50,000 new homes by 2020/21, of which 35,000 should be for social rent. Given that the total provided for social rent over the five years to 2015/16 only reached around 22,500, this would suggest a considerable uplift in public house building over the next five years. These figures also include rehabilitation and conversions, which accounted for 25% of the total in 2015/16. Should this target be reached then housing output, and consequently construction employment, could rise more strongly than the current forecast suggests.

Some growth in public non-housing output is expected over the forecast period, although it is likely to be fairly modest at around 0.3% a year on average. The sector could benefit from the UK government's decision to abandon its fiscal target and perhaps provide more funding for capital projects if some of this heads north of the border.

Scotland is also increasingly making use of the Non-profit Distribution (NPD) funding method to deliver major projects. Four health schemes are currently being taken forward using NPD – the Royal Hospital for Sick Children in Edinburgh, the Dumfries and Galloway Royal Infirmary, the new Scottish National Blood Transfusion Service Centre and the replacement Balfour Hospital in Orkney.

A major project in the education sector going forward is the University of Glasgow's £1bn new build and refurbishment programme over the next decade on the recently purchased 14-acre site of the Western Infirmary.

The industrial and commercial sectors are believed to be most vulnerable to the fall-out from the EU referendum result and impending Brexit, the former because a fall in consumer spending will impact the domestic demand for

manufactured goods despite what exports may or may not do, while the commercial sector could see a decline in investment.

Manufacturing output is projected to grow at a modest 0.7% a year on average, only half the rate of the Scottish economy as a whole (1.4%) over the next five years, and this is unlikely to generate much general demand for new factory space. The transport and storage sector should do better with an annual average growth rate of 2%, thus demand for distribution and logistics space should be stronger. However, as mentioned earlier, this market is estimated to be very small in Scotland.

For these reasons we expect industrial construction to decline to 2021, at an annual average rate of 0.6%.

The commercial construction sector should see some growth, put at just under 1.0% a year on average. Expansion in the sectors that drive demand for commercial premises is expected to be fairly moderate, the information and communications one leading the way with 2.0% a year on average. The largest sector, professional and other private services should see annual average growth of around 1.7%. Take-up of office premises in the two biggest markets north of the border – Edinburgh and Glasgow – was undoubtedly affected by investment uncertainty relating to the referendum result, with its level well down on its five-year average in both centres after an extended period of above average performance. Large projects in the pipeline in the commercial sector seem to be more focused on the retail and leisure areas rather than offices, with a £200m expansion of Union Square in Aberdeen scheduled to start this year, along with a similar sized project at Braehead, and a £400m extension to Buchanan Galleries in Glasgow, due to start in 2019.

The housing R&M sector is also likely to be impacted by the slower economic growth now predicted, especially next year as rising inflation erodes real average earnings growth and puts pressure again on disposable incomes. With unemployment also predicted to increase somewhat it is likely that consumers will hold back expenditure on items such as extensions and conversion while financial uncertainty persists.

BEYOND 2021

As already mentioned, the A9 dualling project and the Aberdeen to Inverness rail upgrades are due to run well into the next decade and in the case of the latter possibly beyond. Also in the pipeline is the upgrade of the road link between Aberdeen and Inverness, the A96, upon which work is scheduled to last until 2030. Also in the pipeline is the upgrading of the Highlands Main Line, which once started is scheduled to last to 2025.

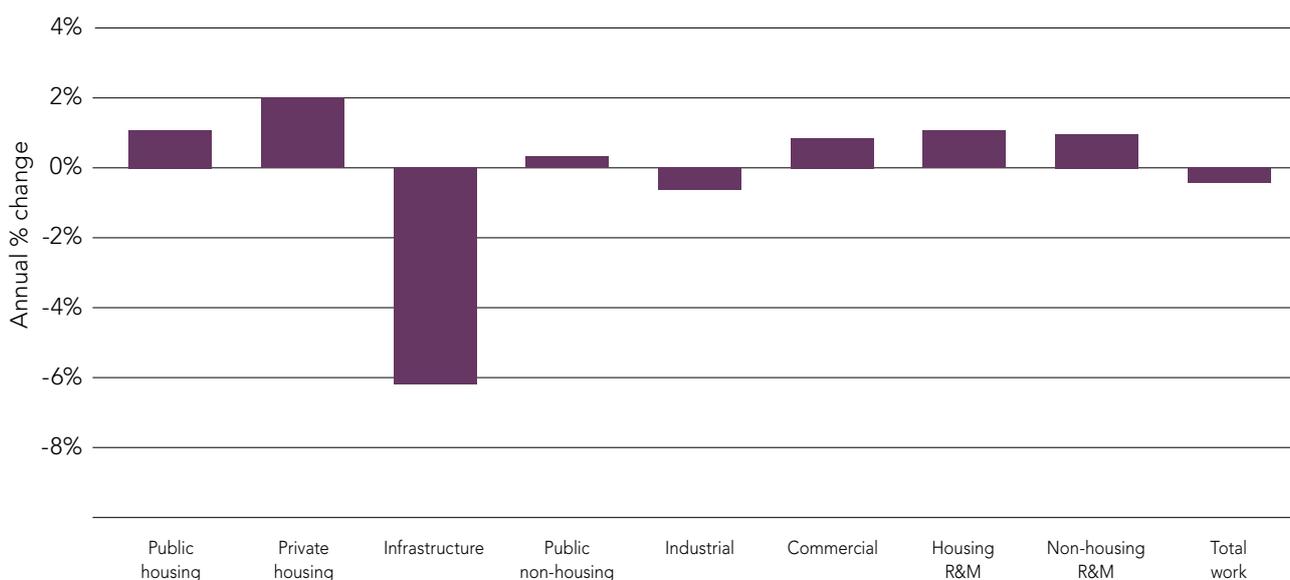
Inevitably any review of possible projects beyond the five-year horizon of the current forecast tends to focus on infrastructure as schemes in this sector tend to be larger than in other sectors and have longer gestation periods.

CONSTRUCTION OUTPUT – SCOTLAND (£ MILLION, 2013 PRICES)

	Estimate	Forecast annual % change					Annual average
	2016	2017	2018	2019	2020	2021	2017-2021
Public housing	555	-3%	-1%	1%	4%	4%	1.1%
Private housing	1,739	7%	5%	1%	3%	-5%	2.0%
Infrastructure	2,962	-14%	-8%	-8%	-2%	1%	-6.3%
Public non-housing	1,607	4%	-3%	-1%	0%	2%	0.3%
Industrial	205	2%	0%	-1%	-2%	-2%	-0.6%
Commercial	2,208	-2%	1%	2%	2%	0%	0.9%
New work	9,275	-3%	-2%	-1%	1%	0%	-1.1%
Housing R&M	1,678	0%	-2%	3%	3%	1%	1.1%
Non-housing R&M	2,237	1%	0%	1%	2%	1%	1.1%
R&M	3,915	1%	-1%	2%	2%	1%	1.1%
Total work	13,190	-2%	-1%	0%	1%	0%	-0.4%

Source: CSN, Experian.
Ref: CSN Explained.

ANNUAL AVERAGE CONSTRUCTION OUTPUT GROWTH 2017-2021 – SCOTLAND



Source: CSN, Experian.
Ref: CSN Explained.

CONSTRUCTION EMPLOYMENT FORECASTS FOR SCOTLAND

TOTAL CONSTRUCTION EMPLOYMENT FORECASTS BY OCCUPATION

The table presents actual construction employment (SICs 41-43, 71.1 and 74.9) in Scotland 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.

Given falls in output, construction employment in Scotland is also expected to decline, at an annual average rate of 0.8% over the forecast period. As usual, there is a lag between the start of the decline in output and employment, with the latter peaking in 2017 and dropping thereafter. Construction employment in 2021 is projected to be around 215,000, nearly 15% below its 2008 peak.

The managerial/supervisory and professional occupations are likely to fare better than the trades, which are expected to take the brunt of the falls. This is in line with the UK profile in terms of which types of employment are expected to fare better than others.

It is interesting to note that while Scotland accounted for 9.9% of total UK construction output in 2015, its share of employment was lower at 8.6%, implying that productivity north of the border was better than the UK average. However, this differential is more likely to be a function of the current structure of the industry in Scotland, with the relatively low labour-intensive infrastructure sector accounting for 29% of output in 2015 against just 15% for the UK as a whole.



TOTAL EMPLOYMENT BY OCCUPATION – SCOTLAND

	Actual	Estimate	Forecast	
	2015	2016	2017	2021
Senior, executive, and business process managers	13,910	13,490	13,560	12,690
Construction project managers	3,430	3,400	3,540	3,580
Other construction process managers	14,330	14,410	14,950	15,160
Non-construction professional, technical, IT, and other office-based staff	28,550	28,970	29,870	29,310
Construction trades supervisors	4,400	3,970	4,280	4,220
Wood trades and interior fit-out	20,910	21,670	21,070	18,380
Bricklayers	6,520	6,410	6,400	5,900
Building envelope specialists	4,270	4,330	4,250	3,770
Painters and decorators	9,830	9,830	9,750	8,720
Plasterers	3,060	3,070	3,050	2,690
Roofers	3,710	3,810	3,860	3,680
Floorers	2,320	2,180	2,160	1,930
Glaziers	2,440	2,540	2,530	2,350
Specialist building operatives nec*	3,780	3,830	3,820	3,450
Scaffolders	2,440	2,410	2,430	2,320
Plant operatives	3,880	3,730	3,890	3,860
Plant mechanics/fitters	4,030	4,090	4,020	3,620
Steel erectors/structural fabrication	1,860	1,890	1,900	1,780
Labourers nec*	11,740	11,660	12,030	11,720
Electrical trades and installation	17,110	17,410	17,370	15,710
Plumbing and HVAC Trades	11,190	11,300	11,420	10,640
Logistics	2,170	2,130	2,200	2,150
Civil engineering operatives nec*	2,880	2,940	2,980	2,850
Non-construction operatives	3,440	3,590	3,670	3,620
Civil engineers	6,850	6,890	7,220	7,500
Other construction professionals and technical staff	23,170	23,200	23,430	22,560
Architects	3,900	3,780	3,920	3,900
Surveyors	5,710	6,280	6,470	6,730
Total (SIC 41-43)	182,200	183,060	185,000	174,100
Total (SIC 41-43, 71.1, 74.9)	221,830	223,210	226,040	214,790

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. The annual recruitment requirement therefore 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.

Despite falling employment, Scotland still has an annual recruitment requirement (ARR) as there will be a level of replacement required for those leaving the industry permanently, while falling output will probably increase net outflows to other parts of the UK where the industry is performing better, as well as into economic sectors within Scotland that can make use of their skills.

Scotland's ARR is projected at 2,340 for the five years to 2021, representing 1.0% of base 2017 employment. Not surprisingly, this is a lower ratio than that for the UK as a whole, of 1.4%, given the weakness in demand. On an absolute level, the largest ARR for construction-specific occupational categories are for civil engineers (350) – who work across the industry, not just in infrastructure – plumbing and HVAC trades (310) and labourers nec., (300). As a share of base 2017 employment the biggest requirements are for logistics personnel (5%), civil engineers (4.8%) and construction trades supervisors (4%).

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 – SCOTLAND

	2017-2021
Senior, executive, and business process managers	–
Construction project managers	70
Other construction process managers	150
Non-construction professional, technical, IT, and other office-based staff	500
Construction trades supervisors	170
Wood trades and interior fit-out	70
Bricklayers	50
Building envelope specialists	–
Painters and decorators	130
Plasterers	–
Roofers	–
Floorers	–
Glaziers	–
Specialist building operatives nec*	–
Scaffolders	<50
Plant operatives	70
Plant mechanics/fitters	–
Steel erectors/structural fabrication	<50
Labourers nec*	300
Electrical trades and installation	–
Plumbing and HVAC Trades	310
Logistics	110
Civil engineering operatives nec*	<50
Civil engineers	350
Other construction professionals and technical staff	–
Architects	–
Surveyors	–
Total (SIC 41-43)	1,990
Total (SIC 41-43, 71.1, 74.9)	2,340

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

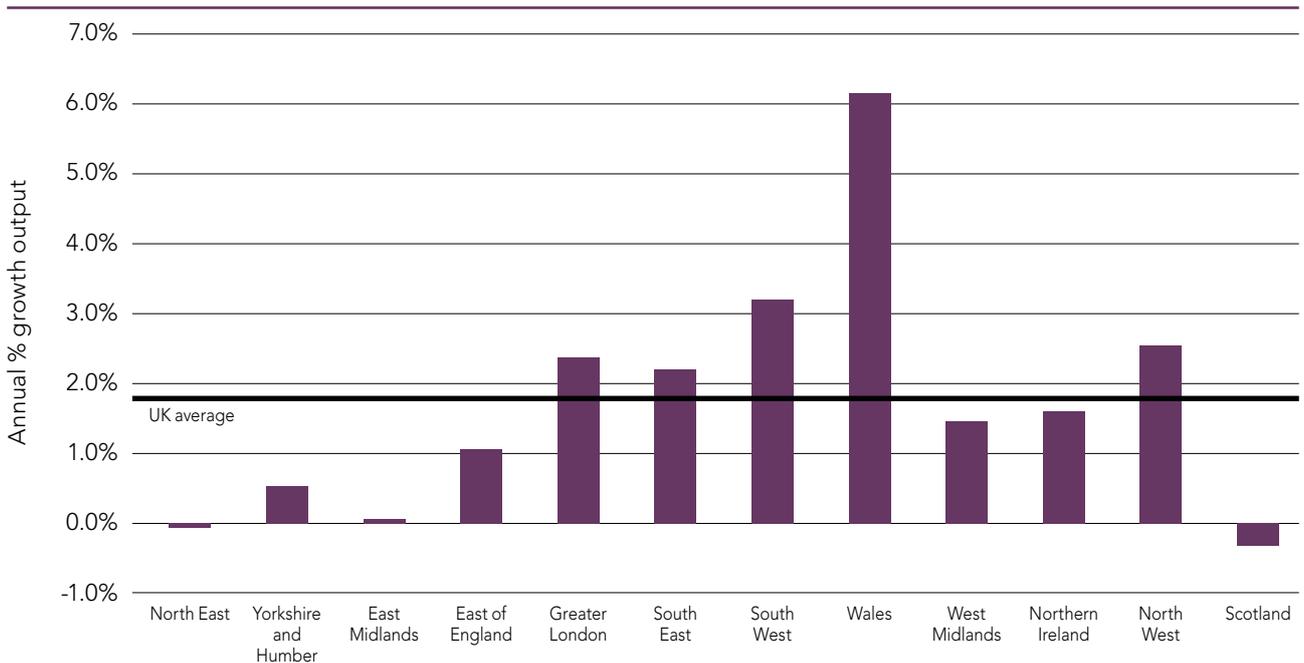
high of 2.7% in Wales to a low of -0.8% in Scotland, against a UK rate of 0.6%.

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.

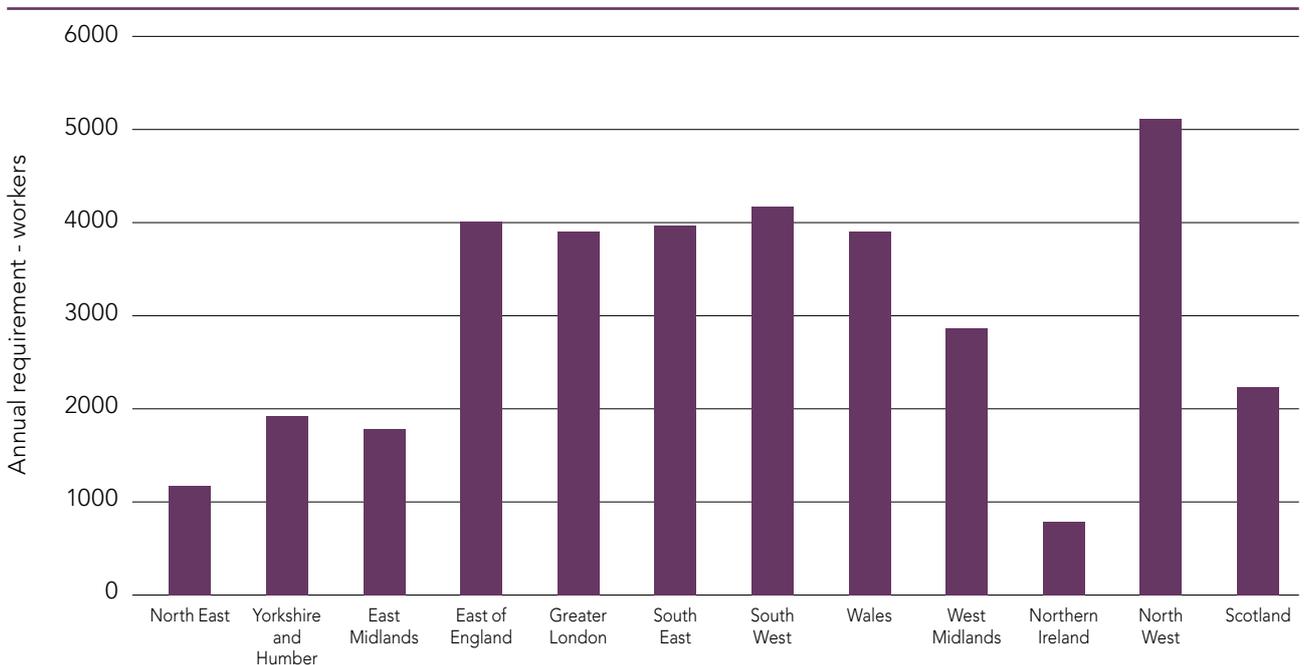
The pattern of annual recruitment requirements can look significantly different to the profile of output and employment, as some regions and devolved nations have historically strong net inflows and some suffer from large net outflows. Thus, Greater London's ARR represents just 0.9% of base 2017 employment, 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



Source: CSN, Experian.
Ref: CSN Explained.

ANNUAL RECRUITMENT REQUIREMENT (ARR) BY REGION 2017-2021



Source: CSN, Experian.

However, still a need to recruit an average of 2,340 new workers per year.

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

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 construction¹

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 work¹

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



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
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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
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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, staggers 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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